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Summary

This dissertation examines public communication in acute chemical, biological, radiological and nuclear (CBRN) incidents. Literature on the subject is considered, extracting general agreements and recommendations, as well as addressing common concerns, issues and myths. This is put into the context of the Norwegian case, where several experts, preparedness agencies and rescue services have been interviewed. The main conclusion is that public communication in acute CBRN incidents in Norway coincides with the literature and guidelines on the subject, with some exemptions. Work can be done to improve public communication with respect to public awareness raising, clear and understandable risk communication, organisational stipulation of communication responsibility, collaboration between responders, experts and governmental departments in reciprocal consultation with the public as well as potential divergences in local areas.

Norsk sammendrag

Denne rapporten tar for seg publikumskommunikasjon i akutte kjemiske, biologiske, radiologiske og kjernefysiske (CBRN) hendelser. Bakgrunnen er basert i en litteraturstudie om temaet, som trekker frem generell enighet og anbefalinger, samt undersøker vanlige problemstillinger og myter. Dette blir satt inn i en norsk kontekst, hvor flere eksperter, beredskapsetater og redningstjenester har blitt intervjuet. Hovedkonklusjonen er at publikumskommunikasjon i akutte CBRN-hendelser i Norge stemmer overens med litteraturen og retningslinjene på området, med noen unntak. Innsats kan gjøres for å forbedre publikumskommunikasjon ved offentlig bevisstgjøring, klar og forståelig risikokommunikasjon, organisatorisk fastsettelse av kommunikasjonsansvar, samarbeid mellom redningstjenester, eksperter og departementer i gjensidig konsultasjon med publikum, i tillegg til lokale avvik.

Contents

Preface

This report was written as an MA dissertation in the programme Terrorism, Security & Society at the Department of War Studies, King's College London. A great part of the work was done as a summer student project at the Norwegian Defence Research Establishment (FFI).

The author would like to thank all of the interviewees for their valuable inputs and for taking the time to participate in the study. Monica Endregard at FFI has been a commendable resource in this project for guidance, professional viewpoints, providing network resources and encouraging the project. Initial guidance from Dr. Brooke Rogers at King's College was essential. Bergit Brattekås and her family deserve thanks for valuable feedback on the dissertation, as well as hosting whilst work was done in Bergen. The rest of the family, flat mates, friends and colleagues have also been deeply appreciated in the process.

Kjersti Brattekås
Kjeller
September 2013

1 Introduction

International focus on chemical, biological, radiological and nuclear (CBRN) incidents has become clearer in recent research projects. Several incidents – deliberate and accidental – as well as increased production and transport of hazardous materials have increased efforts to both prevent and mitigate such incidents. CBRN incidents may cause fatalities, injuries, distress and uncertainty. Impacts '…could be reduced if official agencies successfully informed the public about how to protect themselves and others before, during, and after the incident and about the true nature of any risk.'[1]

According to a UK study, official recommendations about appropriate safety measures are more likely to be followed by a well-prepared and informed public in the event of a CBRN attack. 'Public reactions can be a major determinant of the overall economic, medical, and social impacts of an emergency or disaster' and an'...increased focus on the development of risk communication messages to improve community and individual resilience against a variety of risks, including CBRN terrorism'[2] is recommended.

Handling an acute CBRN incident poses great challenges. Responses involving multiple stakeholders can create confusion and complications for public communication. This dissertation aims to analyse research in the field of public crisis and emergency communication, and to consider the consistency with the Norwegian approach. The field is well developed and there are several general frameworks for constructing messages to the public. However, in a CBRN incident there may be many uncertainties, as well as fear in the public. This dissertation deals with how authorities should inform and communicate with the public for optimal crises preparedness and management. Should general crisis communication be applied differently in CBRN incidents? Is there any general agreement on essential strategies for communication in the literature? What are the expected public reactions to a CBRN incident, and can this be utilised or mitigated by public communication? Do experts, policy makers and responders have a coordinated strategy for public communication in Norway?

In the recent years, after the 22/7 terrorist attack, there has been an increased focus on preparedness in Norway, with CBRN issues considered in several sectors and scenarios. Little research has been done in the area of public communication in relation to CBRN preparedness. This dissertation aims to discuss and compare the Norwegian case of public communication in acute CBRN incidents to existing literature and practice in the field.

The focus of this work will mainly be on public crisis and emergency communication *during* and in the immediate aftermath of an incident – the acute phase – but public communication before and after an incident are also closely linked and not mutually exclusive fields. The often

[1] Rubin et al (2012) p.383
[2] Rogers et al (2013) p.49

overlapping field of risk communication will also be included. In the event of an acute CBRN incident, risk and crisis communication will be strongly connected, as risk behaviour may determine the outcome of an incident. There is continuous research in this field, although knowledge is not centralised, and theoretical frameworks are sometimes not integrative.[3]

From an economic perspective, the impact costs of large CBRN incidents are much higher than the costs of counter-measures.[4] An increasingly industrialised and urbanised world creates conditions for more and worse disasters. Technological advances, incidents in the nuclear and chemical area and new biotechnological and chemical engineering are just some examples of potential hazards. Increasing vulnerabilities stem from more urbanised areas and larger populations, impacts from geographically distant sources and population groups not suited for coping with a disaster.[5] However, it should be noted that it is a potential, not an actuality, and that the risk of worse and more disasters is to an extent counterbalanced by more and better research on disasters and improved security and safety measures.[6]

Such research has been emphasised over the past years, through national and international projects, for instance under the EU FP7 Security Research Programme. The interviews in this work were executed during a summer student project at the Norwegian Defence Research Establishment (FFI), and this dissertation has drawn on several resources from the extensive research done by FFI on the area of CBRN preparedness.

First, the methodology and definitions used in this dissertation are presented. The background and theory for public communication of CBRN incidents follows, as well as a review of the literature on *what* and *how* to communicate. Challenges and myths in the area are then discussed. Examples from the UK and the USA are briefly considered on this basis. The fourth section presents public communication in acute CBRN incidents in Norway, and elaborates on the consistency between the background literature and the data collected in Norway. Conclusions and recommendations follow in the last section.

2 Methodology and Definitions

This dissertation is anchored in literature on CBRN terrorism, emergency, crisis and risk management and communication, and public reactions to risk, terrorism and fear. A state of the literature on the field forms the background for the analysis. Academic research, preparedness plans, recommendations and policy documents covering public communication in the CBRN field form essential foundations for the analysis.

To compare the field in relation to background literature in Norway, policy documents were reviewed and interviews were conducted with several key informants and expert respondents

[3] McComas (2006) p.85
[4] Ramseger et al (2009) p.43
[5] Quarantelli (2000) p.23
[6] ibid p.24

from key authorities for crisis management, public communication and CBRN incidents. Interviews were semi-structured, with a relatively high degree of structure to ensure comparable information. Sixteen interviews were conducted individually in the Oslo and Bergen areas, four of these with two interviewees present. A telephone interview was also conducted.

Themes and questions for the interviews were developed based on the research questions and background literature the dissertation covers. A general list of themes and questions was used for all the interviews, with a possibility to elaborate on the most relevant parts for each interviewee and discuss new themes that could come up. New issues raised in interviews could be developed and discussed in following interviews. On this basis, consistency with – or divergence from – general guidelines and other countries' approaches has been analysed, and some steps for further research and development suggested.

For the purpose of this dissertation, CBRN incidents are defined as follows:

Chemical (C), Biological (B), Radiological (R) or Nuclear (N) incidents encompass all events in which exposure to C, B, or R threat compounds cause great harm to the health of people, animals and/or the environment, as well as incidents in which nuclear materials undergoing fission cause harm through dispersed radioactive fission products or by direct irradiation. CBRN incidents may be caused by an accident or an intentional act.[7]

The CBRN concept comprises the use of nuclear explosives (N) and material that emits ionizing radiation (R), microorganisms and their toxins (B) or chemical substances (C).[8] This dissertation will focus on acute CBRN incidents, and hence less on biological scenarios developing over a longer period of time. 'Event' and 'incident' are used as overlapping terms in some of the considered literature. The term 'incident' is used in this dissertation. On the basis of whether they have or have not occurred, one can separate between CBRN incidents and threats. An attack can be a subcategory of both, depending on whether it is hypothetical or actual.[9]

Some emergency responders in Norway keep a distinction between intended actions under the term CBRN and accidents as 'dangerous substances' or 'hazardous material' (HAZMAT). This distinction is seen as relevant for precautions when handling an incident in order to protect personnel. The distinction is not discussed in depth in this dissertation.

Public communication covers the terms emergency, crisis and risk communication in this context. Public communication is communication before, during and after an incident. To discuss civil preparedness and public communication, the concepts of warnings, risk and threat should be included. Warnings are messages '…transmitted from a source via a channel to a receiver,

[7] Endregard et al (2011) p.9
[8] Oslo University Hospital (2011)
[9] Ramseger et al (2009) p.2

resulting in effects that depend on receivers' characteristics.'[10] Warnings to the public should be an effective delivery of a thoroughly integrated scientific component.[11]

Risk is defined by the internationally recognised framework for risk analysis ISO 31000 '...as the probability that an activity or inaction will lead to an undesirable outcome...risk describes the chance of a hazardous incident occurring'[12] and '[R]isks are often considered as a combination of a hazard and the chance that it happens.'[13] Risk communication should convey information about risks, involve continuing feedback loops between source and receiver and involve sociocultural and psychological factors.

There is mounting public awareness about various risks arising from man-made hazards.[14] Risk analysis assesses potential threats and determines ways to avoid these, while crisis management deals with threats throughout the course of events. A crisis can also be described as a risk manifested,[15]and information needs will change over the life cycle of an incident.[16] 'Emergency communications may counter some of the damaging effects of crises and help individuals and communities return to a normal way of life.'[17]

CBRN threat is a comprehensive term, describing a probable threat from all the substances' properties, including possible toxicity, availability, use and transportation. It includes dangerous situations which can arise intentionally and unintentionally.[18] In the event of a willed threat, it also depends on the actors' intentions and capabilities, as well as availability of agents, effective methods of dispersion, possible consequences and probabilities.[19] 'A threat is a possible danger that could exploit vulnerability, and vulnerability is a weakness that exposes a system to harm.'[20] Throughout the dissertation, several case studies, or 'focus events' are mentioned. '9/11' refers to the September 11 terrorist attacks in the USA in 2001. 'Chernobyl' is the nuclear power plant accident in Ukraine in 1986, whereas 'Fukushima' refers to the 2011 nuclear power plant accident in Japan. '22/7' refers to the terrorist attacks on the Government quarter in Oslo and the shootings at Utoya July 22 in 2011.

The methodology chosen to reflect the Norwegian perspective in this dissertation is exclusively qualitative and based on interviews with professionals working in the area in and around Oslo and Bergen and cannot be generalised to all areas in Norway. The data collected may also reflect some personal views of the interviewees, and are not representative for the entirety of the

[10] Lindell and Perry (2012) p.617
[11] Sorensen (2000) p.119
[12] Swain (2012) p.82
[13] Government Office for Science (GOS) (2009) p.10
[14] Tanaka (1998) p.245
[15] Heath (2006) p.245
[16] Rogers et al (2013) p.54
[17] Wei et al (2010) p.1014
[18] Ramseger et al (2009) p.2
[19] FFI (2008) p.8
[20] Swain (2012) p.82

population or organisations. Nonetheless, the interviews provided valuable insight into the work in the CBRN preparedness area and public communication in Norway.

3 Public Communication in Acute CBRN Incidents

Modern life is increasingly surrounded by hazards, and hence the need for risk communication as a rational step to enhance accurate knowledge of the risks has arisen.[21] Over the past years, the threat of CBRN incidents has come more into focus because of events like Chernobyl, the polonium-210 poisoning of Litvinenko in 2006, Fukushima, 9/11, the radioactive accident in Goiânia, Brazil in 1987, the Bhopal gas disaster in India in 1984, and the Tokyo Subway sarin terrorist attacks in 1995. 'The threat is considered sufficiently real for many countries to have responded with considerable purchases of equipment as a demonstration of capability to satisfy public expectation and dissuade potential aggressors.'[22] In an acute incident, the essential challenge is to inform the public quickly based on uncertain information about the nature of the hazard and the affected area, both to emergency services and the public.

Communication '…about CBRN threats could improve compliance with preferred behaviors through increasing knowledge, reducing anxiety, managing expectations, building trust, and creating familiarity with organizations and emergency response procedures…' [23] This approach recommends increasing knowledge before, during and after a potential incident with measures raising the public's awareness about threats.

Effectively disseminated information about the nature of the threat and recommendations to treatment, detection and transmission can help people reduce their health risks, limit adverse social and psychological effects, maintain trust and confidence and take protective actions as well as reducing the level of disorder, morbidity and mortality.[24] Information and communication can have a great say in the public's reactions and governmental response. An effort that has been well prepared and executed could

…help provide the public and key responder groups with understandable, scientifically accurate information; positively influence the responses of target populations to terrorist-initiated incidents so that people can take appropriate steps to protect themselves; prevent or reduce psychological effects; enable health authorities to be proactive in their communications; build trust and confidence with the public; and reduce morbidity and mortality. In short, "an effective and consistent communications strategy could reduce the impact" of the event and "also diminish the terrorists' success."[25]

[21] Tanaka (1998) p.245
[22] Healy et al (2009) p.119
[23] Rogers et al (2013) pp.56-57
[24] Wray and Jupka (2004) p.214, Fischhoff et al (1993) pp.198-199, Becker (2004) p.205
[25] Becker (2004) p.198

Several stakeholders and different crisis management approaches make the handling of acute CBRN incidents complicated, because a multi-agency response is necessary. Rubin et al performed a literature study with objectives to clarify what information people want in a CBRN incident. They found that CBRN related issues are difficult to communicate because of the public's inability to comprehend information, low baseline knowledge, perceived low likelihood of an attack and that it is more complex to inform about than other risks.[26]

Planning and preparedness have become more structured and customised to CBRN. The wide range of components and stakeholders shows the complexity of the issues, yet consolidates the field further. Coordination can be maximised when organisations have a clear and familiar role in an emergency, know what is to be done and who does it, have clear communication ties to others in the network and maintain flexibility.[27] Communication has technical, cultural, commercial and political barriers, as well as insufficient public attention in the preparation phase. Much of the communication rests on individuals' effort, and a significant challenge is posed by keeping network links if personnel should leave. Formalising these links should be an organisational task.[28]

Developing relevant scenarios and using scenario based exercises for planning and training is appropriate for developing emergency response and communication strategies. 'Relevant scenarios serve as a basis to identify appropriate protection levels and recommendations regarding organisation, procedures, equipment needs and possible shortcomings.'[29] Scenarios are developed for exercises and discussions where emergency responders develop clear lines for responsibilities and communication, as well as practice their roles. In order for the emergency operation to run smoothly through the phases of the emergency, one of the issues is to prepare for ensuring medical treatment for those in need, but try to avoid an overloaded health system by the worried well part of the public. To this end, it is crucial to maintain constant and coordinated communication channels to the affected and surrounding public.[30]

In times of disaster, individuals are information seekers, and it is important to ensure that the population receives and are made aware of alerts and warnings rapidly.[31] Specific local information should also be included. If the information is consistent, accurate, timely and communicated effectively from the government and media, it has the potential to prevent panic and save lives.[32] Information should also be continuous, as it can become a '…valuable "commodity" in resolving (or preventing) the "disaster after the disaster"'[33]and reflect the various stages. Information may also have effects on psychological and social responses to a CBRN

[26] Rubin et al (2012) pp.383-384
[27] Sorensen (2000) p.122
[28] Healy et al (2009) p.129
[29] Endregard et al (2010) p.381
[30] ibid pp.386-387
[31] Kuligowski (2013) p.19
[32] Wray and Jupka (2004) p.214
[33] Boin et al (2001)

incident. The role and responsibilities for leaders span beyond a partial response following an event, also to ensure a programme of research into CBRN consequences.[34]

The project 'Preparedness and Resilience Against CBRN Terrorism using Integrated Concepts and Equipment' (PRACTICE) has the aim to improve the ability to respond to, and recover from a CBRN incident. The objective is to create a European Integrated CBRN Response System through the development of an improved system that is going to provide the EU with a capability to carry out an integrated and coordinated operational reaction following a CBRN crisis.[35] Efforts have been made to create detailed scenario templates. Previous scenarios from projects, as well as historical cases of terrorism and accidents have been considered, and the scenarios are developed on the basis of several previous and ongoing EU projects on international and national levels.

On this basis, a framework for developing a set of reference CBRN scenarios and a detailed scenario template are provided.[36] The template design was developed into a reference set of scenarios covering releases of hazardous CBRN substances. Both accidents and intentional acts are addressed.[37] These scenarios can be used in exercises involving all steps in emergency response, including public communication. Messages to the public can also be formulated and tested on this basis, which has been further developed in Work Package 8 which considers human and societal factors, and is under testing.[38]

In the event of terrorist attacks, these have direct intended and indirect damages, mediated psychologically through the minds of citizens. An analysis of behavioural reactions to the 9/11 attacks in the American population showed that there was increased road travel in order to avoid air travel in the year after 9/11, and it was estimated that this increased the number of road fatalities by 1500 the next year. Dread risks are low-probability, high-impact events affecting many people at the same time. Avoidance behaviour is a common reaction to dread risks.[39] CBRN incidents score high on a dread risk scale,[40] and it is crucial to communicate to the public the facts, risks and possible consequences for their actions.

Information can reduce potential terrorist effects of a weapon.[41] It is particularly important to address issues of insecurity and terrorising effects that spread fear in people's minds. Efforts to reduce a potential death toll would be comparatively easier and less expensive than preventive strategies, and an extended counterterrorism policy can save lives. In order to address this side of the issue, people need to be made aware of the psychological aspect of terrorism – fear. Relevant and factual information should be disseminated to the public, such as information about risk

[34] Wessely (2005) p.1
[35] Endregard et al (2011) p.3
[36] ibid p.9
[37] Endregard et al (2012) pp.5-15
[38] Usher et al (2012)
[39] Gigerenzer (2006) p.347
[40] Boin et al (2001)
[41] Henderson et al (2004) p.224

behaviour and physical reactions to anxiety. By knowing the facts, people can understand and better control immediate emotional reactions.[42]

Misinformation can lead to wrong decisions and create adverse consequences by not addressing misconceptions, create confusion, emphasize irrelevant information, omit key information or erode trust in the communicator. 'By causing undue alarm or complacency, poor communications can have greater public health impact than the risks that they attempt to describe.'[43] This aspect is often incorporated into public communication considerations. It is good to ensure and inform, but not if the information is incomplete or misstated.

Considering what level of preparedness and how much information should be shared with the public is an organisational task, and disseminating constant streams of information about CBRN risks and preparedness can have other problematic features as well. Finding a balance between spreading unnecessary fear and potentially creating a self-fulfilling threat, and make the public more prepared and resilient is a difficult challenge.

3.1 *What* to Communicate

Based on the literature, some general observations on appropriate public communication can be established. These observations can be further customised for the audience in specific areas. Several articles, booklets and plans provide frameworks for general and specific public communication in crises and emergencies. Alerting the public about CBRN incidents depends much on recognition and understanding. A challenge of alerting is that the public has limited education about CBRN, yet they are likely to be the first exposed. Another challenge is the speed, accuracy and appropriateness of information communicated by authorities. 'This is a diffuse challenge, but the history of accidents and terrorist events across C, B, R and N demonstrates its importance'[44]

To reduce outrage, risk messages must reassure, be clear, increase individual knowledge and compliance, provide adequate information, neither under- nor overemphasize risk, increase trust, and simplify complex information. News coverage must thoroughly and precisely present this content from trusted sources, in order to reduce outrage. Audiences also must understand the seriousness of a risk and how their practical responses could mitigate possible Consequences. When individuals perceive a risk as high, they may reject advice presented through public channels, unless the message bolsters enough self-efficacy to adopt the recommended protective behaviour.[45]

Avoiding misconceptions about people's risk perceptions is an important prerequisite. By assuming the wrong knowledge base, mistakes are made. Public threat perceptions are generally considered as probability and consequences, yet several approaches to perceived risk include

[42] Gigerenzer (2006) p.350
[43] Fischhoff et al (1993) pp.198-199
[44] Healy et al (2009) p.126
[45] Swain (2012) p.83

dread and unknown risk factors. Those at risk identify whether there is a threat they need to pay attention to, and the resulting threat belief has been shown to apply in cases where individuals try to maintain their definition of normality in cases involving evidence that it is not.[46] For acute events, the information need has a more urgent potential than risk communication. Frequently updated, consistent information is a must.[47]

A basic approach is to give the public *What-Why-How* information concerning *What* the issues are, *why* the countermeasure is beneficial to implement or an aspect is not threatening, and *how* measures are implemented.[48] Furthermore, the efficiency of public communication in an acute incident will be influenced by characteristics of the sender, the message, the channel and the receiver.[49]

An indicator for effectiveness of emergency communication is the level of compliance to the message. The message must be perceived, understood and remembered. This is likely influenced by design, delivery and characteristics of both sender and recipient.[50] Effective communications about a CBRN incident could improve compliance with recommended behaviours, provided that the information is '…consistent and clear, addresses the knowledge gaps and information needs of the intended audience, and is delivered through a variety of sources…'[51] If certain characteristics are present in a warning message, demographic and environmental factors become less influential in a population response.[52] Personal circumstances and surrounding factors, like location and children matter much for how willing people are to comply with messages.[53]

It is advised that official recommendations offer an explanation for the underlying rationale informing these recommendations in addition to the simple provisions of facts. If the underlying rationale is not communicated, official advice has potential to cause confusion.[54] 'To respond correctly, subjects must first guess the question and then know the answer to it.'[55] The public will take messages more seriously if they confirm that protective measures work rather than just presenting theoretical materials.[56] Cooperation between responders, experts and spokespeople is not automatically incorporated into planning. Messages from different responders should be coordinated because a lack of consistency in messages seems to increase confusion and anxiety.[57]

Wessely proposes that lack of information promotes anxiety, whilst knowledge promotes coping. In addition to practical assistance, he holds that people need communication most of all; both

[46] Lindell and Perry (2012) pp.619-621
[47] Rubin et al (2012) p.391
[48] Tønnessen (2002) p.74
[49] ibid p.79
[50] Husband and Hellier (2011) p.18
[51] Rogers et al (2013) p.56
[52] Kuligowski (2013) p.10
[53] Rogers et al (2013) p.56
[54] ibid p.53
[55] Fischhoff et al (1993) p.192
[56] Becker (2004) p.204
[57] Rogers et al (2013) p.55

accurate factual information from authorities and emotional communication from individual social networks. 'Anything that can be done to maintain these will foster social resilience, reduce panic and protect mental health.'[58]

Sorensen suggests five specific topics to include in a message: the nature, location, guidance, time and source of the hazard or risk. It is important that the message is specific, consistent, accurate, certain, and clear.[59] Henderson suggests information should be full, complete and clarifying, disseminated in a fact-based, calm and authoritative manner with simple and comprehensible language.[60] For leadership in emergency response communication, the implications are to convey full disclosure of information, be honest about unknowns and insecurities, provide the public with action steps, and convey dedication and caring. '[A]n active, engaged leadership with daily media presence can do a great deal to provide direction and simultaneously inspire public confidence.'[61]

Wray and Jupka concluded that message materials should answer some key questions concerning the nature of the threat, suggest protective actions, customised action steps, understand the steps suggested and develop effective dissemination plans. Action steps give a sense of control, whilst a clear sender with detailed information creates credibility. It is advised to level with the public with full disclosure of any information about an event. The public will turn to a variety of information sources in an emergency, and a dissemination plan should be in place to ensure that consistent message material is widely available through multiple sources if an incident occurs. 'Such a plan requires joint effort among private, non-profit, and government agencies at local, state, and national levels to assure efficient provision of critical warning information to responders and public audiences.'[62]

When relevant information has been selected, communicators must present it in a comprehensible way, based on existing conceptual understanding and mental models of the public.[63] A mental model is '...an internal conception for how something works in the real world'.[64] Messages should be tailored accordingly to correct serious misunderstandings and resonate with current conceptions, which in turn may help the public better understand the recommended protective actions. Once an incident has occurred, people need to understand how likely it is that they are affected, and information about protection efficacy is recommended. On the basis of Protection Motivation Theory (PMT), it seems to apply that if protective actions seem effective to the public, is low cost/risk and can be performed, they are likely to comply.[65]

[58] Wessely (2005) p.4
[59] Sorensen (2000) p.121
[60] Henderson et al (2004) p.227
[61] Wray et al (2006) pp.71-72
[62] Wray and Jupka (2004) pp.213-214
[63] Fischhoff et al (1993) p.198, Rubin et al (2012) p.391
[64] Liu et al (2008)
[65] Rubin et al (2012) p.391

It is proposed by communication researchers to use a mental models approach for designing risk messages building on existing lay knowledge and beliefs.[66] Models like the Protective Action Decision Model (PADM) can be applied. This is a multistage model based on people's responses to environmental hazards and disasters. The model identifies threat perceptions, protective action perceptions and stakeholder perceptions, forming the basis for response to a threat. PADM also '…identifies a series of information processing stages relevant to household adoption of protective actions and—for each stage—the typical activity performed, question asked, and outcome.'[67]

The Common Sense Model (CSM) utilises behavioural theory to understand psychological processes explaining the relationship between information and outcomes. It is '…a health behavior theory that brings together the concepts of information processing, mental models, and health behavior.'[68] Research based on the CSM model provided insight into outcomes influenced by information, experience and personal understanding. It concludes that external information has substantial influence on protective behaviour, and underscores the importance of providing specific and general information addressing causes on both personal and environmental levels.[69]

In sum, it is important to provide open, honest, clear and understandable advice, and communication can be based on scenarios. Communication can reduce terrorism effects, misinformation must be addressed and avoided, the underlying rationale must be clear and social networks should be encouraged to communicate. Action steps should be provided, and information adjusted to the mental models of the public can be based on the PMT, PADM or CSM models.

There are, however, insecurities, as '[s]imple reassurance may not be an effective way to increase compliance with behavioural recommendations'[70] and '…despite extensive theorizing and data collection, it still is not entirely clear what motivates people to take protective action.'[71] A crisis is an opportunity to communicate strategic information to the public. In the aftermath of a crisis, while the media is still interested, a momentum for informing the public is created.[72]

3.2 *How* to Communicate

In 2000, Sorensen suggested that '…technology improvements have increased the potential speed of warning dissemination and provided greater system reliability.'[73] This has been further developed, and the choice of communication sources is now virtually infinite.[74] Enhanced

[66] Severtson et al (2006) p.353
[67] Lindell and Perry (2012) pp.616-624
[68] Severtson et al (2006) pp.353-354
[69] ibid p.366
[70] Rogers et al (2013) p.56
[71] Lindell and Perry (2012) p.625
[72] Heath (2006) p.246
[73] Sorensen (2000) p.120
[74] Rød et al (2012) p.95

informational capabilities form an important part of preparedness efforts,[75]and many frameworks utilising new technology have been suggested.

Rubin et al found that information sources for people were mainly focused on mass media, the internet, social networks (friends, neighbours) and any introduced emergency communication mechanisms. It is common to use multiple sources to check for consistency and further details.[76] Technologies such as SMS, applications for smart phones and web based solutions are vital to immediate public information. Those who do not have access to electronic devices often have links to people who do.[77] Message content and presentation must be developed.

A recommendation is to identify, test and prepare multiple communication channels with appropriate information. Furthermore, the information should be available to all population segments, and adjusted to multiple languages.[78] In developing health risk messages, several means may be used to aid the public understanding, such as traditional fact sheets, narratives and visuals.[79] Husband and Hellier provide an extensive framework based on warning perception, advertising, learning processes and risk perception. Based on their findings, it is concluded that effective warning information includes a signal word to attract attention or indicate hazard, explanation of the consequences of being exposed and clear instructions for avoidance. Wording is important for understanding, trust and compliance, and negative statements recommending avoidance are more effective than messages recommending engagement in a given behaviour. Pictorials, colour coding as well as simultaneous audio dissemination are deemed effective and clear. Mental models are utilised here to form frameworks for messaging.[80]

The most influential channels for assessments of personal health risks are both interpersonal channels of communication and mass media. Interpersonal networks are preferred sources, but in times of heightened media coverage, such as an emergency, mass media can influence risk perceptions more. Media can be a source of unintentional risk messages, but can also be used intentionally for these purposes. The previously mentioned mental models method mapping differing understandings of risk between lay people and experts through interviews helps communicators select content for risk communication materials.[81]

In an early consideration of the internet as an informational well, Hobbs et al predicted correctly that the internet could function as an additional information source complementing traditional media for a worried public. It can be used for in-depth information and overviews, and has the possibility to be more specific to public needs, as a reader can select whether and which information to investigate in depth. It is accessible for the public, and can function as a backup for

[75] Henderson et al (2004) p.228
[76] Rubin et al (2012) pp.384-388
[77] Spencer et al (2011) p.110
[78] Henderson et al (2004) p.228
[79] McComas (2006) p.82
[80] Husband and Hellier (2011) pp.2-3
[81] McComas (2006) pp.79-81

the credibility of traditional media.[82] The internet can also have the opposite function, and can be used contradictive or speculative. When everyone has a voice, speculation is hard to avoid. A challenge is that actors can use the internet to spread false information that in turn increases the extent of the crisis. Some cautions are suggested, such as reliability of online information and the quality of access. The impact of web-based information on behaviour is uncertain. 'There is a need to ensure quality information and guard against false assertions by opportunists looking to capitalize on public fear.'[83]

Access and use of social media is increasingly common, and there is enormous potential to reach out to people and open a two way communication channel through social media. However, there are several research gaps in how social media can be utilised in a disaster,[84]and these gaps should be addressed. 'Better local management and decision making about the warning process are more critical than promoting more advanced technologies, although both would help.'[85]
Summarised, there are many technical opportunities, messages should appeal to multiple senses, the media is influential and speculation should be addressed. As the *what* and *how* are relatively consistent, some challenges must be considered.

3.3 The Role of Experts

The complex nature of incidents involving CBRN makes expert advice essential. In an acute incident, the previously mentioned dread risk may be present in the public, and it is important to communicate expertise in an understandable way. [86] Bringing in the experts in an early stage for factual information is, however, essential.

Gaps between the mental models of security experts and non-experts that could lead to ineffective and poor risk communication have been pointed out in several cases. The different mental models of the experts and non-experts can be seen as a consequence of two different levels of knowledge about the subject matter. This difference can decrease the efficacy of public communication, as this is typically messages formulated by security experts to warn non-experts against threats. It is proposed that communication methods should be designed with regards to each security risk based on non-experts' mental models.[87]

Understanding people's risk perception can often be as important as understanding the risk itself. Different basic values and assumptions can be as important as interpretations of facts. 'Communication which sets out to change or influence beliefs without recognising the rational basis of those beliefs, or tries to divert attention away from people's real concerns, will almost certainly fail. A 'we know best' attitude is often a formula for disaster.'[88]

[82] Hobbs et al (2004) pp.70-72
[83] Hobbs et al (2004) pp.72-74
[84] Fraustino et al (2012)
[85] Sorensen (2000) pp.123-124
[86] Lindell and Perry (2012) p.619
[87] Liu et al (2008)
[88] Cabinet Office (2011) p.14

However, prioritising the social context may involve uncertainties. It is important to bear in mind that '[i]n a crisis, official estimates of risk often are value laden, politically and economically influenced, or based on invalid assumptions.'[89] Thus considering giving the public appropriately adjusted expert advice and understandable facts should be prioritised. It is of great importance to ensure good cooperation between experts, responders and the public, as well as bringing in the experts quickly in an acute CBRN incident.

3.4 Effects of Public Information

'…projecting an unsubstantiated CBRN terrorism threat against our society's vulnerabilities may in the end become self-fulfilling.'90 If the focus on CBRN threats is heavily increased, there are worries that excessive information will make the public inactive in an event. This can happen by causing much attention before an actual event, or distributing information about an event that does not turn out as hazardous as expected. There is no wide agreement in research about the cry wolf syndrome, but ways are suggested to avoid inaction in disasters. To ensure continuous credibility of a warning system when a rapid-onset disaster occurs, feedback messages can be provided about a predicted event not occurring and why if there was a false alert.91

Although an elevated level of public education about CBRN is mainly considered appropriate in the literature, it could have the potential to distort the public perception about the threat, increasing and demanding social resources and could as well raise the probability of an attack.92 It is therefore important to carefully balance risk information, as it can be perceived as fear mongering or encouraging an attack by expecting it.

Addressing the cause of anxiety is pertinent. Reassuring fears out of proportion to a threat can increase anxieties instead of reducing them. If the public is continuously reassured about increasingly implausible threats, they can become more anxious and convinced the threat is near approaching. 'Reassurance must be accurate and specific, or it may be counterproductive.'93 It may not be appropriate to inform extensively about vague CBRN related threats or risks, but in an incident or a near miss, it is crucial to inform people. There is an information seeking tendency in people, and it is beneficial to guide their response.

3.5 The Trust Element

'Tell the truth – don't manage the truth. The key is trust.'[94] Trust and involvement of the public is vital in communicating risks and emergency information.[95] A risk-averse approach avoiding full and complete disclosure to minimise potential political negative consequences is highly discouraged. The choice of strategies for effective communication and the possibility for the

[89] Swain (2012) p.82
[90] Ranstorp.and Normark (2009) p.200
[91] Kuligowski (2013) p.14
[92] Healy et al (2009) p.122
[93] Wessely (2005) pp.2-3
[94] Barry in Spencer et al (2011) p.110
[95] Government Office for Science (GOS) (2011) p.25

public to participate in debating ethically complex dimensions of an incident are significant for the issue of trust.[96] 'Honesty and clarity in government communication creates public trust. Public trust is a requirement for reasonable, orderly response to a traumatic incident such as a CBRN event.'[97]

It is of great importance who delivers a message. Trustworthy, clear and consistent information is pertinent in creating adherence for emergency communication.[98] It is recommended to ensure that consistent messages are given by trusted spokespeople via widely accessible sources from multiple organisations.[99] People are more willing to comply the more they trust government officials and orders.[100]

Reciprocal trust is of great significance. '…people are more resilient than we give them credit for, and our leaders can trust their populations more than they sometimes seem to do.'[101] Research has shown that in a crisis, the public have a strong desire for honest and accurate information, even if such information is worrisome.[102] Honesty is a way to create trust, and it is recommended to exhibit candour and openness as facts will emerge regardless. Responsible authorities in a crisis situation should be accessible, report 24/7 and meet the needs of the media. Authorities must '[b]e committed and able to deliver on the promise to be the first and best source of information…We have passed beyond an era of ''no comment.'''[103] Inaccurate, incomplete or sensational coverage can spread misunderstandings to the public. Research has shown that where officials withheld information in fear of widespread panic, the lack of information alarmed the public because of conflicting, shallow coverage in lack of validation.[104]

Familiarity, honesty, consistency and faith determine trust in a source. Emergency messages must clearly express the authorities' concern for people's health and safety. Messages should be presented by a spokesperson with high credibility, and include answers to anticipated questions from the public. In regards to media contact, journalists and authorities need to build trust amongst them. Journalists need to provide fact based context to uncertainties, address speculation, explain risks in a balanced manner, clarify contradictions and offer practical advice. [105]
On the individual level, the most important emotional support for a person comes from their own social networks. Practical support is the most crucial concern for the government handling of a crisis, while people seek their informal networks to talk. '…one of the principal tasks of the authorities after a CBRN incident is to facilitate people talking to each other, and not replace it with ersatz ''friends''.'[106] Encouraging people to talk can also create trust.

[96] Glass and Scoch-Spana (2002) p.221
[97] Spencer et al (2011) p.113
[98] McComas (2006), Rogers et al (2013) p.56
[99] Rubin et al (2012) pp.393-394
[100] Rød et al (2012) p.89
[101] Wessely (2005) p.2
[102] Fischhoff et al (2003) p.257
[103] Heath (2006) pp.246-248
[104] Swain (2012) p.81
[105] ibid p.91
[106] Wessely (2005) pp.3-4

3.6 A Panic Prone Public?

Behind many reservations from sharing complete information in an emergency lay the purposes of avoiding fear and panic. As emphasised, trust is an important factor in communication and compliance, and full disclosure of information is a leading determinant of trust. Extensive research has concluded that panic is a very rare condition among the public. Before withholding information in order to avoid panic, it should be considered that '[r]umour, myth and panic flourish in information vacuums.'[107] Sensationalism in the media can also hamper government response in guiding the public after an incident.[108]

On the other hand, it is a widespread belief amongst the public that authorities will withhold full information to prevent panic. There is a public demand for full information, and nondisclosure to prevent panic is unacceptable.[109] Although panic is extremely rare

…the term continues to be widely used and persists despite the lack of empirical evidence that it happens on any scale; it also continues as noted by students of popular culture to be the staple of disaster movies and novels… perhaps the idea of the possibility of panic is necessary in society to highlight the fact that human beings in contrast react remarkably well in most stressful situations and that the social bonds between and among people usually holds. Supporting this view, as disaster researchers have noted, the mass media in reporting the absence of panic are behaving as if the normal expectation is that panic will occur.[110]

Keeping faith in public authorities is essential in disasters, and people rarely panic unless they have lost faith in these.[111] Conditions often described and analysed as panic can be characterised and explained by other terms.[112] Panic is more often mentioned in terrorist attacks than accidents, as there is greater potential for fear and uncertainty.

Although public panic is absent, heightened anxiety will almost certainly be generated by the deliberate use of CBRN, further emphasised by media reporting. This substantial psychological anxiety can create physical symptoms in the aftermath of a CBRN incident.[113] People would seek medical assistance due to anxiety, general health concerns or uncertainty over perceived symptoms.[114] The 'worried well' issue is an action pattern often perceived to have a connection to panic. If there are uncertainties about health after a CBRN incident, however, seeking medical aid even without exposure is a perfectly rational solution for most. To avoid overloading health services, public communication can help. Patients and their kin should be advised about normal

[107] ibid p.4
[108] Spencer et al (2011) p.110
[109] Henderson et al(2004) p.225
[110] Quarantelli (2001) p.9
[111] Fischhoff et al (2003) p.257
[112] Quarantelli (2001) p.10
[113] Sheppard et al (2006) p.228
[114] Wessely (2005) p.4

responses to abnormal situations, and what symptoms suggest the onset of more serious disorders. When patients are told what to expect, they may utilise health services more appropriately.[115]

Sorensen dispels several myths that many officials hold. The public rarely gets too much emergency information after an event, so 'information overloads' are only a concern in initial messaging following an incident. Concern exists for creating the described *cry-wolf syndrome* by issuing false alarms, even though the *cry-wolf* effect is rare if the basis for the false alarm is understood. One spokesperson is not a sufficient source of information, compliance with the first warning is rare, and people will not follow instructions unless they are based on 'common sense'.[116]

Sheppard et al concluded after considering several cases of terrorist attacks and incidents involving CBRN that the public's response can be divided into two: immediate and short to medium term. The public is fairly resilient, calm and rational in the immediate aftermath, but behaviours and attitudes can change in accordance with risk perceptions in the following days and weeks.[117] Wessely holds that longer term management of an acute crisis could be easier if the authorities demonstrate openness, respond fairly to those affected, try to maintain a register of exposed people and have a programme of sensible research in place early on. Wessely's '…prediction is that after a CBRN attack the acute effects will be less than we fear, and the long-term effects more insidious and difficult to manage that[sic] we imagine.'[118]

Glass and Scoch-Spana emphasise the potential for using the public as a cooperating participant in response efforts. The tendency to prioritise a professionalised response is dominant in most approaches. Recommendations are to treat the public as a capable ally, enlist civic organisations, anticipate home-based patient care, invest in public outreach and communication strategies and customise planning to the values and priorities of an affected population. Capitalising on the effectiveness and resourcefulness of non-professionals is recommended based on panic being rare and preventable, and they are rather considered as helpful and cooperative. It is important to develop strategies that enlist the public as capable partners.[119]

Scoch-Spana et al further develops the idea of catalysing the civic infrastructure for extreme health events by elaborating on how response system overloads can be avoided with more civic engagement. Community ties can be strengthened by raising awareness, and it is essential that civic organisations, the populations and responders are familiar with each other before an incident occurs.[120] 'During the crisis period, the civic infrastructure can function as a multifrequency crisis communication network, provide support to professional responders, and enable more community members to respond rather than be victimized.'[121] Spencer et al point out, consistent with other

[115] Hall et al (2006) p.246
[116] Sorensen (2000) p.121
[117] Sheppard et al (2006) p.238
[118] Wessely (2005) p.5
[119] Glass and Scoch-Spana (2002) p.222
[120] Scoch-Spana et al (2007) pp.9-11
[121] ibid p.22

findings, that the positive, responsive public behaviour following a CBRN incident can also lead to a response with too much alertness. This can create false alarms over innocent substances or an overloaded health system from a worried public.[122] The public should be alert, but also properly informed.

Research shows that panic is rare, even in extreme events. Expecting panic reactions after a CBRN incident and developing communication principles and withholding information on this prediction can have negative effects.

3.7 Pre-Incident Messages

For optimal effectiveness of communication, it is useful to make decisions about when to deliver the information. This can be done before (pre-incident), during (incident) or after (post-incident).[123] The 'Pre-event Project' had a strategy to anticipate scenarios and develop materials before an event occurs to stay ahead of demand for information. Reciprocal communication between authorities and media can be used to clarify the views of people and how they perceive information from authorities. By testing messages and spot potential errors, identified problems can then be corrected to make messages and fact sheets more responsive and effective.[124] Heath argues that best practices call for pre, incident, and post-crisis communication. Pre-incident messages are part of a holistic approach involving communication about risk, appropriate responses and expressing involvement and responsibility.[125]

Messages developed and kept on the ready before incidents enables almost immediate release of vital information. In order for such messages to be effective one must know the views, perceptions and needs related to CBRN among the audience.[126] Messages taking into account research into public response to emergencies can then be designed, tested and refined to meet the information needs for CBRN incidents.[127] Pre-incident coverage with stories about the preparedness could also help the audience anticipate scenarios, avoid exposure, familiarise themselves with concepts, and address misconceptions and speculation.[128]

Pre-incident messages will not substitute further crisis communication, but be used as a supplement. Leaflet interventions in the UK are for example designed to '…accompany, not replace, messaging that addresses the need for real-time information about an ongoing incident.'[129] To develop pre-incident messages, one could apply a framework like the PADM-model, which can be utilised and customised for many different contexts.[130]

[122] Spencer et al (2011) p.103
[123] Rogers et al (2013) pp.56-57
[124] Vanderford (2004) p.194
[125] Heath (2006) p.245
[126] Becker (2004) p.199
[127] Rogers et al (2013) pp.49-50
[128] Swain (2012) p.91
[129] Rogers et al (2013) p.56
[130] Kuligowski (2013) p.2

Through PRACTICE, scenarios and public communication strategies are currently tested on populations in the EU. A model has been developed involving mental models, influencing factors and responses in a multidirectional resilience matrix to test the publics' vulnerability. This model is currently being tested, and has the potential to guide further work on developing public communication for a CBRN incident.[131]
The public can be a potential partner in meeting the challenges following a CBRN incident if they are informed and understand their role. There is some agreement in the literature about pre-incident messages being a suitable strategy, yet this must be deemed appropriate on a practical and political level in order to function, and balanced pertaining to risk assessments.

3.8 National Approaches to Public Communication in CBRN incidents

In this section, policy documents and academic studies from the UK and the USA are briefly discussed for an overlook of general national approaches to public communication in CBRN incidents. The examples mentioned are by no means exhaustive, and are meant to serve as examples rather than a comparative basis.

3.8.1 The UK

In the UK, there is a general response for CBRN incidents, as well as a particular framework for CBRN terrorism prevention. There is a command system across all of the emergency services reflecting operational, tactical and strategic response in a multi-agency command.[132] Civil emergencies in the UK are best managed by local emergency responders and planners on a local level.[133] Preparedness is viewed in a broader spectrum of resilience, which is considered a constant state integrating preparedness into normality. There is access to several websites on different levels, as well as local resilience forums.[134]

According to risk assessments in the UK, CBRN related accidents and attacks are included in priority risks.[135] The Government's counter-terrorism strategy, CONTEST, aims to stop terrorists gaining access to expertise and materials, as well as preparing for the consequences should terrorists succeed.[136] Comprehensive plans have been developed under CONTEST, including training for personnel in case of incidents involving CBR weapons, to ensure an effective response for rescue efforts and impact management.[137]

The UK has carried out a national CBRN recovery exercise, involving national and local government and the emergency services, which helped identify issues that might arise if there was

[131] Usher et al (2012)
[132] Healy et al (2009) p.127
[133] Cabinet Office (2012) p.4
[134] Spencer et al (2011) p.109
[135] HM Government (2010a) p.27
[136] Cabinet Office (2012) p.6
[137] ibid p.40

an actual attack. The UK also has major involvement in the development of an EU CBRN Action Plan which aims to support the efforts of EU states to counter CBRN terrorism.[138]

Efforts are made to improve the communication plans from the UK Resilience Capabilities Programme to minimise public risk.[139] A framework with detailed guidelines for risk communication is provided. Because of more complex and uncertain risks in a technological and interconnected society, it aims to prevent crises, make decisions about risk management, empower and reassure the public by a two way communication process and build trust in the Government. Open communication with the public is favoured to create trust and awareness, as well as closing communication gaps between experts and audience.[140]

In the Blackett Review, high impact - low probability risks were discussed, concluding with eleven recommendations for the Cabinet and Government. Among these recommendations are use of more external experts, balancing the risks and resource use, enhance warning systems and detect signs earlier, use probabilistic analysis and develop communication strategies with experts. The National Risk Assessment (NRA), which is restricted, and the National Risk Register (NRR), which is open to the public, summarise and assess relevant risk scenarios in the UK. Policy makers are encouraged to expand the boundaries of their mental models by imagining a broader range of high impact low probability risks.[141] Based on the NRA, it has been deemed appropriate to use resources on preparing the public and increasing the level of knowledge about CBRN.

Over the last years, the risk communications in some areas, like CBRN, has been downscaled. This is based on the assumption that there may be good reasons in some cases not to address all communication needs. It may not be possible to inform about the nature of a terrorist threat without increasing the risk for the public. The role of the media is particularly emphasised as it can shape the public view of risk. However, media is diverse and the public have ambivalent views of some media channels. Nonetheless, it is argued strongly for a policy of cooperation with the media, to understand and develop trusted relationships with them.[142]

The six guiding principles for a communication strategy are sound management systems, robustness, speed, messages, images and intelligence. A seven step procedure to design, put into effect, maintain and evaluate a communication strategy is suggested. One can also formulate a SORCO (Single Over-riding Communication Objective), specifying the main elements of the strategy simply.[143] A list of principles communication strategies should be based on includes honesty and openness, up to date and accurate factual information, local or regional detail, addressing needs of different audiences, communicate internally and externally, make use of available technologies, inclusivity and promptness. Message communicators should be selected based on their communication skills and empathy with the target audience. ‘The main

[138] HM Government (2010b) pp.14-17
[139] Cabinet Office (2012) pp.49-50
[140] Cabinet Office (2011) pp.7-12
[141] GOS (2011) pp.7-11
[142] Cabinet Office (2011) pp.18-20
[143] ibid pp.28-46

communication aim will almost certainly be to protect the public, or help them protect themselves, and reduce any disruption to their lives to the minimum.'[144]

According to the Government Office for Science (GOS), scares about public risk can have a massive effect on policy making. Public risks not properly addressed can also create distrust. Their main recommendation is to reduce anxiety, manage and raise awareness about risks. 'Ideally, public risk communication should be pro-active, carefully planned and based on an ongoing high-quality dialogue with key stakeholders and the public.'[145] Their five key elements of public risk communication are assembling the evidence to demonstrate credible basis, acknowledge public perspectives, analyse options, define authority in charge and interact with the audience.[146] Balancing awareness raising with spreading unnecessary fear is carefully considered.

There are several online portals for information about CBRN related hazards, warnings and other information that can be consulted in an event. Consistent with recommendations for trusted sources, the MET Office has a portal relating to these matters[147], as well as Public Health England[148] and several other agencies. The local responders also have information portals of their own, often linking to broader governmental websites.

3.8.2 The USA

Information today is transmitted instantly via the Internet and the 24/7 news channels. While timely information is valuable, it also can be overwhelming. For an effective response, expertise and experience must be leveraged to support decisionmaking and to summarize and prioritize information rapidly. Information must be gathered accurately at the scene and effectively communicated to those who need it. To be successful, clear lines of information flow and a common operating picture are essential.[149]

The CBRN context is important in the US, where resources have historically been more focused on military capabilities than accident response. The domestic push for defensive capability is driven by fear of consequences from CBRN terrorism. Terrorism is, however, far outstripped by the death toll from CBRN accidents and war.[150] From a US approach, it is recommended that the government develops scripts in advance of a CBRN incident to be followed by acknowledged experts that should be known by the media.[151]

After 9/11, the USA increased their focus on preparedness and emergency response. The incidents in 2001 had tremendous effect on the American population and government, and the focus on terrorism escalated, CBRN included. The national US preparedness for a CBRN incident

[144] ibid pp.47-52
[145] Government Office for Science (GOS) (2009) p.2
[146] ibid p.4
[147] http://www metoffice gov uk/publicsector/cbrn
[148] https://www gov uk/government/topics/public-safety-and-emergencies
[149] Deparment of Homeland Security (2008) p.49
[150] Healy et al (2009) p.121
[151] Spencer et al (2011) p.110

is an approach not aiming for total security, but a level between the maximum preparedness after World War II and the low level of preparedness just before 9/11.[152]

One of the overall consequence management ways is to sustain assurance and dissuasion by effective communications.[153] Under the Federal Emergency Management Agency (FEMA), there is a multisectoral National Response Framework stating that critical information and direction will be released to the public throughout an emergency via various media. 'By carefully following the directions provided, residents can reduce their risk of injury, keep emergency routes open to response personnel, and reduce demands on landline and cellular communication.'[154] There are several detailed response frameworks for different responders, and the general principle is to manage a domestic CBRN incident on a local level if possible, always with a layered response spectrum. One of the goals is to '[g]auge public reaction to the incident as it can affect response requirements, particularly if the level of fear is high or likely to grow, or if massive population movement is under way or expected.'[155]

Public information and warnings should be coordinated through the activation of a state's public communications strategy and the incident command may establish a Joint Communication Center (JIC), a location where information for the public and the media is coordinated, disseminated and managed on a local, regional or national level. The JIC staff facilitates dissemination of accurate, consistent, accessible and timely information by developing coordinated news releases and contact lists.[156] Similar to the EU, there are scenario sets including all the CBRN categories for emergency planning related to the National Planning Scenarios.[157] In a catastrophic incident, anticipation that normal civilian communications means will be greatly affected and should not be considered as primary means of communications during the event is recommended. 'Themes, messages, images, and actions should be synchronized across jurisdictions, agencies, and organizations. Planning must include anticipated outages of civilian mass media capabilities for communicating evacuation and quarantine information.'[158]

According to Scoch-Spana et al, the preparedness communication tendency in the USA has been one-way communication to the public in the form of pamphlets, press releases, public meetings and websites instructing citizens to follow specified instructions and raise awareness about specific issues. There are consultations with the public soliciting opinions through polls, surveys, focus groups and advisory panels, but this communication is one-way from the consulted population.[159] The Centers for Disease Control and Prevention (CDC) gathered data from the

[152] Dembek (2008)
[153] Joint Chiefs of Staff (2012) p.I-3
[154] Deparment of Homeland Security (2008) p.17
[155] Joint Chiefs of Staff (2012) p.I-18
[156] Deparment of Homeland Security (2008) pp.37-38
[157] ibid p.75
[158] Joint Chiefs of Staff (2012) p.I-20
[159] Scoch-Spana et al (2007) p.14

public in order to address the audience's information needs and views, and created CBRN risk communication fact sheets made available online.[160]

Wray et al conducted a quantitative study about American emergency communication related to terrorist attacks. Findings emphasized the importance of trust, and the differences between countryside and cities. Mutual trust relationships can be developed through interaction between government officials, emergency responders and the public, which can be an effective way of communicating emergency risk information.[161]

If public perceptions reflect confidence that the government can perform its duties and is dedicated and caring about the public's health and wellbeing, levels of public trust are likely to be higher, which in turn makes communication more effective. In order to gain public trust, perceived honesty and full disclosure of information are essential. Personal and past experience with government agencies or officials affects perceptions of trust. Perceived discrimination by the government can contribute to this perception. It was concluded that medical personnel are preferred over government sources for risk communication. Local emergency responders and officials were generally perceived as more dedicated, caring and trustworthy than federal officials.[162] On a more detailed level, it is recommended that emergency messages are formulated on a 6th grade reading level, to ensure the understanding of the US population. Choices of words can illicit different types of response, and '[t]here are certain types of words that can convey urgency.'[163]

In the USA, many of the widely framed emergency plans on the national level are publicly available. Particularly when it comes to terrorism related matters, the USA has a lower threshold for sharing information to the public where the UK approach is more cautious.

3.9 International Context

Several international projects are cooperating in mitigating the CBRN threat. The previously mentioned PRACTICE, joint Centres of Excellence, international dialogue over the issues and shared research among collaborators are examples of such cooperation. However, most crises happen on a local level, and although strategies are being developed to prepare and inform a wide, international audience, the public communication from responders and experts closer to the scene is indispensable. Hence national and local communication strategies should be made, and may well be based on cooperative, international frameworks.

The UK and the USA are countries with large populations that spend large resources on defence and both have much experience with terrorism. They are also nuclear power states. In this context, it is interesting to consider how a non-nuclear, sparsely populated country like Norway

[160] Centers for Disease Control and Prevention (CDC)
[161] Wray et al (2006) pp.47-48
[162] ibid pp.48-68
[163] Kuligowski (2013) pp.12-13

handles this. Norway is interconnected with the neighbouring countries, and also has its own more recent experience with terrorism.

4 Discussion: Public Communication in Acute CBRN Incidents in Norway

The urgency of providing accurate and rapid information during an emergency presents a double challenge to organizations that combine science and government functions. Recommendations for protecting public health must be developed and cleared by scientists not only for accuracy but also for consistency with previously established and related science. Guidelines and information must be coordinated across multiple agencies and multiple levels of government that are responding collaboratively to a crisis.[164]

This section is based on interviews conducted with several professionals working with CBRN preparedness and general CBRN issues in Norway, and includes preparedness bodies, blue light services and specialised research facilities in the Oslo and Bergen regions. The interview framework was constructed based on previous sections, and the information gathered is considered in this context. The interviews aimed to highlight: What is prioritised to communicate in relation to acute CBRN incidents in Norway, how it is done, how experts are involved, expectations to public reactions, level of knowledge, panic, the cry-wolf syndrome, the trust element, and the view on pre-developed messages. Discussions about previously referred literature pertaining to the Norwegian case are incorporated in this section.

4.1 General Approach

After 22/7, the Norwegian Government and population have had an increased focus on prevention and preparedness. Many of the interviewees were involved in the aftermath of the terrorist attacks, and it has been an agenda setting incident for the country. International incidents also affect threat assessments and preparedness in Norway. Particularly, the Chernobyl accident has influenced the Norwegian approach to the issue of nuclear preparedness.[165] The Seveso chemical disaster in 1976 led to new legislation and a new regime to prevention and preparedness in chemical industry in Europe, the Seveso Directive.[166] Hence, industry and transportation accidents involving hazardous material (HAZMAT) is another significant impact factor on the Norwegian preparedness, included here in the CBRN incident concept.

In June 2012, a Royal Decree instructing the preparedness work in the state departments was enacted, providing rather detailed frameworks for organisation, responsibilities and level of preparedness in the Norwegian society.[167] This Decree requires all sectors to develop and follow coordinated plans. In an acute incident, the key services in Norway are the first responders,

[164] Vanderford (2004) p.193
[165] NRPA (2006)
[166] European Commission (2013)
[167] *Kongelig resolusjon* 15 06 2012 [Royal Decree]

emergency call centres, hospitals and the municipality crisis management organisations, as well as possible cooperation with the Civil Defence, military units and non-governmental organisations. The Norwegian emergency preparedness builds on the principle that all necessary resources should be made available in a crisis from the military, public and private sectors, referred to as Concept of the Total Defence. The concept is based on the governing principles of responsibility, equivalency, subsidiarity and cooperation.

The responsibility principle states that the organisation responsible for a discipline or service in normal circumstances also has responsibility for handling extraordinary events and emergency preparedness preparations within this area. The equivalency principle states that organisations established during crises should be as similar as possible to organisation in the state of normality. The subsidiarity principle states that a crisis should be managed at the lowest organisational level possible, and the cooperation principle states that authorities, enterprises and agencies are responsible for ensuring the best possible cooperation with relevant actors in prevention, preparation and management of crises and emergencies.[168] The fire and rescue services are the responsibility of the municipalities, whereas the police are managed by the state.

Norway has two nuclear reactor facilities, mainly for research purposes, and is not a nuclear energy producing country. The preparedness for a nuclear or radiological disaster is well organised[169] and the Chernobyl accident proved that incidents in other countries can also affect Norway. *Kriseutvalget* (KU), the Norwegian Crisis Committee for Nuclear preparedness, consists of six agencies, and is led by the Norwegian Radiation Protection Authority (NRPA). In the case of a nuclear emergency, KU has the authority to gather necessary information, data and forecasts, and are responsible for providing coordinated information to authorities, the public and media. The Committee has its own information group to strengthen information strategies towards the public and the media.[170] The nuclear preparedness is exempt from the subsidiarity principle. For all nuclear and radiological incidents, the KU is responsible for coordination, including public communication. Chemical and biological incidents are initially handled by local first responders and the municipality where the incident occurs. The Police Incident Commander is responsible for public communication. Depending on the nature and magnitude of the incident, various national authorities become involved.

On a local level, plans for handling a CBRN incident are under evaluation. The domestic consequence management of CBRN incidents in the USA works with a 'Hot-Warm-Cold zone approach, where the epicentre of the calamity area is closed off to everyone save those with the appropriate protection gear. The radius further out has declining levels of protection, and the closed area ends in the outer Cold zone.[171] After an exercise in 2005, this approach was found

[168] Endregard and Grunnan (2013)
[169] *Kongelig resolusjon* 15 06 2012 [Royal Decree]
[170] NRPA (2003)
[171] Joint Chiefs of Staff (2012) p.II-30

useful in Norwegian emergency rescue services and has been implemented by many responders in central areas since.[172] It has, however, not been implemented officially on a national level.

This approach can be beneficial for immediate public communication, as it secures the surrounding area from harm, and the emergency responders work closely together and have to communicate well. Whilst adequately protected fire and health personnel can start rescue work and treatment of contaminated and harmed people in the Hot and Warm zones, the Cold zone is most times administered by the police who take care of public contact and information to the immediate surroundings.[173] Close cooperation and coordination is needed between the emergency responders, and the Incident Commander's key challenges are defining safety zones, place the command-control post and determine safety precautions for emergency personnel.[174]

Emergency responders and a specialist in public crisis reactions noted that the approach is valuable for managing a contaminated area. The greatest challenge will be holding back those that are not severely injured from moving out of the area, thus spreading the contamination.[175] Such potential scenarios make two measures essential: Firstly, training emergency responders in communicating to the potentially contaminated the underlying rationale for keeping them on the site, explain the physical reactions to anxiety and how these can be confused with real symptoms. Secondly, scenarios must be exercised realistically, taking the public reaction to move out into account. The emergency responders all doubted that the public involved would wait for them in a contaminated area, but rather seek treatment themselves.[176]

It can be relevant to separate the concepts of CBRN and HAZMAT for responders, but in cases with great insecurity, it will hardly matter to the public perception. What is important is appropriate and factual information about the incident. This can, however, be more straightforward in HAZMAT incidents, because industries and rescue services have oversights over what substances one has to deal with and cargo is labelled. In cases where it is clear what substance is present, it is also simpler to pre-develop messages in case of an incident.

4.2 What to Communicate

All the interviewees emphasised the importance of factual, sober and sincere information without elements of speculation. It is considered important to create public understanding and knowledge about the hazardous substance in question and explain the basis for any action steps provided. Honesty and openness were seen as crucial factors, and information should only be held back if it matters to a police investigation, can increase the danger for the public, or if it does not have any relevance for the public. This approach is in agreement with Swain's recommendations.[177]

[172] Interviews, A Dybwad, 31 July 2013, Deputy Head, 09 July 2013, J E Andersen, 30 July 2013
[173] Interviews, Deputy Head, 09 July 2013; J E Andersen, 30 July 2013; A Dybwad, 31 July 2013
[174] Endregard et al (2010) p.386
[175]Interviews, Deputy Head, 09 July 2013; J E Andersen, 30 July 2013; A Dybwad, 31 July 2013; Ph D in P sychology, 21 August 2013
[176] ibid
[177] Swain (2012) p.83

Specialists tend to comment or make public statements when requested. Specialist agencies will be involved when an incident relates to their particular field.[178]

Consistent with Rubin et al's findings, the Norwegian interviewees generally found issues of CBRN difficult to communicate due to the complex nature of CBRN hazards and characteristics of the public.[179] As there have been few CBRN incidents in Norway, it was an overall perception that scenarios are an important basis for deciding what to communicate, consistent with recommendations for developing messages and scenarios.[180] Rogers et al point out an essential work area for the Norwegian case as well, namely coordination of different messages from responders to avoid confusion and anxiety.[181] An observation from several interviewees was that although handling the acute phase can be straightforward, the aftermath can be way more complex and difficult to handle in a CBRN incident, consistent with Wessely's prediction.[182]

It is important to make sure that agencies do not interpret guidelines for information differently. Guidelines and strategies should be developed in dialogue with the involved actors, whilst having dynamic communication with the public about what information they need.[183] In cases of great insecurity, it is customary in cases involving radiation to inform quickly that there has been an incident regardless of whether the exact reasons and effects are known. The threshold for informing should be low, and everything with possible effects for the public should be communicated.[184] Professional considerations concerning health risks will not depend on the factors causing the incident, and advice should be communicated as soon as the nature of the hazard is known.[185] The KU has fact sheets with clear explanations and guidance for how to act in the case of nuclear events available online.[186] Other institutions have some risk communication available online as well, like the NBC-Centre and Kriseinfo.no. General and customised fact sheets for CBRN risks can be an inexpensive measure for awareness raising and preparedness.

Overall, the Norwegian interviewees expressed much the same views of what should be communicated to the public that is recommended in the literature, but mental models and model frameworks are utilised to a lesser extent.

4.3 How to Communicate

According to an opinion poll from 2010, the internet is considered the most important single channel of information from the authorities. TV and radio are still more important for general information, but the increase in internet use has been strong compared with previous polls.[187]

[178] Interviews, T A Østmo, 05 July 2013; Department Director, FHI, 16 July 2013
[179] Rubin et al (2012) pp.383-384
[180] Endregard et al (2011)
[181] Rogers et al (2013) p.55
[182] Wessely (2005) p.5
[183] Interview, T A Østmo, 05 July 2013
[184] Interview, E Holo, 09 July 2013
[185] Interview, G Brunborg, 15 July 2013
[186] NRPA (in the function of Secretariate for the Crisis Committee)
[187] NRPA (2010) p.4

information, but the increase in internet use has been strong compared with previous polls.[187] However, mass news media are prioritised as the main source for disseminating information to the public in a crisis.[188]

It was emphasised by an interviewee that in a CBRN incident, or any other incident, it is absolutely critical that operators of telecom infrastructure manage to keep the internet access up, which is another potential vulnerability that preparedness plans must take into account. Thus people can search the web for unfamiliar terms that they are worried about, and find additional information they might want.[189] In this regard, it is important to make well developed, trustworthy messages and factual information easily accessible online. One possible solution for this is discussed in the following section.

Tyfon is a loudspeaker system administered by the Civil Defence, which can sound alarms for different emergencies. The system is audible for a large part of the Norwegian population. However, few of the younger generations are trained in the meanings of different alarms, and it has been deemed appropriate to only sound the alarm signalling 'Important message - Listen to radio' in order to notify the public to pay attention to messages distributed in the media. The system can be utilised to get the public's attention in an acute incident.[190]

If the electricity should disappear, information is still important, and should not be used as an argument not to develop net based systems. The basic approach is that people will eventually get electricity and communication infrastructure back, whereupon they get immediate updates, or that neighbouring areas with electricity may reach them with vital messages.[191] Resilient solutions have been discussed for emergency preparedness for national communication if parts of the country lose electricity.[192]

Contact with the media is well developed and important for emergency management in Norway. The easiest way of reaching the public is through the media, and most interviewees report that they have good media contact and consider journalists and media channels as collaborators in emergency situations. Experiences suggest that the main media channels in Norway have a sense of social responsibility in crisis situations, and report advice from responders, experts and governmental agencies to the public in order to help. In the aftermath of a crisis, the handling of a situation can be scrutinised by the media, but this is considered a necessary and appropriate critical view in an open society.

Following initial signs of a crisis, the public will mainly turn to media channels for information, and then possibly to governmental institutions for further advice. It is pointed out that the

[187] NRPA (2010) p.4
[188] DSB (2011)
[189] Interview, G M Landro, 24 July 2013
[190]Interviews, A M Bollmann, 08 August 2013; K Ellingsen, 14 August 2013; O P.Parnemann, 09 August 2 013
[191] Interview, K B Jørgensen, 17 July 2013
[192] Interview, C E Christoffersen, 13 August 2013

Norwegian Broadcasting Corporation, NRK, is very resilient.[193] NRK, the largest media organisation in Norway, is owned by the government, comprises several radio and TV channels and has a large presence on the internet. NRK has a legally required preparedness responsibility to be used as an emergency notification channel in a crisis.[194] NRKs reputation in the public is strong and stable.[195] Social media presence is increasingly relevant for many agencies.

Norwegians have a large presence on social media platforms, and this is a prime chance to reach and inform people. The Norwegian police departments have a strong presence on Twitter, which is used as an instant medium. In a crisis, the municipalities in Oslo and Bergen have SMS systems that can send instant text messages to the population in particular areas. This system can be accessed by the police in a crisis situation.[196]

4.3.1 Kriseinfo.no

Kriseinfo.no, directly translated as 'crisisinformation.no', is a website for Governmental information concerning *all* crises. It links to relevant authorities and entities in times of crises for official information and advice from relevant institutions to the public. It was established in January 2012 in the Norwegian Directorate for Civil Protection (DSB), and is based on similar initiatives in the Nordic countries, particularly the Swedish equivalent *krisinformation.se*.[197] *Kriseinfo.no* is meant to guide the public and address their information needs, especially in cross-sectorial crises. Many are not familiar with navigating their way to the relevant authority responsible for the information concerning their particular needs, and *Kriseinfo.no* aims to simplify the access to the relevant Norwegian agencies. In addition to redistributing information from the government, the website administrators have the potential to discover divergences in information from different agencies. *Kriseinfo.no* can function as an intermediary between the public and the government, but the procedures can take some time, as questions from the public must be answered by the agency in question. *Kriseinfo.no* is not an immediate emergency message disseminator, but an information portal.[198]

Kriseinfo.no has not been firmly established as a 'go-to' portal for the Norwegian public, but there is wide agreement that it can have great potential in a cross-sectorial crisis if it manages to get attention from the audience. The process of being familiarised with the public can be a cumbersome process, and hasty decisions have not been made in this case. *Kriseinfo*.no provides some general fact sheets on HAZMAT, nuclear incidents and terrorism, linking people to relevant expertise. There is potential to link customised risk information on a wide spectrum of risks to this website, and highlight potentially relevant information in an acute incident.

[193] Interview, O P.Parnemann, 09 August 2013
[194] *Lov om kringkasting (lov 1992-12-04 nr 127) § 2-4* [Broadcasting law]
[195] TNS Gallup
[196] Interviews, G M Landro 24 July 2013; E Olstad, 05 August 2013; K Ellingsen, 14 August 2013
[197] Interview, K B Jørgensen, 17 July 2013
[198] ibid

4.4 Involvement of Experts

Several interviewees noted that risk perceptions between lay people and experts diverge. Those most willing to comply with evacuation orders in the Norwegian society are often trusting expert knowledge and have higher education themselves. Risk perceptions and risk responses may be shaped by psychological, social, institutional and cultural processes; however, a study showed that '…individual differences are overridden by trusted relationships with experts and sociodemographic variables.'[199] The trust in experts and authorities in a radiation related incident has increased the past decade. However, people also reported that in cases with danger of radiation to their local areas, they would turn to the municipality administration or local police. Other agencies were not considered relevant contact points.[200] The NRPA noted that even though they are organised on a central level, they wish to be as close as possible to an incident on a local level. They work with county administrations, and the exemption from the subsidiarity principle is a matter of definition.[201]

Consultations with experts on a particular area within the CBRN spectrum will depend on the scenario. Some experts note that although they have a consultant role in planning, they are rarely involved in exercises. There is a call for preparedness procedures indicating clearly who to contact and when.[202] The interviewed experts all considered communication departments in their institutions valuable, as they can formulate messages, make them understandable and know what the public would want to know. This is particularly relevant in information aimed at prevention. There is also agreement that experts request more cooperation with other institutions working in the CBRN field. There is a wish for more realistic exercises with insecure elements in substances and public reactions in order to prepare personnel more realistically.[203] Operational leader forums where emergency response team leaders meet, as is being done in several central areas, are consistent with Scoch-Spana et al's recommendation that responders should be familiar with each other.

A problematic feature noted was the role of 'self-declared' experts speculating without the proper scientifically based depth knowledge. Such sources can influence and damage public communication, and can be avoided with clear advice from acknowledged sources.[204] It is noted by Norwegian interviewees that there is little official guidance ensuring continuity in specific CBRN preparedness for departments, and effort often rests on personal interest and individual engagement, which is consistent with other empirical studies. Clear lines of communication and clear areas of responsibility are somewhat lacking between experts, governmental bodies and responders for particular CBRN responsibilities and preparedness.

[199] Rød et al (2012) p.95
[200] NRPA (2010) p.4
[201] Interview, E Holo 09 July 2013
[202] Interview, G Brunborg, 15 July 2013
[203] Interviews, J E andersen, 30 July 2013, A M Bollmann 08 August 2013, Ph D in Psychology, 21 August 2013
[204] Interviews, L Linde, 08 August 2013; Ph D in Psychology, 21 August 2013

4.5 Expectations for Public Reactions

Are we crying 'Wolf!'? There are shared opinions on this subject. One consideration is that the CBRN focus can 'steal' resources from other, perhaps more relevant and high risk preparedness issues, and it should be decided centrally how preparedness should be organised and resources distributed. There are in some instances a push from the emergency responders and academic communities to make CBRN preparedness more relevant and inform more about it, but it is said that this cannot decide the emphasis centrally.[205]

Another consideration is that intelligence agencies are more open about risks now than before, and this is not a *cry-wolf* symptom, it is a tendency that reflects the societal development, which is a good sign.[206] It is an impression that the public have a fear based view on radiation in particular, without necessarily having any factual basis for this fear.[207] The 'dread risk' perception of CBRN hazards is the case in the Norwegian population as well.

There are few expectations of public panic. As expressed: 'People have seen too many Hollywood movies.'[208] Most interviewees consider Norwegians a very calm and rational people, in some cases even bordering on the naïve. When it comes to low likelihood-high impact incidents, most tend to have an 'It won't happen to me' approach.[209] The response and awareness seems better in industrial areas where the risk is known and education continuous, although people's expressed risk perceptions in these areas tend to put CBRN incidents low down on the list of risks.[210] One particular area was considered as panic prone in relation to a CBRN incident and other incidents, namely big events gathering large crowds of people in a limited space. For instance, during big arena concerts, crowd control is utilised to plan for and manage the audience. Guidance about behaviour and clear, calm advice from responsible actors was emphasized as crucial to avoid panic in a crowd when there is much insecurity.[211] The panic perceptions thus coincide with the empirical material in the Norwegian case as well; panic is rarely the case, but is nonetheless often brought up in communication considerations.[212]

From experience, some interviewees told about a completely opposite reaction pattern in the public following incidents. People sometimes tend to flock towards a place where an incident has taken place, due to curiosity, and wanting to help and report about the incident. This was the case in Oslo 22/7, where many moved towards the smoke from the Government quarter after the bomb went off.[213] It has been experienced that people seek out health services without taking advice into consideration first. If they are insecure, they would rather be safe than sorry, and some may also feel ill although they have not been exposed to a CBRN substance. It is emphasized that clear

[205] Interview, O P.Parnemann, 09 August 2013
[206] Interview, C E Christoffersen, 13 August 2013
[207] Interviews, T A Ostmo, 05 July 2013; G Brunborg, 15 July 2013
[208] Interview, G M Landro, 24 July 2013 [Freely translated]
[209] Interviews, Deputy Head, 09 July 2013; A Dybwad, 31 July 2013, K Ellingsen, 14 August 2013
[210] *Grenlandsundersøkelsen* (2010)*;* Interview, T F Tandberg, 13 August 2013
[211] Interview, E Olstad, 05 August 2013
[212] Quarantelli (2001); Fischhoff et al (2003); Sheppard et al (2006); Wessely (2005); Sorensen (2000)
[213] Interview, A M Bollmann, 08 August 2013

information *must* be provided concerning health effects and symptoms, as well as action steps for decontamination and other measures to avoid an overloaded health system by the worried well.[214]

It was mentioned by several interviewees that if the term CBRN is used when communicating with the public, the majority will not know the meaning. It was pointed out that if you use 'ABC' or 'NBC', the population segment from the 'Cold War generation' will have an idea, but certainly not the younger ones.[215] It is a general perception among the interviewees that the population are not necessarily informed about CBRN in particular, but they are better informed in general, much due to internet access, level of education and overall curiosity and information seeking tendencies. That the term CBRN is not known does not make factual information about substances less beneficial. Instead of mentioning CBRN as a vague concept to the public, the substance in question can be directly referred to. It is easier to explain and advice about a threat such as for instance 'nerve agent', 'radioactive nuclide caesium' or 'anthrax spores'.

General communication to the public does not necessarily address all segments of the population. Diverse methods are recommended, and in specific scenarios it is beneficial to customise the dissemination to the needs of the public, particularly to vulnerable parts of the population. Using a spokesperson that the target group can identify with to explain worries and action steps is recommended.[216]

The literature suggests public engagement as a contributing factor in responding to CBRN incidents. In Norway, the focus is to have a professionalised response being able and prepared to handle an incident, but there are few indications showing the public to be engaged in preparedness efforts for acute CBRN incidents, but possibly for pandemics. Engaging the Norwegian public as potential collaborators in a response could lead to increased awareness and potentially reduce the scope of an incident.

4.6 Public Trust in Norway

Some research from Norway has shown that lay people are likely influenced by someone they identify with. Also, those with higher levels of education are more likely to have an accurate risk perception, as the educated are more skilled at acquiring and evaluating information about hazards. The study proposes that rather than just convey facts about risks, it may be more useful for government agencies to meet people's needs at rational and emotional levels because risk is manifested socially.[217]

The emergency responders report a high level of trust from the public.[218] In an acute incident, the responders are visible and are a crucial information source for the public, but also for involved

[214] Interviews, Deputy Head, 09 July 2013, J E Andersen, 30 July 2013, A Dybwad, 31 July 2013
[215] Intreviews, K Ellingsen, 14 August 2013; Deputy Head, 09 July 2013
[216] Interview, Ph D in Psychology, 21 August 2013
[217] Rød et al (2012) pp.95-96
[218]Interviews, Deputy Head, 09 July 2013, G M Landro, 24 July 2013, J E Andersen, 30 July 2013, E Olsta d 05 August 2013, L Linde, 8 August 2013

agencies and experts. Competent and well prepared emergency responders can do a great deal to guide public reactions to a CBRN incident depending on their initial actions.

Withholding information is not acceptable. Unless it is founded in security considerations, police investigations or avoiding personal privacy infringements, none of the interviewees would hold back information about an acute CBRN incident from the public eye. It is considered unfortunate to try and hide information from the public in order to protect organisational reputation, as the general view is that such information will always be discovered eventually. The consensus is that if it matters for the public safety, information should be released as soon as possible. People can also be trusted with more information if you have their trust.[219] As Wessely points out, lack of information promotes anxiety, whilst knowledge promotes coping.[220] In accordance with recommendations in the literature, trust and honesty is prioritised in public communication in Norway.

4.7 Pre-Incident Messages

It is very rare to develop detailed pre-incident messages about CBRN incidents in Norway. The risk is considered so minimal, and the scenarios so many, that this is not a feasible way to spend resources. It is experienced that pre-developed messages have to be almost entirely rewritten when scenarios happen due to varying surrounding factors. However, it is pointed out that the more personnel get used to writing these messages, the faster it goes. Experienced communication personnel are a good resource to formulate instant informative and understandable messages.[221]

Most of the official bodies have general guidelines provided for public communication, and some have more special plans like KU have for nuclear and radiation incidents. The police also have some subject briefs containing messages developed correspondingly to the briefs. However, the message is usually very general at an early stage in lack of information. Some police units have particular fact briefs and action briefs that advise them about CBRN scenarios. They have some completely specified cards, on for instance anthrax, and lists with who to contact in the cases of C, B and R incidents, as well as their own areas of responsibility and possible scenarios.[222] The centre for NCB-medicine in Oslo has clear guidelines to the public in the event of radiological contamination. C and B, however, are more woolly areas. There are general guidelines developed for all agents, but not on a detailed level because situations will vary.[223]

It is noted by several that contrary to the national level, risk communication and pre-incident messages are utilised in industrial areas in Norway. Larger industries processing hazardous substances are required under the Major Accidents Regulations, developed based on the EEA Seveso Directive, to inform the surrounding areas about potential hazards and risks.[224]

[219] Interview, T F Tandberg, 13 August 2013
[220] Wessely (2005) p.4
[221] Interview, C E Christoffersen, 13 August 2013
[222] Interview, E Olstad, 05 August 2013
[223] Interview, A Dybwad, 31 July 2013
[224] Interview, T F Tandberg, 13 August 2013

In the case of an incident, people will be prepared to act as directed. Industries should also have pre-developed action steps and information available. 'To date, the role of information about, and from, schools in guiding behaviour during a disaster has been neglected in the literature.'[225] In industrial areas, schools and other public institutions are informed about the hazardous risk potential of the industry, and instructed how to act in an incident. There is local focus on risk communication in areas with potentially hazardous industry. In these areas, the communications with the public and clear areas of responsibility are better developed, consistent with threat assessments and legal frameworks. Information concerning particular hazards from these areas could potentially be used for development of specific threat information for the rest of the country if this is considered necessary and appropriate.

In the literature, the UK approach suggests that a well-prepared and informed public are more likely to follow recommendations about safety measures. It is interesting to consider whether this opinion was shared by the interviewees in Norway. As shown, general awareness raising and pre-incident messages are rare about CBRN threats in Norway. People are informed about specific hazards in industrial areas, yet the general awareness for CBRN in Norway is considered low, and preparing the public is not considered to a great extent.

The use of scenario-based exercises for acute CBRN incidents is backed by all interviewees in Norway. However, planning and pre-developing messages on this basis is not necessarily considered relevant. In a mainly rural country like Norway, it is essential to focus on more holistic approaches to low likelihood risks, and if the planning is too detailed on pre-developed scenarios, one may not be able to utilise plans in an actual incident if circumstances diverge from the scenario.[226] It is certainly important to develop, be aware of and consider scenarios for CBRN incidents, but they must be utilised hypothetically, not as a main factor in emergency preparedness.

Some frameworks are developed, but few are agreed upon centrally and do not cover all aspects for public communication in an incident. Mental model approaches for message formulation may be used by the communication divisions in some of the agencies, but are not utilised for a broad, national framework for different segments of the population. Before deciding to formulate pre-incident messages, it should be considered what the appropriate and desired level for preparedness should be. Reasons not to develop pre-incident messages are worries about fear-mongering, to disseminate ideas that can inspire perpetrators or simply that there are too many scenarios to comprehend, and none are alike. There is a divergence from recommendations when it comes to public awareness raising and possible collaboration with the public in Norway. This has several justifications, but should be considered contextually in further work.

[225] Rogers et al (2013) p.56

[226] Interviews, J E Andersen, 30 July 2013; E Olstad, 05 August 2013; C E Christoffersen 13 August 2013

5 Conclusions and Recommendations

It has previously been recommended that CBRN incidents should be included in preparedness planning and exercises in Norway and that plans should cover the entire risk spectrum. Responsibilities should be clarified and research involving all relevant stakeholders must be arranged, as well as proper enhancement of training for personnel.[227] These conclusions remain valid for this assessment.

General awareness raising about CBRN is not imminent in Norway. If this should be considered, it is worth taking into account the approach used by communities in industrialised areas. Here, the general population are informed about specific risks, and know how to behave in case of an incident. This could, however, be hard to implement on a national level, and a further challenge is how to explain a broader risk evaluation of the entire CBRN spectrum. A prepared and knowledgeable public is favourable. However, the risk assessments provided should be credible, balanced and scientifically based. The CBRN threat should be placed in context with the overall picture. In areas where risk and threat analyses indicate that awareness should be raised, it should be considered to use appropriate frameworks for developing such communication. It should be considered what level of national public preparedness is wanted and appropriate for CBRN incidents in Norway based on threat and risk assessments, including what values are at stake in case of an incident.

Furthermore, a framework stating clear lines of responsibility and communicational tasks both internally and to the public should be developed in the field of CBRN preparedness in Norway, ensuring continuity in further development. This responsibility should rest on organisational work, and be less reliant on individual engagement. Acute CBRN incidents will inevitably be cross-sectorial, and there is a need to further consolidate the organisational tasks and communication channels between responders, experts and governmental departments in order to ensure unambiguous public communication. For disseminating official governmental advice, a portal like *Kriseinfo.no* can serve a purpose if it is used by and known to the public, but for more immediate public communication the media continues to be an important actor and collaborator, and good contact should be maintained. The use of social media and the internet has enormous potential for use, but it must be used with precautions, and robust systems must be developed and maintained. It is important to be aware of and address speculation that can arise in these forums.

The role of experts is indispensable in a complex situation like a CBRN incident. Experts should have defined roles in particular scenarios, and need to be brought in at an early stage. Although expert advice may differ, it is better to get input from multiple viewpoints than unqualified advice and explanations from self-proclaimed ‘experts’ speaking in general terms.

Setting a course forward, further research is recommended to focus on developing and testing messages adjusted to different segments of the population based on mental models and taking into consideration characteristics of the sender, the message content, the channel of communication

[227] Endregard and Grunnan (2013)

and the receiver. Work on mapping the CBRN preparedness in Norway has focused mainly on the central areas which are more densely populated and have higher threat assessments. Further work should be done to investigate preparedness in local areas as well, and determine whether the same preparedness measures for acute CBRN incident communication should be the same on a national level.

This work is limited to public communication in acute CBRN incidents, and has discussed it on a general basis. Specific messages have not been formulated or tested, and any one framework is not singled out as most appropriate. The dissertation is not meant to give an account of civil preparedness against CBRN incidents, but focuses on the public communication aspects. The analysis is the responsibility of the author.

Bibliography

Printed material

Becker, Steven M. (2004) 'Emergency Communication and Information Issues in Terrorist Events Involving Radioactive Materials', *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science*, 2:3, pp.195-207

Boin, Arjen; van Duin, Menno and Heyse, Liesbet (2001) 'Toxic Fear: The Management of Uncertainty in the Wake of the Amsterdam Air Crash', *Journal of Hazardous Materials*, 88, pp.213–234.

Dembek, Zygmunt F. (2008) 'Preparedness for a CBRNE Event', *Joint Force Quarterly*, 51:4, pp.52-56

Endregard, Monica and Blatny, Janet M. (Eds) (2008) 'Counter biological and chemical terrorism: WP1000: Potential biological and chemical threat agents'. FFI-rapport 2008-00979, Forsvarets Forskningsinstitutt (FFI) [Norwegian Defence Research Establishment] Exempt from public disclosure.

Endregard, Monica; Reif, Bjørn; Petterson, Anders; Vik, Thomas and Busmundrud, Odd (2010) 'Consequence assessment of indoor dispersion of sarin – a hypothetical scenario', *Journal of Hazardous Materials* 176, pp.381-388

Endregard, Monica and Grunnan, Tonje (2013) 'Scenario classes and scenario analyses for chemical disaster emergency planning', ESREL 2013

Fischhoff, Baruch; Bostrom, Ann; Quadrel, Marilyn J.(1993) 'Risk Perception and Communication', *Annual Review of Public Health* 14, pp.183-203

Fischhoff, Baruch; Gonzalez, Roxana M.; Small, Deborah A. and Lerner, Jennifer S. (2003), 'Evaluating the Success of Terror Risk Communications', *Biosecurity and Bioterrorism*: *Biodefense Strategy, Practice and Science*, 1:4, pp.255-258

Gigerenzer, Gerd (2006) 'Out of the Frying Pan into the Fire: Behavioral Reactions to Terrorist Attacks', *Risk Analysis*, 26: 2, pp. 347-351

Glass, Thomas A. and Scoch-Spana, Monica (2002) 'Bioterrorism and the People: How to Vaccinate a City against Panic', *Confronting Biological Weapons*, 34, pp.217-223

Hall, Ryan C.W.; Hall, Richard C.W. and Chapman, Marcia J. (2006)'Medical and psychiatric casualties caused by conventional and radiological (dirty) bombs', *General Hospital Psychiatry* 28, pp.242– 248

Healy, M. J.F.; Weston , K; Romilly, M and Arbuthnot, K (2009) 'A Model to Support CBRN Defence', *Defense & Security Analysis*, 25:2, pp.119-135

Heath, Robert L.(2006) 'Best Practices in Crisis Communication: Evolution of Practice through Research', *Journal of Applied Communication Research* 34:3, pp.245-248

Henderson, J. Neil; Henderson, L. Carson, Raskob, Gary E. and Boatright, Daniel T. (2004) 'Chemical (VX) Terrorist Threat: Public Knowledge, Attitudes, and Responses', *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 2:3, pp. 224-228.

Hobbs, John; Kittler, Anne; Fox, Susannah; Middleton, Blackford and Bates, David W. (2004), 'Communicating Health Information to an Alarmed Public Facing a Threat Such as a Bioterrorist Attack', *Journal of Health Communication: International Perspectives*, 9:1, pp.67-75

Husband, Poppy A. and Hellier, Elizabeth (2011) 'Persuasive Methods of Communication: Evidence Base for Injury Prevention', Plymouth University and Devon county Council

Lindell, Michael K. and Perry, Ronald W.(2012) 'The Protective Action Decision Model: Theoretical Modifications and Additional Evidence', *Risk Analysis*, 32: 4, pp.616-632

McComas, Katherine A. (2006) 'Defining Moments in Risk Communication Research:1996-2005', *Journal of Health Communication: International Perspectives*, 11:1, pp.75-91

NRPA, *Kommunikasjonsstrategi for Kriseutvalget ved atomulykker* [Communication strategy for the Crisis Committee in nuclear accidents] (2003) *Strålevern Hefte 2003:2*, Østerås: Norwegian Radiation Protection Authority

NRPA, *Nasjonalt Strålevernbarometer, Løpende Opinionsundersøkelser* [National radiation survey, continuous opinion polls] (2010), Norwegian Radiation Protection Authority

Ranstorp, Magnus & Normark, Magnus (2009) 'Unconventional Weapons and International Terrorism: Challenges and New Approaches' (London: Routledge)

Rød, Sverre Kjetil; Botan, Carl and Holen, Are (2012), 'Risk communication and the willingness to follow evacuation instructions in a natural disaster', *Health, Risk & Society*, 14:1, pp.87-99

Rogers, M. Brooke; Amlôt, Richard and Rubin, G. James (2013) 'The Impact of Communication Materials on Public Responses to a Radiological Dispersal Device (RDD) Attack', *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 11:1, pp.49-58

Rubin, G. James; Chowdhury, Alexander K. and Amlôt, Richard (2012) 'How to Communicate with the Public About Chemical, Biological, Radiological or Nuclear Terrorism: A Systematic

Review of the Literature', *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 10:4, pp. 383-395

Scoch-Spana, Monica; Franco, Crystal; Nuzzo, Jennifer B. and Usenza, Christiana on behalf of the Working Group on Community Engagement in Health Emergency Planning (2007) 'Community Engagement: Leadership Tool for Catastrophic Health Events', *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science*, 5:1, pp.8-25

Severtson, Dolores J.; Baumann, Linda C. and Brown, Roger L. (2006) 'Applying a Health Behavior Theory to Explore the Influence of Information and Experience on Arsenic Risk Representations, Policy Beliefs, and Protective Behavior', *Risk Analysis*, 26: 2, pp.353-368

Sheppard, Ben; Rubin, G. James; Wardman, Jamie K. and Wessely, Simon (2006) 'Terrorism and Dispelling the Myth of a Panic Prone Public', *Journal of Public Health Policy*, 27, pp.219-245

Sorensen, John H. (2000) 'Hazard Warning Systems: Review of 20 Years of Progress', *Natural Hazards Review*, 1:2, pp.119-125

Spencer, Michelle L.; Kindt, Michael T. and Stans, Megan P. (2011) 'Public Resilience in CBRN Events: Lessons Learned from Seven Cases', *The Counterproliferation Papers Future Warfare Series*, 52, USAF Counterproliferation Center

Swain, Kristen Alley (2012), 'Explanation of Risk and Uncertainty in News Coverage of an Anthrax Attack', *Journal of Risk Analysis and Crisis Response*, 2:2, pp. 81-95

Tanaka, Yasumasa (1998) 'Psychological Dimensions of Risk assessment: Risk Perception and Risk Communication', *Progress in Nuclear Energy*, 32:314 pp. 243-253

Taylor, Mel; Joung, Wendy; Griffin, Barbara; Hill, David; Chisari, Robert; Hesketh, Beryl and Raphael, Beverley(2011) 'The public and a radiological or nuclear emergency event: threat perception, preparedness, and anticipated response: Findings from a preliminary study in Sydney, Australia', *The Australian Journal of Emergency Management*, 26:1, pp.31-39

Tønnessen, Arnfinn (2002), 'Psychological reactions to nuclear threats – information, coping and the uncertainties of outcome at the individual level', Ph.D. Thesis, Department of Media and Communication University of Oslo, HQ Defence Norway, Medical Staff/Dept. Group of Psychiatry and the Radiation Medicine Department, Norwegian Radiation Protection Authority

Vanderford, Marsha L. (2004) 'Breaking New Ground in WMD Risk Communication: The Pre-incident Message Development Project', *Biosecurity and Bioterrorism: Biodefense Strategy, Practice, and Science*, 2:3, pp.193-194

Wei, Jiuchang; Zhao, Dingtao; Yang, Feng; Du, Shaofu and Marinova, Dora (2010) 'Research on Timing the Crisis Information Releasing via Televisions', *Disasters*, 34:4, pp.1013-1030

Wessely, Simon (2005) 'Don't panic! Short and long term psychological reactions to the new terrorism: The role of information and the authorities', editorial, *Journal of Mental Health*, 14:1, pp.1–6

Wray, Ricardo and Jupka, Keri (2004) 'What Does the Public Want to Know in the Event of a Terrorist Attack Using Plague?', *Biosecurity and Bioterrorism: Biodefense Strategy, Practice and Science*, 2:3, pp.208-215

Wray, Ricardo; Rivers, Jennifer; Whitworth, Amanda; Jupka, Keri and Clements, Bruce (2006) 'Public Perceptions About Trust in Emergency Risk Communication: Qualitative Research Findings', *International Journal of Mass Emergencies and Disasters*, 24:1, pp. 45-75

Online resources

All hyperlinks were functional at the time of review, 29 August 2013
Cabinet Office. (2011a) 'UK Resilience: Communicating Risk', from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/60907/communicating-risk-guidance.pdf

Cabinet Office (2012) 'National Risk Register of Civil Emergencies 2012 Edition' from https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/61929/CO_NationalRiskRegister_2012_acc.pdf

Centers for Disease Control and Prevention (CDC) from http://www.cdc.gov/

Department of Homeland Security (2008) 'National Response Framework' from http://www.fema.gov/pdf/emergency/nrf/nrf-core.pdf

Direktoratet for samfunnssikkerhet og beredskap (DSB) (2011), *'Befolkningsvarsling'* [population warning] from www.forf.no

Endregard, Monica; Breivik, Hanne; Schultz Heireng, Hege; Enger, Elin; Sandrup, Therese; Kelly, Dominic (2011) 'D2.1 Scenario template, existing CBRN scenarios and historical incidents', PRACTICE WP2, Norwegian Defence Research Establishment(FFI), Norway, available from http://www.practice-fp7-security.eu/

Endregard, Monica; Breivik, Hanne; Schultz Heireng, Hege; Enger, Elin; Sandrup, Therese; Fonteyne, Pierre-Alain; Eriksson, Håkan; Kelly, Dominic (2012) 'D2.2 Reference set of CBRN scenarios', PRACTICE WP2, available from http://www.practice-fp7-security.eu/

European Commission (2013) Council Directive 82/501/EEC from http://ec.europa.eu/environment/seveso/index.htm

Federal Emergency Management Agency (FEMA) 'National Incident Management System' from http://www.fema.gov/national-incident-management-system

Fraustino, Julia Daisy; Liu, Brooke and Jin, Yan (2012) 'Social Media Use during Disasters: A Review of the Knowledge Base and Gaps', Final Report to Human Factors/Behavioral Sciences Division, Science and Technology Directorate, U.S. Department of Homeland Security, START from http://www.start.umd.edu/start/publications/START_SocialMediaUseduringDisasters_LitReview.pdf

Government Office for Science (GOS) (2009) 'A Practical Guide to Public Risk Communication: The Five Essentials of Good Practice.' Risk and Regulation Advisory Council, from http://www.bis.gov.uk/files/file51458.pdf

Government Office for Science (GOS) (2011) 'The Blackett Review of High Impact Low Probability Risks' from: http://www.bris.ac.uk/eng-systemscentre/allpdf/blackett-review.pdf

Grenlandsundersøkelsen,[The Grenland area survey], DSB, from http://www.dsb.no/Global/Publikasjoner/2010/Rapporter/Grenlandsrapport_fullversjon.pdf

HM Government (2010a) 'A Strong Britain in an Age of Uncertainty' from http://www.direct.gov.uk/prod_consum_dg/groups/dg_digitalassets/@dg/@en/documents/digitalasset/dg_191639.pdf

HM Government (2010b) 'The United Kingdom's Strategy for Countering Chemical, Biological, Radiological and Nuclear (CBRN) Terrorism' (Home Office) from http://webarchive.nationalarchives.gov.uk/20100418065544/http:/security.homeoffice.gov.uk/news-publications/publication-search/cbrn-guidance/strat-countering-use-of-CBRN?view=Binary

Joint Chiefs of Staff (2012) 'Chemical, Biological, Radiological, and Nuclear Consequence Management', Joint Publication 3-41, from http://www.dtic.mil/doctrine/new_pubs/jp3_41.pdf

Kongelig resolusjon 15.06.2012 [Royal Decree], *Instruks for departementenes arbeid med samfunnsikkerhet og beredskap, Justis- og beredskapsdepartementets samordningsrolle, tilsynsfunksjon og sentral krisehåndtering*, [Instruction for the Departments' work with societal security and preparedness, Norwegian Ministry of Justice and Public Security's coordination role, oversight function and central crisis management] from http://www.dsb.no/Global/Publikasjoner/2012/Andre/Kongelig_resolusjon_15_06_2012.pdf

Kuligowski, Erica D. (2013) 'NIST Technical Note 1779 General Guidance on Emergency Communication Strategies for Buildings', National Institute for Standards and Technology, from http://dx.doi.org/10.6028/NIST.TN.1779

Liu, Debin; Asgharpour, Farzaneh and L.Jean Camp (2008) 'Risk Communication in Security Using Mental Models', Usable Security, from http://usablesecurity.org/papers/liu.pdf

Lov om kringkasting (lov 1992-12-04 nr 127) § 2-4 [Broadcasting law] from http://www.regjeringen.no/nb/dep/jd/dok/nouer/2006/nou-2006-6/13/6/2.html?id=157617

MET Office, from http://www.metoffice.gov.uk/publicsector/cbrn

NRPA, the Norwegian Radiation Protection Agency, Secretariat of the Crisis Committee, 'What should I do in case of a nuclear event?' from http://www.nrpa.no/dav/a24f0e6869.pdf

NRPA, the Norwegian Radiation Protection Agency (2006) 'StrålevernHefte 30: Nuclear Preparedness - National and Regional Organisation. Royal Decree of 17 February 2006' from http://www.nrpa.no/eway/default.aspx?pid=240&trg=CenterAndRight_6345&CenterAndRight_6345=6393:0:15,6250:1:0:0:::0:0

Oslo University Hospital (2011) Håndbok i NBC-medisin [Handbook in NBC Medicine] from http://www.oslo-iniversitetssykehus.no/nbc

Public Health England, from https://www.gov.uk/government/topics/public-safety-and-emergencies

Quarantelli, E.L.(2000) 'Disaster Planning, Emergency Management and Civil Protection:The historical Development of Organized Efforts to Plan for and to Respond to Disasters', University of Delaware Disaster Research Center, from http://dspace.udel.edu/handle/19716/673

Quarantelli, E.L. *(*2001*), 'The Sociology of Panic', Disaster Research Center, University of Delaware, from* http://dspace.udel.edu/handle/19716/308

Ramseger, Alexander, Kalinowski, Martin B. and Weiß, Lucia (2009)'CBRN Threats and the Economic Analysis of Terrorism', prepared for the Network for the Economic Analysis of Terrorism (NEAT). Economics of Security Working Paper 9, Berlin, from http://d-nb.info/1012101266/34

TNS Gallup, from http://www.nrk.no/contentfile/file/1.11049204!omdomme_nrk_tns_gallup_13.pdf

Usher, Dave et al (2012) PRACTICE, D8.5, 'State of the Art Review, Review of CBRN research project for human and societal factors content', WP8 Deliverable, from http://practice.fp7security.eu/wp-content/uploads/2006/06/D8.5-State-of-the-Art-Review.pdf

Interviews, in chronological order

Interview with Torild Agnalt Østmo, senior advisor, head office, Department of Control, Section Sales to Consumer, the Norwegian Food Safety Authority, 05 July 2013, Oslo

Interview with Deputy Head of Emergency Preparedness, Nedre Romerike brann- og redningsvesen IKS [Lower Romerike fire- and rescue service], 09 July 2013, Lillestrøm.

Interview with Eldri Holo, Section Manager, The Norwegian Radiation Protection Authority (NRPA), 09 July 2013, Oslo

Interview with Gunnar Brunborg, Department Director, Chief scientist PhD, Department of Chemicals and Radiation, Division of Environmental Medicine, Norwegian Institute of Public Health (FHI) 15 July 2013, Oslo

Interview with Department Director, Division of Bacteriology and Infection Immunology, Norwegian Institute of Public Health (FHI) 16 July 2013, Oslo

Interview with Kristina Brekke Jørgensen, Responsible for *Kriseinfo.no* [Crisis information], Norwegian Directorate for Civil Protection, 17 July 2013, Tønsberg

Interview with Gustav Magne Landro, Police Captain, Head of Operative Section, Hordaland Police Department, 24 July 2013, telephone

Interview with Jan-Erik Andersen, Brigade Commander, Emergency Preparedness Division, Agency for Fire and Rescue Services in Oslo, 30 July 2013, Oslo

Interview with Anders Dybwad, Leading specialist nurse, The Norwegian Center for NBC Medicine, 31 July 2013, Kjeller

Interview with Erling Olstad, Incident Commander/Police Superintendent, effort management, Joint Operative Section, Oslo Police District, 05 August 2013, Oslo

Interview with Leif Linde, Chief of Operative Section, Agency for Fire and Rescue Services in Bergen, 08 August 2013, Bergen

Interview with Anne-Margrete Bollmann, District Commander, Civil Defence District Hordaland, the Norwegian Civil Defence, 08 August 2013, Bergen

Interview with Ole Petter Parnemann, department for Police Emergency Preparedness and Crisis Management and Gase Handeland, Senior Adviser and leader of the media team, the National Police Directorate (POD), 09 August 2013, Oslo

Interview with Carl-Erik Christoffersen, Senior Adviser, Emergency Support Unit, Norwegian Ministry of Justice and Public Security, 13 August 2013, Oslo [Christoffersen spoke from personal opinion, not in his role as Senior Adviser]

Interview with Torill F. Tandberg, Department Director, Business Industry, Products and Hazardous Substances, Norwegian Directorate for Civil Protection, 13 August 2013, Tønsberg

Interview with Kåre Ellingsen, Head of Department, City of Oslo Emergency Planning Agency, 14 August 2013, Oslo

Interview with Ph.D. in Psychology, Specialist in public reactions to nuclear threats, 21 August 2013

Appendix A List of abbreviations

CBRN: Chemical, Biological, Radiological and Nuclear
CSM: Common Sense Model
DSB: The Directorate for Civil Preparedness and Public Security
FFI: Norwegian Defence Research Establishment
HAZMAT: Hazardous Material
Kriseinfo.no: [Crisicinfomation.no] Web portal for governmental crisis information
KU: The Crisis Committee for Nuclear Accidents
NBC-Centre: The Norwegian Centre for NBC Medicine
NRK: The Norwegian Broadcasting Corporation
NRPA: The Norwegian Radiation Protection Authority
PADM: Protective Action Decisions Model
PMT: Protective Motivation Theory
POD: The Norwegian Police Directorate

Appendix B Interview sheet – Public Communication in Acute CBRN Incidents

The interviews were conducted on a semi-structured basis. All interviewees were informed that all questions would not be equally relevant for their field, and encouraged to focus on their expertise. All interviews were conducted in Norwegian, and transcripts are freely translated by the author. Full Norwegian transcripts are kept by the author and King's College. The following question/theme outline was utilized in all interviews, and transcripts should be read on this basis.

Topics that will be addressed:

Background: Preparedness for **acute C(B)RN incidents** (attacks/accidents)

- Planning in your area?
- Training and/or exercises: operational or table-top? Is public communication involved?
- What is said and done in incidents with great insecurity? (Unknown factors, suspicion of CBRN?)
- Are acute incidents handled the same if it is an accident or an attack?

Focus: Public Communication

- How should acute C(B)RN incidents be communicated to the public (involved, surrounding)?
  - To what degree do you inform of your actions/handling of the situation?
  - How much information is shared? How fast? Are there scenarios where information would be altered or held back from the public?
  - Expected public reactions? Expected level of knowledge in the public?
  - Will public communication be different if an incident turns out to be a terrorisk attack?
- Is informastion disseminated and used strategically to increase awareness about safety measures and prevent incidents?
  - Pre-developed messages?
- What sort of media is used to convey the message/communicate?
  - Conventional media? Mobile devices? Social media?
- Degree of cooperation with other involved actors in communication work: Responsibility? Use of experts?
- Communication through public systems like schools, industry, municipalities or others?

+Final considerations about other related issues in your field.