[PRACTICE]

D3.2+D3.3 OUTLINE OF OPERATIONAL FUNCTIONS & IDEAL OPERATIONAL FUNCTIONS

PRACTICE WP3 deliverables

Dissemination level: Public

Nature: Report

Title:	D3.2+D3.3	
Date:	July 23, 2012	
Author(s):	Ingrid Bastings	TNO
	Clara Peters	TNO
	Nathalie Vink	TNO
	Jeroen Wevers	TNO
	With contribution from all WP3-partners	

Summary Work Package 3

The objective of WP3 is to identify existing operational functions and (best) practices, training concepts, and standards used in Europe to prepare for, respond to, and recover from the effects of CBRN events. WP3 for instance looks into how EU member states and associated countries try to prevent CBRN events from happening, how they detect that an event is occurring, and how they discern between real events and hoaxes.

WP3 is divided into four different tasks:

- *3.1 Development of the survey methodology*
- *3.2 Survey of operational functions*
- *3.3 Development of an ideal set of operational functions*
- *3.4 Evaluation of survey results and the ideal set*

Work Package 3 team:

Anders Sjöstedt	Umea University European CBRNE Center, UMU
Svenja Stöven	Umea University European CBRNE Center, UMU
Monica Endregard	Forsvarets Forskninginstitut, FFI
Hanne Breivik	Forsvarets Forskninginstitut, FFI
Karolina Gasinska	Totalförsvarets forskningsinstitut, FOI
Christian Carling	Totalförsvarets forskningsinstitut, FOI
Håkan Eriksson	Totalförsvarets forskningsinstitut, FOI
Ingrid Bastings	Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek, TNO
Nathalie Vink	Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek, TNO
Clara Peters	Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek, TNO
Jeroen Wevers	Nederlandse Organisatie Voor Toegepast Natuurwetenschappelijk Onderzoek, TNO
Kristian Krieger	King's College London, KCL
Ed van Zalen	Netherlands Forensic Institute, NFI
Marcin Smolarkiewicz	Szkola Glowna Sluzby Pozarniczej, SGSP
Tomasz Zweglinski	Szkola Glowna Sluzby Pozarniczej, SGSP

Contents

1. Executive Summary

After finalizing the survey methodology (D3.1) of WP3 of the PRACTICE project, an insight has been created into the current existing operational functions (OFs) on CBRN-events throughout Europe. The following activity comprehends a survey on operational functions to assess the risk of CBRN events and to prevent, prepare for, respond to, and recover from the effects of CBRN events or hoaxes (task 3.2). Furthermore, an ideal set of these functions has been selected (task 3.3). This report is a result of tasks 3.2 and 3.3 and describes the results of the survey and the development of an ideal set of OFs.

The aim of the survey on current OFs is to find out (a) whether particular activities from this list were hindered in the (optimal) performance, and (b) retrieving ways for improving the effectiveness and efficiency of the performance. The initial set of OFs, as drafted in D3.1 was explored by the use of a prescribed set of questions. The answers to these questions have led to adjustments to the list of OFs, leading to the development of an ideal list of OFs.

In this document, a detailed description of the survey methodology and an ideal list of OFs is provided. Hereby WP3 has gained more insight into the current and the ideal OFs that are used or needed when dealing with CBRN-events in Europe. For detailed information per OF we refer to the Annex document.

2.   Introduction

In the context of the EU project PRACTICE, WP3 has conducted a survey on operational functions related to dealing with CBRN-threats (for definitions: see paragraph 2.2). Furthermore, an ideal set of these functions has been selected. This report describes the results of the survey and the development of an ideal set of operational functions.

Chapter 2 briefly describes the objectives of WP3 (paragraph 2.1), followed by paragraph 2.2 summarizing the definitions that have been chosen for WP3 (and which was elaborated in more detail in D3.1 [1]). Chapter 3 describes the approach and the actual results of the survey. The ideal list of operational functions is presented in Chapter 4. The concluding Chapter 5 describes the way ahead for WP3.

2.1   Work Package 3

WP3 identifies the operational functions (OFs) used in Europe to address all elements required to counter (the threat of) CBRN events. An ideal list of OFs and a gap-analysis will be part of the directive for the design concepts for the PRACTICE toolbox (WP4). This new toolbox will prove the EU and its Member States with a flexible and integrated system for coordinated response to CBRN terrorist attacks, which is adaptable to various national organizations and regulations.

The objective of WP3 is to identify existing operational functions, to investigate how well these functions are performed and whether they need improvement. WP3 focusses on OFs used in Europe to assess the risk of CBRN events and to prevent, prepare for, respond to, and recover from the effects of CBRN events or hoaxes.

WP3 is divided into four different tasks:

- *3.1 Development of the survey methodology*

    A plan was written to determine which operational functions for combatting CBRN events are in use in Europe today. This plan, documented in D3.1[1], consists of a methodology for the work to be done (via a survey), including designed deliverable formats.

- *3.2 Survey of operational functions*

    The goal of the survey on operational functions was to get insight into the current operational functions on CBRN-events throughout Europe, its Member States, organisations and institutes.

- *3.3 Development of an ideal set of operational functions*

    A list of ideal operational functions that are needed to prevent and overcome CBRN incidents has been generated here.

---

[1] Bastings, I.C.L. et al 92011) D3.1Survey Methodology, EU FP7 project PRACTICE

- *3.4 Evaluation of survey results and the ideal set*

  Evaluation and comparison of the survey results (task 3.2) and the ideal set of operational functions (task 3.3) will lead to identification of commonalities and needed improvements/adjustments.

2.1.1 Combination of D3.2 and D3.3

The PRACTICE Description of Work states that both tasks 3.2 and 3.3 deliver a separate deliverable. D3.2 (task 3.2) should address an outline of existing operational functions for the handling of CBRN events in Europe. D3.3 (task 3.3) should describe the ideal set of OFs that should be performed. However, during the consortium's progress meeting in December 2011 it was decided to combine these two deliverables. The reason for this is the fact that these tasks are strongly intertwined. The survey (task 3.2) addresses both the current situation and the ideal implementation (improvements) of the functions. The definition of the ideal implementation of the function is also part of task 3.3, which makes it difficult to separate these two tasks; therefore a combined deliverable (i.e. this document) takes more account of the interrelation of both tasks.

2.2   WP3 – definitions

2.2.1 Security cycle

WP3 structures CBRN incidents according to a security cycle which involves five phases: threat assessment, prevention, preparedness, response and recovery (Figure 1). The following definitions[2] are used for the phases of the security cycle[3]:

- Threat assessment: comprises an analysis of the (potential) perpetrator(s), their capabilities and possible target(s); How to identify potential perpetrators at an early stage. What are the potential targets of an attack?

- Prevention: prevent an actor from becoming a threat. This includes preventing an actor from obtaining/producing CBRN agents and dispersion equipment; How can we prevent that someone is able to execute an attack?

- Preparedness: stop an actor from executing an attack, prepare and train responders, promote awareness and resilience within the general public in case of an incident. What can we do to mitigate the impact of an attack?

Figure 1 PRACTICE Security Cycle.

---

[2] Based on the definition of the Security Cycle used in DECOTESSC1: EU FP7 security project 242294.
[3] The PRACTICE-project is not only focussed on intentional acts (terrorism), but also includes accidents. The security cycle which is described above can also be used when handling accidents, although certain phases need to be read slightly different (e.g. threat assessment would be replaced by risk assessment).

- Response: first response directly after an incident and early diminishment/containment of the effects of an attack.
- Recovery: recover people (after-care) and repair damage; restore to a normal situation.

The survey that is conducted in WP3 has been arranged according to this cycle: that is, the operational functions are arranged using this structure.

2.2.2 Operational functions

The goal of the survey on operational functions is to get an insight into the current existing operational functions regarding CBRN events. The following definition – composed by WP3 - is used for operational functions:

Operational functions (OF): Activities (tasks) that need to be performed to identify and to actively counter CBRN threats, to be prepared for, to respond to and to recover from CBRN incidents/attacks. These activities have a clear goal, resources and input/information are needed to start the activities and certain conditions need to be met to perform these activities, see Figure 2. The survey has aimed to retrieve information on all these aspects.
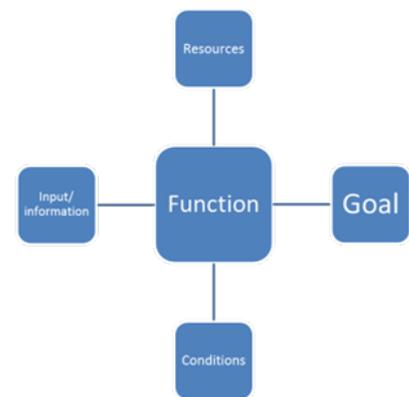
Figure 2 Aspects related to an OF.

2.2.3 Definition of ideal set of operational functions

The PRACTICE Description of Work mentions the development of both, "an *ideal* set of functions" and "a set of *ideal* functions" when describing task 3.3.

The definition used for an "ideal set of functions" in this deliverable is a combination of these two descriptions, so actually an "*ideal* set of *ideal* functions": an adaptation with respect to strive for a comprehensive list of OFs, together with a description of the ideal implementation of this OF (as can be made based on the results of the survey).

3. Survey

3.1 Survey approach

The aim of the survey is to gain insight into the current existing operational functions on CBRN events throughout Europe and to find out (a) whether particular activities from this list were hindered in the (optimal) performance, and (b) retrieving ways for improving the effectiveness and efficiency of the performance. In preparing the survey methodology, a list of OFs was drafted as a basis for conducting the survey (D3.1 [1]). This list is based on existing lists from the IMPACT-project, the Dutch national lists of functions, the ACRIMAS-project and DHS[4]. Drafting the original list of functions was also a first step in determining an ideal set of functions. Input from the survey and progress meetings was used to update this list to the final set of functions (as presented in chapter 4).

To retrieve insight into the current existing OFs, in D3.1 [1] a list of questions has been made. Annex II shows the template that has been designed for capturing the answers. In D3.1 an earlier version of this template is presented. During a progress meeting of WP3 (December 2011 in Paris), the partners concluded that this earlier version was too complex and affected further integration with outputs from WP2 and further use of WP4. Therefore, a somewhat simplified template was drafted, capturing the essence of the information needed:

- What is the goal of the operational function? And when is that goal achieved?
- What triggers the function, what information is needed therefore and who is providing this trigger?
- What scaling options are available (for instance for prolonging the 'time in production' by mobilisation of additional resources)?
- What resources are used / needed (human, technical, information)?
- What conditions need to be fulfilled to be able to perform the function?
- Which elements in the current functions need to be improved (what things are not optimized in the current handling of this function) and how can they be improved?

D3.1 did not set specific guidelines for the sources that should be used, allowing each partner to choose a method they are comfortable with.

Every partner summarized their retrieved information into one template per OF and sent this to the WP3 lead. After collecting all data, the WP3 lead has combined the results (provided by the WP3 partners) into a 'final draft' per OF from the survey. This 'final draft' has been sent back to all partners to check if they recognize their input in the overall combined version.

After this review the WP3 lead incorporated remarks then deduced the final version. Parallel to the review of the survey results, conclusions from the results were discussed within the WP3 team (during a meeting in Rijswijk NLD on May 7 2012).

---

[4] IMPACT: EU PASR security project SEC4-PR-008000, Dutch project on MultiRespons CBRNe, ACRIMAS : EU FP7 security project 261669, DHS : USA Department of Homeland Security Target Capability List – September 2007

3.2   Division of work amongst partners

This work package includes seven partners. The work among them was divided according to Table 1 (taken from D3.1), which shows for which phases of the security cycle the WP3 partner aimed to retrieve information on (some of) the operational functions.

Table 1 Work division amongst WP3 partners.

	Threat assessment	Prevention	Preparedness	Response	Recovery
FFI		CRN*	CRN	CRN	RN
FOI			CBRN	CBRN	CBRN
KCL			CBRN*	CBRN*	CBRN*
NFI				CBRN*	
SGSP	CBRN		CBRN	CBRN	
TNO	CBRN	CBRN	CBRN	CBRN	CBRN
UmU		B	B	B	B

* Means that only some of the operational functions in the specific phase will be explored upon.

As the table clearly shows, not all phases of the security cycle were equally covered by the WP3 partners. Also, not all specific functions per phase were covered equally. Paragraph 3.3 will provide more detailed information about the coverage of the survey, based on the information actually retrieved.

3.3   Achieved results

3.3.1   Templates OFs

For every OF the completed templates have been combined into one overall description/template per OF. These descriptions are captured in Annex III – VII; each annex represents the OFs of one of the phases of the security cycle.

3.3.2   Quantitative information on the collected data

Given the number of partners and the list of OFs in Annex I, the maximum number of filled out survey templates is 7 (partners) x 66 (OFs) = 462. However, as already indicated in Table 1 this was not the case, because partners only conducted the survey according to the division of work. When taking this division into account, a total number of 306 OF templates were expected to be filled out.

The survey resulted in 269 filled out templates, which is a response of 88%. Figure 3 shows a visualisation of the survey response for each phase. Note that this purely illustrates the quantity of the results, and does not say anything about the quality of the results.
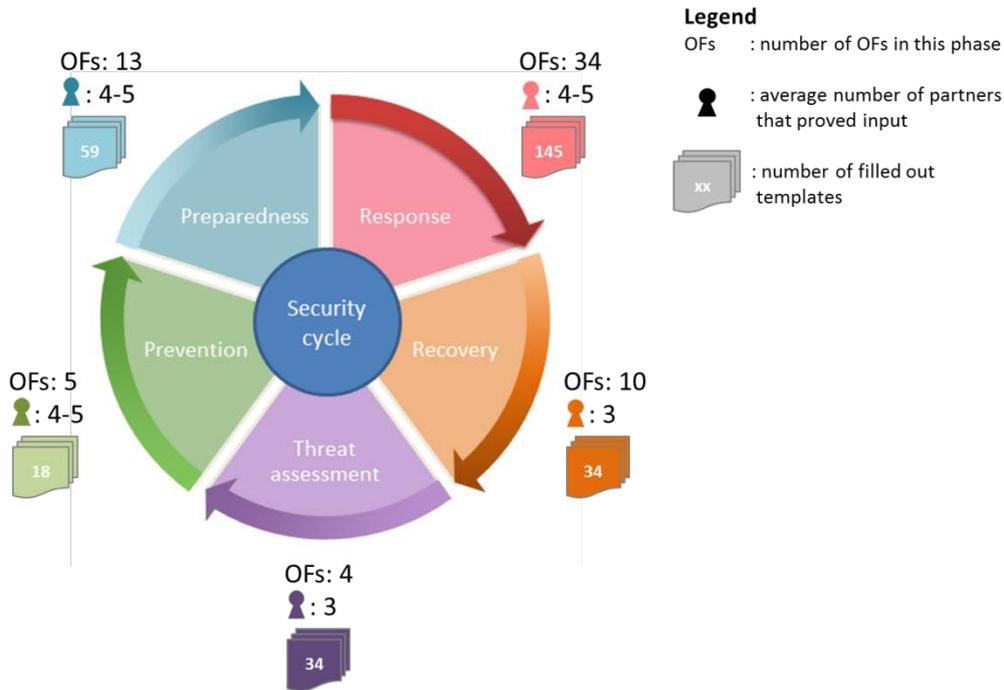
Figure 3 Number of OFs and completed templates per phase.

Below, a short overview per phase is given about the number of delivered templates and the sources that have been used for the data collection. In general, for all phases the completed templates are enriched by people from the WP3 team and other consortium partners who are experienced with CBRN related crisis management and have knowledge about existing gaps and possible improvements in this area.

Threat Assessment phase: The threat assessment phase was covered by 13 completed templates. Three partners have provided information for the four OFs in this phase. The information is based on a survey of literature about terrorism cases such as the Aum Shinrikyo case.[5] Although the context (specific nation affected, period of time in which the incident occurred etc.) of these incidents is not 100% matching with the current setting in the EU Member States, a lot can be learned from them. Furthermore, interviews were conducted with first responders, crisis management professionals, armed forces and civil authorities, primarily from Sweden. The focus of one of the partners was primarily on B-threats.

Prevention phase: The prevention phase, consisting of five OFs, was covered by 18 completed templates. The sources used for this phase were literature[6] and interviews. The interviewed persons were professionals from first response organisations, crisis management and civil authorities from Sweden. One of the partners paid only specific attention to B-scenarios.

---

[5] Danzig, R. et all, *Aum Shinrikyo. Insights Into How Terrorists Develop Biological and Chemical Weapons* (downloaded from: http://www.cnas.org/aumshinrikyo ; visited on 21 October 2011).
[6] Danzig, R. *Aum Shinrikyo.* (2011).
Wijk, R. de en C. Relk, *Doelwit Europa. Complotten en aanslagen van moslimextremisten* (Alphen aan de Rijn, 2006); Target Europe. Conspiracies and attacks of muslim extremists (in Dutch).

Preparedness phase: In general each of the OFs (13 in total) was covered/handled by either 4 or 5 partners; 59 templates have been filled out. One of the partners has been investigating the B-scenarios specifically, others explored the full range of CBRN. The sources used for this phase were mostly interviews with first responders and with a representative of EU level institutes like the European Centre for Disease Control. Some OFs also have input from evaluation reports[7] and one of the partners has conducted a separate written questionnaire on one of the OFs. Another source of information is the set of results from the Polish and Norwegian national workshops that have been held within WP2 with the purpose to validate the developed scenarios and to assess the consequences of these scenarios. Remarks on OFs that were made during these workshops were afterwards captured in the WP3 templates. In some cases the workshop remarks were used as a starting point for specific interviews.

Response phase: For the response phase, 145 templates, describing 34 operational functions were acquired. Similarly to the preparedness phase, on average 4 to 5 partners have provided information on each of the response OFs. The sources of information were: interviews with B-specific and general first responders, as well as the WP2 national workshops mentioned above. Furthermore, incident evaluation reports[8] and scientific reports[9] were used, and an additional questionnaire on a couple of OFs written by two partners.

Recovery phase: The recovery phase was described in 34 templates covering 10 OFs. Three partners filled out the templates, providing input from interviews with first responders, crisis management and civil authorities. Also the European Centre for Disease Control has been contacted. Furthermore, specific literature about psychological health care in case of CBRN-incidents was analysed.[10]

3.3.3 Reflection on survey results

The previous paragraph shows that a large quantity of data was collected through the survey. This paragraph reflects on these results starting by discussing the chosen method for retrieving the data and continuing with some observations regarding the quality of the collected data.

Method

Every method for retrieving data has its advantages and disadvantages. In advance it was stated that the preferred way of conducting the PRACTICE survey is to interview experts out of the

---

[7] For instance: Berenschot and NICIS institute, *Plannen in de praktijk, praktijk in de plannen* (Utrecht 2010); Plans in practice, practice in plans (in Dutch)

[8] Inspectie Openbare Orde en Veiligheid, *De staat van de rampenbestrijding, Onderzoek Rampenbestrijding op Orde eind 2009* (The Hague 2010); The condition of disaster management (in Dutch).
Helsloot, I., Dorssen, M. van (9 maart 2011), *Evaluatie Aanpak Nieuwe Influenza A (H1N1); Evaluation of Combatting Influenza A (H1N1) (in Dutch).*

[9] For instance: TNO report, *Multi-respons CBRNe* (October 2011)

[10] Havenaar, J.M., J.G.Cwikel and E.J.Bromet, *Toxic turmoil. Psychological and societal consequences of ecological disasters* (The Plenum Series on Stress and Coping; New York 2002).

Reinke, S. et al., After the crash. Assessing the immediate and long-term effects of disaster on a small town (Georgia Political Science Association, Conference Proceedings 2007).

network of WP3 partners. However, since not all partners were able to use this method (e.g. they were not able to interview the appropriate experts within the timeframe), other methods were suggested and used. The national workshops within WP2, written surveys and case studies, are alternatives to retrieve data.

The partners have chosen method(s) with which they are comfortable and which were practicable given the timeframe available for performance of this WP-task (from September 2011 – February 2012). A broad range of activities has been performed which in a general sense led to retrieving a wide range of data. Because of the explorative nature and sources of this survey, its results are explorative as well. A disadvantage of this approach is that the survey results are more difficult to compare with one another than when using only one method. Task 3.4 will leave room for more thorough analysis of a number of OFs.

Quality of collected data

During the process of combining the data of the partners to make an overview per OF, the differences and similarities between the templates became apparent. There were a couple of aspects regarding the content of the completed templates that were striking:

Quantity
For most of the functions on average 4 to 5 partners have provided input. For some OFs however, only one partner provided input. In this case the end results for the OF concerned as presented in Annex III - VII reflects this one template and drawing general conclusions was therefore not possible.

Missing data
Although in this study a broad range of activities has been performed, none of the templates were completely filled out. There are various possible reasons for missing data:

- Partners have were not been able to reach contact appropriate people appropriate for to interview about specific OFs;
- The knowledge of the interviewee does not cover the entire OF or was specific for on eof the letters and might be focussed on one element of C, B, R and/or N;
- To some extend the knowledge of the interviewer will lack certain element so not all OFs will be dealt with equally,
- The interviewed person did not find (some aspects of) the OF relevant enough (which does not automatically mean that the OF is not relevant, others might argue otherwise!);
- OFs related to The data regarding the phase threat assessment is are often classified information and will therefore not be distributed easily;
- The interviewer did not specifically ask specifically for certain matters i.e. during an interview only the most pressing elements were discussed;
- The awareness to CBRN might be very low among the interviewed persons, which means that specific questions were difficult to answer.
- The most pressing elements will be discussed in an interview. As a result, those OFs having a lower urgency may have been 'forgotten' to mention in the interview.
- Lack of time and freedom of speech of interviewees.

Interpretation

Not all functions/questions were interpreted in the same way by all partners. Some partners have for instance focused on aspects that *might* go wrong, while others mentioned things that actually went wrong in the past. The process of combining the data was in this case aimed at catching the different views as much as possible.

Level of detail

There is a large variation in the level of detail to which partners have filled out the templates. Some template were filled out extensively, providing quite detailed answers for most of the questions in the template. In other cases however, very little detail was provided: some templates mentioned only a few keywords.

Differentiation

The template allowed the partners to differentiate their answers between the letters C, B and R/N, outdoor incidents vs. indoor incidents and intentional vs. unintentional incidents. However, most of the templates were filled out for CBRN situations in general. An exception is Biological aspects, which were specifically targeted by one of the partners. Determining whether the execution of OFs differs when an incident is outdoor/indoor or intentional/unintentional could be further explored in task 3.4.

Concluding reflection of the results

Although the survey did not cover all OFs in great detail and leaves some questions unanswered, it provided a wealth of information about the CBRN security cycle: the survey has led to an increased insight into the complexity and range of functions necessary to counter and overcome CBRN threats. Furthermore the results were essential for fine-tuning the original set of OFs into the ideal set of ideal functions (see Chapter 4) and they will provide a sound basis to be used in the more detailed analysis of task 3.4.

4.   Ideal list of Operational Functions

One of the outcomes of tasks 3.2 and 3.3 is the description of an ideal list of operational functions. As pointed out in paragraph 2.2.3, this ideal list will be "an *ideal* set of *ideal* functions". This ideal set is captured in paragraph 4.2.

Paragraph 4.1 will first address the interaction with WP4 with which we intend to retrieve additional information (on top of the survey results) for drawing the ideal list of OFs.

4.1   Input from WP4

At the start of the project, it was decided that it would be important to exchange information between WP3 and WP4 to provide each other with input for activities that are conducted in parallel.

In February 2012 WP4 held a meeting on linking the OFs from WP3 to the Critical Event Parameters (CEPs) from WP2. During this meeting the initial list of OFs was used, derived from D3.1. When going through the list of OFs, the WP4 team made some alterations regarding this list. One OF was added to the list: Volunteer management.

Furthermore some functions were split into two functions, namely:

-   The original OF 2.2 was split into '*track and trace (dangerous) goods (including securing storage and transport, export control etc.)*' (OF 2.2a) and '*continuous screening of water and food (entire chain) for CBRN contaminants*' (OF 2.2b).
-   The original OF 2.5 was split into '*vetting of people working for organisations in security or vital infrastructures sectors'* (OF 2.5a) and '*screening of public in open spaces'* (OF 2.5b).
-   The original OF 4.24 was split into '*identify wider population at risk/affected'* (OF 4.24a) and '*distribute mass prophylaxis'* (OF 4.24b).

These alterations have been considered when setting up the ideal list of OFs.

Furthermore, during this WP4 meeting, it turned out that some OFs are not triggered by CEPs, but by other operational functions. This shows that the OFs are not stand alone functions but are interdependent. This interdependency means that the performance of one OF can also – either positively or negatively - influence the performance of one or other functions. As a result of the WP4 meeting alterations, WP3 addressed the dependencies between the OFs during a small WP3 meeting in March 2012. These dependencies are visualised in a graph (see Figure 4). **PLEASE NOTE THAT THIS GRAPH IS A FIRST IMPRESSION OF THE INTEDEPENDENCIES AND NEEDS FURTHER EXPLORATION!**

Three types of relations between two functions have been considered:

•   An OF triggers another OF (solid black line)
•   An OF influences another OF (solid red line)
•   An OF is actually a part of (more specified description) of another OF (dashed black line)

Each of the ovals in the graph represents an OF, the numbers identify OFs as in the original list of OFs from D3.1 together with the additions mentioned above.

PLEASE NOTE THAT THIS GRAPH IS A FIRST IMPRESSION OF THE INTEDEPENDENCIES AND NEEDS FURTHER EXPLORATION IN COMING TASKS!
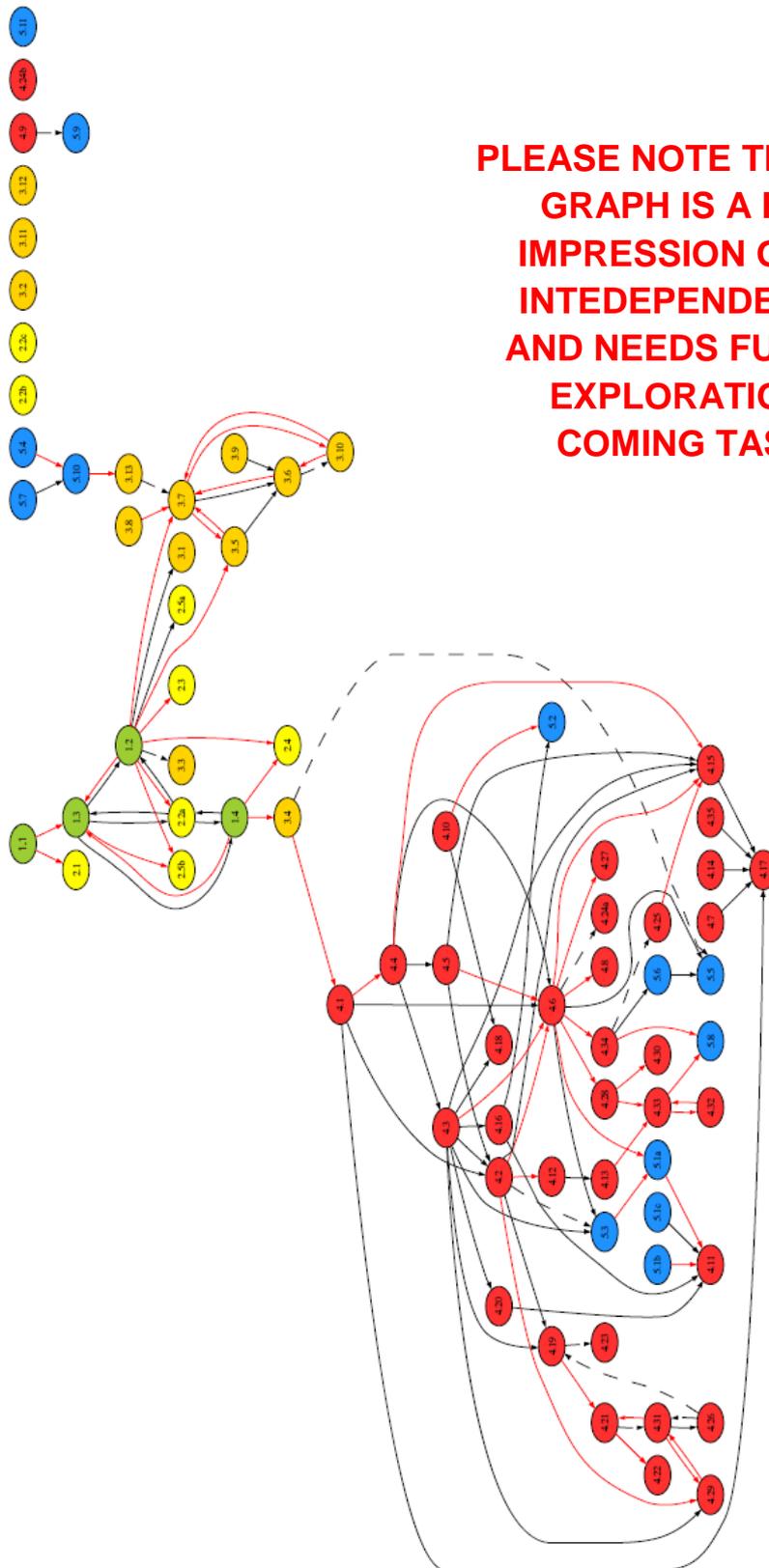
Figure 4 First draft of the visualization of the dependencies of OFs.[11]

---

[11] See tables in Chapter 4.2 for the actual OF related to the numbers.

The phases of the security cycle are marked by colours:

- **Green** for Threat assessment,
- **Yellow** for Prevention,
- **Orange** for Preparedness,
- **Red** for response and
- **Blue** for recovery.

In summary, there are 74 OFs and 111 links. The graph consists of one large connected component with 65 OFs, the other 9 are of a more abstract nature and connect with a lot of other OFs. The main graph shows two 'distinct' sub graphs: one focussing on pre-incident OFs, predominantly green, yellow and orange OFs) and one focussing on after-incident OFs, red and blue OFs).

The dependencies were determined during a meeting and have not been further validated. Although it is not included in the task description of WP3, it became clear during the work that more insight into these interdependencies between OFs be useful for the toolbox concept development by WP4 and for PRACTICE as a whole. At this point, no conclusions will be drawn based on these preliminary results but they will be used as a basis for task 3.4.

4.2 Ideal list of operational functions

Below the ideal (= comprehensive) list of OFs is included. Besides the alterations that are made on the list itself, a brief (ideal) description is given of the concerning OF. Because of the alterations, the original numbering (in the initial list) has slightly changed when compared to the list below.

1. Threat assessment
1-1 **Identify/trace suspected terrorists (suspected intentions and capabilities included)** To be able to gain knowledge about emerging threats and (potential) terrorists with use of all (inter)national information that is available.
1-2 **Conduct (national) risk and vulnerability assessment of areas and critical infrastructures/possible targets** To be able to assess risks and threats for national and EU areas/objects, as a basis for (inter)national crisis management planning and with use of all available (inter)national information.
1-3 **Determine alert state** To be able to determine the appropriate state of readiness for all organizational entities involved in (inter)national crisis management.
1-4 **Trend watch on emerging threats** To be able to perform long term foresights into emerging threats for early warning, indication purposes and providing input for OF 1-1.

2. Prevention
2-1 **Apprehend suspected terrorists** To be able to identify and arrest suspected terrorists to prevent an attack from occurring.
2-2a **Track and trace (dangerous) goods (including securing storage and transport, export ** * **control etc.)** To be able to follow (track and trace) identified dangerous goods available (in use) in a nation and/or EU; being aware of the location, quantity and declared use at all times, for all identified CBRN-substances.
2-2b **Continuous screening of water and food (entire chain) for CBRN contaminants** * To be able to screen the entire human and animal water and food chain (from raw materials to finished product and retail; Food and Feed) for the presence of CBRN contaminants.
2-3 **Enforce non-proliferation measures** To be able to draw agreements internationally (and control them) about the handling of all identified CBRN-substances.
2-4 **Execute anti-radicalisation programs** To be able to execute activities that prevent people, susceptible to terrorism, of becoming actual terrorists.
2-5a **Vetting of people working for organisations in security or critical infrastructure sectors** To be able to investigate (vet) people employed in security sensitive working areas with respect to possible malicious activities and/or susceptibility for blackmail.
2-5b **Screening of public in open spaces** * To be able to screen large groups of people (in real life but also virtual communities) for identifying (upcoming) malicious activities and/or identifying possible terrorists (perpetrators).

3. Preparedness	
3-1	**Create redundancy in company processes (for possible targets)**
	To be able to organise processes in critical sectors (possible targets) in such a way, that a break down of one of the chains/organisations will NOT lead to a total break down for a region/nation (contingency planning).
3-2	**Create public awareness (for early warning and mitigation of effects)**
	To be able to inform the general public about certain possible incidents in such a way that, if and when this incident actually happens, people do not panic and effects are manageable (risk communication).
3-3	**Monitor and protect critical infrastructures/possible targets**
	To be able to foresee and prevent possible attacks towards critical infrastructures by continuous surveillance of and communication with the 'objects' and implementation of measures that make approaching of the object less easy.
3-4	**Monitor (general) public health**
	To be able to collect data about the general status of health in a population.
3-5	**Execute capability assessment in relation to threat/risk assessment**
	To be able to tune necessary (input from threat/risk assessment) and available first responder capability and capacities.
3-6	**Develop and procure equipment and methodologies for first responders**
	To be able to acquire needed equipment for first responders, related to the tasks they are expected to perform (effectively and efficiently).
3-7	**Develop and train emergency plans and CBRN protocols for first responders and crisis management organisations**
	To be able to describe activities and responsibilities for all involved organisations during the handling of a CBRN incident and to develop and run training courses to practice all these activities.
3-8	**Develop plans to support incident command**
	To be able to describe activities and responsibilities for CBRN incident command for all involved organisations.
3-9	**Develop communications network (for crisis management)**
	To be able to describe activities and responsibilities for all involved organisations, with respect to crisis management communication between these organisations, and acquire and install the appropriate equipment for support of this communication.
3-10	**Ensure interoperability between first responders and crisis managers (standard operating procedures)**
	To be able to address interdependencies between activities/organisations and to agree upon procedures and vocabulary to make sure that cooperation runs smoothly.
3-11	**Establish (inter)national subject matter expert (SME) teams**
	To be able to identify (inter)national experts and come to an agreement about involvement before, during and/or after actual incidents.
3-12	**Cooperate and coordinate with international institutes/agencies to exchange information and experience**
	To be able to identify international institutes/agencies and to come to an agreement about exchange of information and experiences.
3-13	**Implement lessons learned**
	To be able to implement improvements that have come forward through learning from experiences with actual incidents and/or exercises.

4. Response - General and situational awareness
4-1   **(First) alert** To be able to collect an initial alarm (audio, visual, electronic, ..) which announces an incident (or a serious threat) and to start-up assigning appropriate response capabilities.
4-2   **Determine scale of incident, propagation in time, appropriate security zones and level of response** To be able to address the characteristics of the event, predict possible development and assign the necessary capabilities with respect to this information.
4-3   **Detect, sample, identify and monitor hazardous materials** To be able to quickly and accurately determine the CBRN substance that has been released taking into account all required safety measures for responders.
4-4   **Determine cause and origin of incident, preserve evidence** To be able to investigate the origin of the incident (source, location, etc.) with respect for preserving evidence in case of malicious intent (or omissions) and prosecution of perpetrators.
4-5   **Check for and deactivate secondary threat (in case of intentional incident)** To be able to identify the presence of a secondary threat, determine the location of this secondary threat and deactivate it so no second incident will start.
4-6   **Assess consequences for (public) health, infrastructure and environment** To be able to quickly and accurately (in quantity, size of location etc.) determine the consequences of an incident with respect to (public) health, infrastructure and environment in the near vicinity of the incident.
4-7   **Report to higher command** To be able to inform higher level stakeholders in the involved organisations about the incident.
4-8   **Communicate with the media** To be able to address appropriate media channels and to exchange/communicate all necessary information.
4-9   **Involve (inter)national subject matter expert teams (for communication and assessment of information)** To be able to cooperate with (inter)national experts in the appropriate field (with respect to the incident) to retrieve current information about the incident, possible evolvement and communication to those directly involved and society in common about the incident.

4. Response - Environment
4-10   **Remove debris, (instable) constructions and vegetation (with the aim to reduce or prevent the risks resulting from the incident)** To be able to safely and timely remove any objects that might increase risks for the general public as well as first responders after an incident has occurred.
4-11   **Handle/dispose of contaminated waste** To be able to safely and timely remove any waste resulting from a CBRN-incident.
4-12   **Secure affected area** To prevent people who are not needed at the incident location, from approaching the location for the timeframe that is requested, but also keeping people in that are not allowed to leave the incident scene.
4-13   **Manage traffic (emergency transport, managing other traffic flows)** To be able to (re)route any traffic in the vicinity of the incident location in such a way that responders are not hindered and the handling of the incident can take place as smooth as possible.
4. Response - Organisation

4-14	**Coordinate crisis management organisations**
	To be able to support cooperation between all organisations involved to optimise the handling of the incident. This concerns all levels: tactical, operational and strategical.
4-15	**Scale up/down emergency response**
	To be able to increase/decrease response capacities if the development of an incident over time needs more or less capacities than are available.
4-16	**Control and monitor hazardous material on-site**
	To be able to prevent a source of any CBRN hazardous material from further spreading.
4-17	**Command and control**
	To be able to direct on-site operational functions and to tune running activities and the information flow.

4. Response - Public care	
4-18	**Search and rescue**
	To be able to search the incident scene for victims and to safely (for responders as well as victims) get them out to enable appropriate medical care.
4-19	**Manage casualties on-site (triage – treatment – stabilization)**
	To be able to timely provide appropriate emergency medical care for victims of a CBRN-incident, taking into account all safety measures for responders.
4-20	**Decontaminate people, (companion) animals, their equipment and vehicles**
	To be able to remove CBRN contamination from those involved in a CBRN-incident, without long waiting times and taking into account the needed medical treatment afterwards and the timeframe in which this needs to take place.
4-21	**Register and evacuate injured people**
	To be able to identify people involved and injured in the incident, register all necessary information and transport them into a safe area.
4-22	**Isolate infected people/animals**
	To be able to identify people (and/or animals) involved in the incident, determine whether isolation is needed, appoint the appropriate amount of isolation capacity and transport people to this location.
4-23	**Treat patients in hospitals**
	To be able to provide necessary medical care in hospitals.
4-24a *	**Identify wider population at risk/affected**
	To be able to identify the area at risk in the near vicinity of the incident, determine the population presence in this area during the incident and possibly select groups to retrieve preventive care.
4-24b *	**Distribute mass prophylaxis**
	To be able to provide appropriate prophylaxis to people at risk in a timely matter, with consideration of possible long term effects.
4-25	**Organize (additional) medical capacity**
	To be able to extend medical capacity if a CBRN-incident exceeds the local/regional capacity for treatment of victims.
4-26	**Register and take care of the deceased**
	To be able to identify, handle and relocate deceased people, taking possible contamination into account.
4-27	**Warn population in surrounding areas**
	To be able to inform the population in the near vicinity of the incident about the incident and the measures they need to take.
4-28	**Evacuate surrounding areas**
	To be able to identify the area that experiences unacceptable risks from the incident, inform the population about the evacuation and transport people to a safe area/location.

4-29	**Register and trace exposed people**
	To be able to identify people involved in the incident, trace and make contact with them to provide all necessary information and/or treatment.
4-30	**Provide shelter, nutrition, water, sanitation and hygiene to evacuated people**
	To be able to determine shelter locations, arrange all logistical activities to (re)supply water, food and sanitary needs to these locations.
4-31	**Register and handle belongings that were left behind**
	To be able to collect, register and store belongings that were left behind at the incident scene and if possible trace the owner and return his items.
4-32	**Inform the general population**
	To be able to timely and accurately provide information to the general public about the incident, the measures that were taken and about what is expected from people themselves.
4-33	**Manage the public order**
	To be able to maintain order in common and specifically in the affected/threatened area.
4-34	**Provide psychological care**
	To be able to ensure psychological support for those involved in the incident by specialized personnel and estimate the need for long term care.
4-35 *****	**Mobilise and manage voluntary sector (volunteer management)**
	To be able to determine the need for voluntary assistance, draw agreements on how assistance is to be given, integrate volunteers into active processes in such a way that synergy occurs and current processes are not disturbed.

5. Recovery	
5-1	**Decontaminate infrastructure and environment (static)**
	To be able to remove any contamination from objects and from the environment (soil, water, air).
5-2	**Clear debris**
	To be able to safely and timely remove, any objects after an incident has occurred, that might increase risks for the general public as well as first responders.
5-3	**Determine residual contamination level**
	To be able to assess whether the residual contamination levels are acceptable for people and livestock.
5-4	**Reconstruct basic services (e.g. energy supply, telecom), infrastructure and environment (including private property)**
	To be able to quickly restore all basic facilities that make the society work as normal as possible and desired.
5-5	**Provide long term health care (keep track of / conduct research on long term effects)**
	To be able to retrieve information about the long term health effects of an incident.
5-6	**Provide long term psychological care**
	To be able to provide timely and sufficient psychological care to people that are affected by the incident.

5. Recovery (continued)
5-7   **Restore first response capabilities** To be able to bring back trust from society in response capabilities.
5-8   **Restore (trust in) society, government and economy** To be able to bring back society to the way it was before the incident happened (restore tranquillity) as much as desired.
5-9   **Prosecute perpetrators** To be able to take legal actions towards those that are responsible for the incident that has occurred.
5-10   **Evaluate incident response and retrieve lessons learned** To be able to exchange experiences about an incident (or exercise) with all parties involved in handling the incident (including citizens) and point the aspects that did (not) go well.

5. Way ahead

By conducting tasks 3.2 and 3.3 we have gained more insight into the current and the ideal OFs that are used or needed when dealing with CBRN-events in Europe. The initial set of OFs, as drafted in D3.1 was explored by the use of a prescribed set of questions. The answers to these questions have led to adjustments to the list of OFs, but also have given more detail into to current existing gaps.

The next phase of WP3 will focus on the analysis of these results: task 3.4 which is described in the DoW as:

DoW Task 3.4: Evaluation of the survey results to identify commonalities and unique qualities among the various CBRN crisis management/response systems and standards. ..... Identify areas where redundancy might be reduced with multi-national cooperation. Highlight areas where improvements are needed.

The next task (T3.4) focusses on comparing the survey results with the ideal set; it will be a more in-depth analysis of the functions and how they should be performed in the ideal situation. The ideal set described in chapter 4is a very broad set of functions. In order to come to a more condensed sub selection of this set, WP3 will analyse the functions with regard their CBRN-specificity and whether or not there a particular CBRN-challenges for an operational function. Also, WP3 will take functions into account which are of interest for upcoming PRACTICE CBRN-exercises. This selection will be done during a combined meeting of WP3 and WP4 partners, since both WPs will work on the analysis. Although T3.4 and T4.2 (plus T4.1) are separate tasks, with respect to the content there is an overlap:

DoW Task 4.1/4.2: Analyse ... to identify best practices as well as gaps and shortcomings. Define (sub) concept elements or functions which are either missing or need to be replaced or modified ..... Describe the requirements of the (sub) concept elements or functions identified in WP 4.1.4. Special care to be given to the prioritized gaps identified.

For this reason it was decided, by both WP-leaders, that combining and tuning of efforts on both tasks was preferable. Furthermore, D4.2 (related to DoW Task 4.1/4.2) has its delivery date in month 16, D3.4 in month 24. This means that D4.2 will set another reference for D3.4 and can be used as input for D3.4.

In summary, task T3.4 will continue to retrieve insight (analyse) into the OFs with respect to desirable improvements, but will focus on a smaller set of OFs. An extra input for this will be D4.2.

Annex I: List of Operational functions – derived from D3.1

In D3.1 a list of Operational Function has been captured, that has been used for conducting the survey in Task T3.2. This Annex shows this initial list with Operational Functions, structured according to the five phases of the security cycle.

Phase 1 Threat assessment

1. Identify/trace suspected terrorists (suspected intentions and capabilities included)
2. Conduct (national) risk and vulnerability assessment of areas and vital infrastructures/possible targets
3. Determine alert state
4. Trend watch on emerging threats

Phase 2 Prevention

1. Apprehend suspected terrorists
2. Track and trace (dangerous) goods (including securing storage and transport, continuous screening of water and food for CBRN contaminants, export control etc.)
3. Enforce non-proliferation measures
4. Execute anti-radicalisation programs
5. Screen people (working at security related companies)

Phase 3 Preparedness

1. Create redundancy in company processes (for possible targets)
2. Create public awareness (for early warning and mitigation of effects)
3. Monitor and protect vital infrastructures/possible targets
4. Monitor (general) public health
5. Execute capability assessment in relation to threat/risk assessment
6. Develop and procure equipment and methodologies for first responders
7. Develop and train emergency plans and CBRN protocols for first responders and crisis management organisations
8. Develop plans to support incident command
9. Develop communications network (for crisis management)
10. Ensure interoperability between first responders and crisis managers (standard operating procedures)
11. Establish (inter)national subject matter expert teams
12. Cooperate and coordinate with international institutes/agencies to exchange information and experience
13. Implement lessons learned

Phase 4 Response

General and situational awareness
1. First alert
2. Determine scale of incident, propagation in time, appropriate security zones and level of response
3. Detect, sample, identify and monitor hazardous materials
4. Determine cause and origin of incident, preserve evidence
5. Check for and deactivate secondary threat (in case of intentional incident)
6. Assess consequences for (public) health, infrastructure and environment
7. Report to higher command
8. Communicate with the media
9. Involve (inter)national subject matter expert teams (for communication and assessment of information)

Environment
10. Remove debris, (instable) constructions and vegetation (with the aim to reduce or prevent the risks resulting from the incident)
11. Handle/dispose of contaminated waste
12. Secure affected area
13. Manage traffic (emergency transport, managing other traffic flows)

Organisation
14. Coordinate crisis management organisations
15. Scale up/down emergency response
16. Control and monitor hazardous material on-site
17. Command and control

Public care
18. Search and rescue
19. Manage casualties on-site (triage – treatment – stabilization)
20. Decontaminate people, animals and vehicles
21. Register and evacuate injured people
22. Isolate infected people
23. Treat patients in hospitals
24. Distribute mass prophylaxis
25. Organize (additional) medical capacity
26. Register and take care of the deceased
27. Warn population in surrounding areas
28. Evacuate surrounding areas
29. Register and trace exposed people
30. Provide shelter, nutrition, water, sanitation and hygiene to evacuated people
31. Register and handle belongings that were left behind
32. Inform the general population
33. Manage the public order
34. Provide psychological care

Phase 5 Recovery

1. Decontaminate infrastructure and environment (static)
2. Clear debris
3. Determine residual contamination level
4. Reconstruct basic services (e.g. energy supply, telecom), infrastructure and environment (including private property)
5. Provide long term health care (keep track of / conduct research on long term effects)
6. Provide long term psychological care
7. Restore first response capabilities
8. Restore (trust in) society, government and economy
9. Prosecute perpetrators
10. Evaluate incident response and retrieve lessons learned

[PRACTICE]

Annex II: Survey template – revised version

PHASE / OPERATIONAL FUNCTION	General	Specific (if different than in 'general' field) *				Source(s)
		C, B, R, N	accidental incident	indoor / outdoor	contaminated area / clear area	
GENERAL						
Goal of operational function						
START						
Trigger for starting the function						
Needed information to get started						
Available scaling options to extend the production time						
RESOURCES and CONDITIONS						
Needed type of resources (specialized)						
Needed conditions						
IMPROVEMENT						
What goes wrong in the current way of performing the function?						
How could the function be improved?						
OTHER REMARKS						

* suggested specific circumstances. They can be used as 'trigger' for further questioning.

Annex III: Threat assessment phase

Operational function 1.1: Identify/trace suspected terrorists

Goal of operational function

The goal of the operational function 'Identify/trace suspected terrorists' is to gain knowledge about emerging threats in order to apprehend them. This function also includes gaining insight into (potential) terrorists who are trying to acquire capabilities which allows them to attack. Capabilities is broadly defined and includes training and acquisition of required material.

Trigger for starting the function

The operational function can be triggered by specific information about suspicious behaviour. For instance, acquiring of CBRN material and devices, scouting of objects, trying to acquire specific materials or in large quantities, or travelling to suspicious countries.

Besides specific triggers, this function is also performed as a continuous activity. Intelligence, police and private services scan the environment on a day-by-day basis.

Needed information to get started

Intelligence about aberrant behaviour of (potential) terrorist is important. To start up an investigation, intelligence and police organisations are looking for clues or leads. Without suspicious or aberrant behaviour of (potential) terrorists, their preparations will likely be overlooked.

Available scaling options

Needed type of resources

Needed conditions

Clear legislation regulating possession, production and distribution of CBRN materials is needed , it is not allowed to collect information about people who you think might be preparing an attack.

Willingness to cooperate and e.g. to exchange information.

What goes wrong in the current way of performing the function?

Improvement options

Major improvement in the field of international cooperation.

Other remarks

In the case of the Aum sect the police was not particularly looking for terrorists. This means that without the right mind-set recognizing threats will be extremely difficult.

Operational function 1.2: Conduct Risk and Threat Assessment

Goal of operational function

The goal is to conduct a risk and threat assessment in order to analyse risks and vulnerabilities of any potential object of an attack, it could be a specific location, an event or region. The risk and threat assessment is a basis for all crisis management plans at any organizational level. It is, in other words, the start of preparing against relevant risks and threats.

Trigger for starting the function

A trigger could be specific information coming from the intelligence services. Although, a risk and threat assessment often also are performed as part on regular basis in order to ensure that plans are still viable. Also an upcoming (major) event may be the start of an assessment. If, in a certain area, a CBRN facility is located, then it may be the case that on a regular basis the area is monitored.

Needed information to get started

-

Available scaling options

-

Needed type of resources

Intelligence sources are important, however, for some threats more specialised knowledge is required. For instance, for biological threats experts are needed to conduct the assessment.

Needed conditions

-

What goes wrong in the current way of performing the function?

-

Improvement options

National and international cooperation is essential. It is particularly important to share information since it will increase the accuracy and timeline of the plans.

Other remarks

Operational function 1.3: Determine Alert State

Goal of operational function

The goal of an alert state is to determine the appropriate level of readiness for organisations involved in first response and crisis management given a certain threat level. The idea behind an alert state is to ensure a timely and proportional response to an emerging threat.

In case of a biological threat, the alert state level will function as a warning signal to prevent an infectious disease from spreading and developing into pandemics.

Trigger for starting the function

Determining the alert state level is based on information coming from threat assessments or the identification of suspected terrorists. The alert state can then be raised to warn organisations for an upcoming event.

The alert state might also be raised due to an incident. In such a case, the operational function is to prevent a second attack and/or cascading effects.

Needed information to get started

For biological cases, information about infectious diseases or medical knowledge in general is needed in order to correctly determine the alert state.

Available scaling options

Needed type of resources

Needed conditions

What goes wrong in the current way of performing the function?

Improvement options

Systematic sharing of intelligence, especially on an international level.

Other remarks

In Sweden, at regional level (County Administrative Board) 'crisis' is defined as an incident for which more than one person in charge is activated. For B-attacks a list of 60 infectious diseases is drafted. For these diseases, one patient per County is enough to raise the alert state.

Operational function 1.4: Trend watch on emerging threats

Goal of operational function
Trend watch on emerging threat is done for early warning and indication purposes.

Trigger for starting the function
Trend watch is done on a regular basis. It needs to be continuously updated. While there is no specific trigger, it is possible that new topics are put on the agenda. This is often a political decision.

Needed information to get started

Available scaling options

Needed type of resources
Trend watching requires personnel and information networks.

Needed conditions

What goes wrong in the current way of performing the function?

Improvement options

Other remarks
For B, the difficulty lies in the incubation time of most infectious diseases. It is a medical challenge to correctly diagnose a patient's symptoms especially for cases that are out of season or cases of rare diseases that are not readily recognized. New viral/bacterial strains will only be recognized after detailed molecular analysis, which is not done routinely.

Annex IV: Prevention phase

Operational function 2.1: Apprehend suspected terrorists

Goal of operational function
The goal of apprehending suspected terrorists is to prevent a terrorist attack from occurring.

Trigger for starting the function
To trigger this function clear information or intelligence is needed about suspicious activities, including announcements/statements in social media.

Needed information to get started
Legally sound information about the perpetrator's identity and location is essential. The information needs to be as specific as possible about the observed behaviour and whereabouts.

Available scaling options

Needed type of resources
Police and intelligence forces. In an early stage there might even be so-called first-line professionals like social workers involved.

Needed conditions
Laws which enable to apprehend people preventively. This means that police services need certain powers to act beforehand.

What goes wrong in the current way of performing the function?
Response to information may take several hours. Given the fact that multiple disciplines can be involved, (mis)communication or lack of communication makes that optimal handling is not guaranteed.

Improvement options

Other remarks

Operational function 2.2: Track and trace dangerous goods

Goal of operational function
The main goal of the operational function 'Track and trace dangerous goods' is to secure the whereabouts of goods and materials that can be used for making a weapon or for preparing an attack. It is done to acknowledge suspicious acquisition of goods or loss of goods. This includes tracking and tracing goods which can be used in producing CBRN agents.

Trigger for starting the function
Tracking and tracing is partially on a routinely base. However, it may receive input coming from trend watching; a shift of use of certain goods may lead to tracking and tracing of different goods.

Needed information to get started
Basically, tracking and tracing of dangerous goods needs two types of information: an assessment of which kind of goods are potentially useful for a terrorist attack and specific information about interest of terrorist in certain goods. Detailed knowledge about the characteristics of chemicals,B or R/N agents and their weaponisation processes is needed.

Available scaling options

-

Needed type of resources

-   Scanning equipment in ports and transit locations,

-   …..

Needed condition
Laws and regulations about what is allowed and what not.

What goes wrong in the current way of performing the function?
There is a lack of surveillance of research facilities with regard to unauthorized removal of B agents. Parts of the food chain (such as restaurants) and producing companies are also vulnerable; they are supposed to report incidents but not always comply to these rules..

Improvement options
GPS for transports of goods that could be used for CBRN attacks.

Other remarks
Awareness of people working with sensitive materials is essential.

Operational function 2.3: Enforce non-proliferation measures

Goal of operational function

Enforcing non-proliferation measures ensures that potential rogue states or terrorists do not get certain hazardous materials .

Trigger for starting the function

In general, non-proliferation measures are in place and need to be continuously monitored by national and international authorities. States can be put on – and of course removed from – a black list. This means that export of certain goods is no longer allowed to these countries.

Needed information to get started

Available scaling options

Needed type of resources

Needed conditions

Internationally agreed legislations about secure production, storage and transport, already in place for CBRN. There are international organisations looking after non-proliferation measures.

What goes wrong in the current way of performing the function?

Improvement options

Other remarks

Operational function 2.4: Execute anti radicalization programmes

Goal of operational function
Anti radicalization programmes are meant to prevent individuals or groups to radicalize and ultimately become a terrorist and perform a violent attack. These programmes try to reach individuals and groups and seek to take away their grievances.

Trigger for starting the function
Anti radicalization programmes are started based on specific information about individuals and groups who are already radicalizing or have a higher chance of becoming a terrorist. The latter aspect is extremely difficult because it does not deal directly with suspected persons but is about circumstances (socio-economic, political etc.).

Needed information to get started
Information about suspicious behaviour – for instance statements – indicating a trend towards more radical worldviews is needed for targeted programs. Other programs are started based on a survey of grievances or problems related to broader elements in society.

Available scaling options

Needed type of resources

Needed conditions

What goes wrong in the current way of performing the function?
One problem is that some individuals radicalize on their own in a short time period and (almost) unnoticed. These so-called lone wolfs are extremely difficult to identify. Furthermore, there are many pathways to become a terrorist: recognizing why and who will become a terrorist is extremely difficult. Therefore, anti radicalization programmes will not always identify radicalizing persons.

Improvement options

Other remarks

Operational function 2.5: Vetting of people working for organisations in the security or critical infrastructure sectors

Goal of operational function
Vetting of people is done to prevent individuals, who might pose a security risk, to get a job at an organisation in the security or critical infrastructure sectors or other sensitive employments.

Trigger for starting the function
Vetting people is done when they have successfully applied for a job, but before they get started. It is sometimes also done for employees who change functions internally, especially when the new job is deemed as more sensitive. In many countries, vetting is also done on a regular base, as a routine check of the employees.

Needed information to get started
Depending on the level of sensitivity regarding the job position, a lot of personal data is needed. It ranges from track records from former jobs, residences, family and friends, contacts with police, and visits to specific countries.

Available scaling options

Needed type of resources
The resources needed are professionals in the field of psychology, field workers, policemen, analysts etc.; detailed personal information, databases and analysis is needed to vet potential employers.

Needed conditions
Legislation needs to be in place.

What goes wrong in the current way of performing the function?

Improvement options
Psychological vetting of people is not always a routine. How to ensure that the right people are screened?

Other remarks
Municipality personnel working with sensitive issues (social services, health protection in restaurants and companies) and frequently being in stressful situations should undergo psychological training.

Privacy is less an issue here: it is a clear that, when applying for a job is this kind of businesses, vetting is part of the procedure.

Annex V: Preparedness phase

Operational Function: 3.1 Create redundancy in company processes for possible targets

Goal of operational function
To ensure the continuity of a company's essential processes that are possible targets, and therefore to avoid or limit negative side effects (e.g. domino effects) of an attack or accident.

Trigger for starting the function
This function has several triggers:

- Threat or risk assessment that shows that breakdown of functioning would lead to unacceptable side effects,
- Actual breakdown of everyday functions which resulted in negative side effects (e.g. lack of electricity, heating, drinking water),
- Legal acts which force to prepare and implement the function.

Needed information to get started
- full characteristic of the process functionality to design backup systems (sensitive areas within organization or of production processes),
- information about redundancy options,
- staffing plans,
- alarm activation in technological systems.

Available scaling options
In general, creating redundancy is all about creating scaling options: making sure that, despite incidents threatening the continuity, the process can continue. If the planned redundancy option is also failing, scaling options might still be available from sources outside the company e.g. generators for creating electricity or retired personnel that can be called in for help.

Needed type of resources
- Sufficient and qualified company/facility staff,
- technological facilities capacity (enough quality and quantity available)

Needed conditions
- existence of back-up systems and possibilities for continuation of the process in different, not contaminated places,
- plans and procedures for in-company crisis management system activation in force (staff trained in the procedures),
- information about the character of the threat and therefore the place of possible back-up establishment if this is not a fixed location.

What goes wrong in the current way of performing the function?
- lack of backup system/solutions,
- wrong assessment of the threat,
- (tele)communication problems,
- procedural problems (e.g. lack of a human resources back ups and alternative facilities to continue the process)
- *No organised back-up for personnel.* Routines for calling in back-up appears to be lacking at some organizations.

Improvement options
- Involvement of possible targets in risk and vulnerability assessment (threat assessment phase),
- Regular exercises together with possible target organisations,
- existence of backup system for key functions/processes in the company/facility,
- training in procedures,
- backup systems for communication (e.g. phone, sms, e-mail, etc.),

Other remarks
- The need for redundancy in the laboratory analyses is not addressed.

Operational Function: 3.2 Creating public awareness (for early warning and mitigation of effects)

Goal of operational function
Informing the general public to achieve better public response during a crisis (e.g. public support of measures) and by that decreasing of society vulnerability towards CBRN incidents.

Trigger for starting the function
Risk assessments at (inter)national and local levels identify threats and trigger efforts by emergency planners and other agencies to communicate/educate the public prior to an incident. For example reoccurring events like influenza in the winter or reports by the WHO about upcoming pandemic flues trigger for communication campaigns to start.

When the threat has more deliberate aspects in it, the police will be more involved.

Responses are scenario specific and will be tailored to the risks. Triggers may vary depending on extent of decontamination, risk of exposure, (non-) intentional, etc.

Needed information to get started
- information what the threat /risk is so that accurate information can be communicated (when R is concerned, it is about time/distance/shield while C and B is about removal of clothes)
- Basic survival and self-rescue skills, as well as information gathering techniques
- The timeframe in which an increase in awareness is needed – this determines the type of communication that will be used.
- Information coming from the health care system about e.g. an infectious disease.

Available scaling options
There are not many options, since there is the problem of resources: these are limited because of competing priorities and tight budgets.

There are several media types available to bring the message. Depending on the urgency multiple types may be used and also frequency of messaging can be varied.

Needed type of resources
Appropriately trained and experienced staff. The number and type will vary depending on the nature of the incident/threat.

It is important to have an unambiguous name (expert) that is used during the communication; not different experts declaring different statements about the (possible) upcoming incident because this disturbs the public.

Needed conditions
- Helpful and sympathetic media to be able to bring the message,
- Graphic design etc. to make sure that the message is brought accurate,
- A receptive and listening public,
- Conditions will vary depending on the lead organisation - this could be police for deliberate release, but others for accidental and depending on the type of agent.

What goes wrong in the current way of performing the function?

- Very little CBRN specific activity undertaken, more in the accidental/natural hazards domain.
- There is little personnel available at local level for communication on CBRN-incidents – most of it is national.
- Wrong information is passed to society, the target group is chosen too narrow (because of lack of access to mass-media transmitters). This results in people not being aware of possible threats.
- Informing public is often seen as frightening them and therefore not properly executed.
- Unclear delegation of the responsibility. Ideally, all information should be performed by one actor, however, in real life it is often done by multiple actors, as mentioned previously, sometimes leading to contradicting advice.
- In the communication about H1N1 in the Netherlands, the strategy was used to have a single expert which is independent from government. This led to 'invisibility' of governmental actions, which led to discussion about the role of government.

Improvement options

- Need to empower the public to save/rescue themselves. Emergency responders are tied up with tactics, doctrine, health and safety, policy and political issues. The public needs to be educated without frightening them.
- Well-established provision exists for response, but further public awareness and tests of response that provide realistic challenges needed. Development of response needs to be evidence-based and constantly evolving.
- Government strategy and funding for public awareness campaign + recruitment of specialists to provide appropriate psychological support linked to humanitarian assistance capabilities locally
- Must be, where possible, agent/scenario specific. However, identification of any 'one size fits all' solutions also needed.
- permanent education starting from childhood (formal at school and informal by e.g. NGOs);
- common agreement on use of telecommunication networks, masts and if necessary contact data of the telecommunication subscribers;
- take into account the international dimension of a possible incident; involvement of international organisations and mass-media together with ' spreading the word' together.
- An official government view is needed. Don't try to reassure the public, but provide information about risks and free choice about measures (e.g. vaccination). Monitor risk perception and need for information and adjust communication strategy to this rapidly.
- Active use of social media to communicate with citizens, but also to investigate (and to influence) society's sentiment on the crisis situation.

Other remarks

- In general, the Ministry of Internal Affairs is deemed responsible for this function.
- Interoperability between agencies that would provide united messages and clear direction.
- In Sweden warning and informing the public via various channels is one of the main tasks of the County Physician (regarding a local occurrence).

Operational Function: 3.3 Monitor and protect critical infrastructures/possible targets

Goal of operational function

Early warning in case of a sign that something might happen (monitor) and increasing the possibility to prevent an attack (protect).

Trigger for starting the function

This function has several triggers:

- Information coming from threat assessment phase/functions (e.g. awareness of potential threat, vitality (importance) of the company/institute for society),
- An alert from 'society': a citizen, an employee.
- Law enforcement.

Needed information to get started

- Information on special objects: location, entrances, exits, storage of hazardous materials, how many people are normally in the building etc.
- To increase the intensity of the function there should be an increase of the probability of a terrorist attack (outcome of threat assessment)

Available scaling options

This function is usually an on-going process, increase of intensity towards certain objects can be done by a raise of the number of time/people that observe objects. Increasing protection requests building processes (and therefore time). When all security personnel is already 'in business' some scaling can be provided by the police (and/or military).

Needed type of resources

- Monitoring systems (hardware but also 'soft'-ware like procedures how to monitor).
- Detection instruments (substance specific in case of CBRN)
- Security staff and necessary equipment availability (weapons, telecommunication tools, etc.)

Needed conditions

- Plans for crisis management at local, regional, state level in force,
- For B agents, a centralized system for reporting special conditions in the health system is vital in order to raise the alarm when something extraordinary is happening.

What goes wrong in the current way of performing the function?

- Infrastructural changes at the sites, are not always communicated to the first responders,
- In case of a high threat at too many critical infrastructure objects that need to be secured, there is possibly a shortage of resources (police, municipal police),

Improvement options

- ….

Other remarks

There is a difference between securing a building/object (e.g. factory) as a critical infrastructure and securing an "open" infrastructure (e.g. telecommunication net, gas pipelines, etc.) with wide spread of the network.

Operational Function: 3.4 Monitor general public health

Goal of operational function

To retrieve early information on possible (large scale) human illness; this could be due to a natural outbreak of a disease or a possible terrorist attack. Through this function, society can prepare for treatment. This way, the vulnerability of society will decrease.

Trigger for starting the function

This function is actually performed continuously and therefore does not have one very clear trigger. However there are several triggers that can increase efforts of public health monitoring or that can change the focus (for instance to monitor a new disease):

- News surveys on outbreaks around the world,
- WHO reports
- Raised terrorist threat

Needed information to get started

- Possible symptoms that can occur,
- Information about the terrorist attack (if available).

Available scaling options

Not applicable

Needed type of resources

- Medical personnel
- Information from health care system (nationwide) reporting from local physicians,
- Information on international incidents

Needed conditions

- Reporting duties required by law for a list of 60 infectious diseases (this differs per nation),
- Continuous feed of information into the network.
- Plans for disaster health management on local, regional and state level,
- Procedures for first contact medical (veterinary) personnel how to proceed with patients/cattle applying for diagnosis.
- …

What goes wrong in the current way of performing the function?

- Shortage of epidemiological hospital wards,
- shortage of medical doctors specialized in epidemic,
- lack of procedures,
- shortage of laboratory capacity and/or capabilities…

Improvement options

For B scenarios the difficulty lies in the incubation time that most infectious diseases have and in the medical challenge to correctly diagnose the patient's symptoms especially for cases that are out of season (influenza) or cases of rare diseases that are not readily recognized. New

viral/bacterial strains will only be recognized after detailed molecular analysis, which is not routinely done.

Other remarks

- …..

Operational Function: 3.5 Execute capability assessment in relation to threat/risk assessment

Goal of operational function

To tune available and needed capability in (first) response. By relating threat/risk assessment to the available capabilities/capacities, more insight is gathered about the state of preparedness of a nation (region or local).

Trigger for starting the function

This function has several triggers:

- Legal acts / law
- Information (through recent incidents) about an existing mismatch between available and needed capabilities/capacities.
- Policy statements about acceptable risks/threats and their acceptable possible consequences.

Needed information to get started

- Information from the Threat assessment phase
- Information about (current) available resources/capabilities (in numbers and quality).
- Information from public authorities and commercial companies if necessary.

Available scaling options

This function is conducted on a regular basis, therefore scaling is not highly applicable. If, for instance through an incident, a 'repair' activity needs to start, then staff within ministries or within crisis management organisations will be made available (by legal act).

Needed type of resources

Resources come from crisis management structures of different levels; actually all organisations involved in response actions will be needed to provide input (community, municipality, provincial, county), rescue and emergency services, inspectorates, military etc.

Needed conditions

- There has to be a thorough threat assessment which includes the level of detail that capability planning needs.

What goes wrong in the current way of performing the function?

In case of crisis many (regional) organisations will quickly be understaffed and underequipped (depending on the scale of the incident). It is difficult to take this into account when conducting capability assessment. There is not enough insight into the current status of response organisations.
Result of capability assessment on regional/local level: too little training/exercise, endurance (personnel), (financial and technical) resources, routines for coordination, no international coordination and cooperation.

Improvement options

- ….

Other remarks

- ….

Operational Function: 3.6 Develop and procure equipment and methodologies for first responders

Goal of operational function

The aim of development and procurement (and maintain) of equipment and methodologies is to ensure that first respond organisations (and related organisations) are able to perform the task that they are expected to do (efficiently and effectively). For this they need equipment; without fitting tools the functions can not be performed. Procurement of new (innovative) materiel will increase the capabilities of responders.

Trigger for starting the function

This function has several triggers:

- Indication from threat assessment that specific equipment is needed
- Lessons learned from past incidents
- Political and strategic will to support response organisation for some functions/tasks
- The will to improve: curiosity and knowledge about new (innovative) equipment that is available.

Needed information to get started

- Product information,
- Gap analysis for missing methods and equipment,
- Knowledge about new (innovative) equipment that is available.

Available scaling options

Taking into account scaling options when developing and procuring equipment and methodologies is very important. Usually the extent to which response organisations are capable of conducting this function depends largely on finance that is available. In case of urgency, crisis or very predominantly presence of failure, this can be increased.

In some cases, first responders can lean on civil defence; they have more equipment. But this is not available until after some time. This means that there has to be an assessment of what type of equipment responders need to have themselves and for what type the time-delay is acceptable.

Needed type of resources

- Research staff ('scientific' investigations),
- Financial sources,
- End users input

Needed conditions

- Wide commitment and a need for new equipment,
- methods for the procurement-process,
- economic development and profit for commercial companies involved

What goes wrong in the current way of performing the function?

Absence of efforts to develop equipment and methodologies; responders rely too much on the old way of working (no room/will for innovation). Decreasing budgets will make only urgent purchases possible (and even for them not always enough budget is available

Improvement options

Better formal arrangements for access to the civil defence's equipment would also use/test/consume the equipment more, ensuring that it is operational when needed and not over shelf-life.

Other remarks

Not applicable

Operational Function: 3.7 Develop and train emergency plans and CRBN protocols for first responders and crisis management organisations

Goal of operational function

Enabling first responders and crisis management organisations to react properly during crisis/ incidents: reduce response times, minimize delays and mistakes, increase cooperation between stakeholders, learn how to use equipment, etc. This function is important to improve preparedness, especially for rare scenarios.

Trigger for starting the function

This function has several triggers:

- (Inter)National political decisions (law) to develop general and specific crisis management plans and encourage training and exercise; government parties are obliged to make plans for crisis management situations, including training,
- Awareness of the need for training,
- Lessons learned from past incidents,

Needed information to get started

- Risk evaluation,
- Capability assessment,
- Plans on a higher level (ranking of priorities)
- standard operating procedures,
- gap analysis for training needs.

Available scaling options

This function is conducted on a regular basis, therefore scaling is not highly applicable. Plans are made on many different levels and scales, also depending on the expected incidents and current level of preparedness.

For upcoming B-incidents (pandemics) emergency plans are adjusted in detail to the current situation (e.g. prior to reoccurring epidemics like influenza) and training will be increased when higher/different impact is expected.

Needed type of resources

- Availability of financial support for training/exercises
- Training facilities including (specialist) instructors,
- sometimes special training equipment, because the 'real' equipment can not be used for training.

Needed conditions

- Training should be as realistic as possible (live agent in case of C, if needed),
- Information on special objects and their risks to be able to target the training. Object owners are co-responsible by having to invite first responders to train at their facilities.

What goes wrong in the current way of performing the function?
- It is hard to find a training relevant for both first responders and crisis management organisations, but the cooperation between the two are key to a successful operation,
- Ambulance personnel focus on C when training CBRN, less on B and R. Fire departments deal with industrial gases regularly (either in real life or during training), but other they have less (opportunity to gain) experience with other CBRN substances
- Gaps between planning for crisis situations and what actually happens during an incident. Furthermore there was a lack of insight in who is educated and trained, but this has improved using staff tracking systems.
- Priorities and ambitions differ between safety regions, causing different levels of preparedness (besides differences in plans that occur anyway because of size of the area, number of inhabitants and region specific risks). This hinders optimal cooperation between regions. This will probably be even more the case in CBRN incidents because of the low probability.
- The possibilities for training with live agents are disappearing due to environmental issues. But training this way is key for a good preparedness level.
- The importance of exercises and training is generally acknowledged. However, there is little capacity for performing exercises and those that are organised naturally focus on more likely incidents (see risk analysis). Crisis management plans are not revised frequently enough because of lack of time,
- B incidents are included in plans but not trained enough. The rescue services (in Umeå) are not well trained for CBRN incidents.
- The personnel also need education (i.e. not only training) about the agents/threats so they can make informed/rational decisions in acute situations. Generally, there is a lack of education so this can lead both to underestimation of threats (and confer to risks to themselves and others involved) or overestimation.

Improvement options
- Three options for solving the gap between theory and practice are mentioned in a report: (1) interactive planning (involving professionals to try to close the gap), (2) don't try to close the gap, rely on skills and expertise of professionals (3) challenging professionals with smart interventions. It also mentions pro's and cons for each method.
- Optimal interoperability between safety regions is expected to be reached by the obligation to meet a set of basic requirements (set by the government, e.g. force this by law).
- All hazard ("there is a problem, solve it") and specific training ("we know what it is (C, B, R), solve it") is needed.

Other remarks
- The County Council Administrative Board (SWE) shall exercise crisis management every fourth year. Nurses recruited to the ambulance receive special training, which is repeated/checked annually. Ambulance personnel also undergo physical fitness tests every year (rescue service personnel more often). On regional level special plans are developed for the biggest threat/most likely scenario, for example floods, forest fires, breaches in dams.

- The county councils in Sweden have an agreement with municipalities regarding quarantine facilities; specialized national plan for quarantine at Umeå/Holmsund harbour and Umeå airport, also on County level to assist counties with nuclear power plants in case of emergency.

Operational Function: 3.8 Develop plans to support incident command

Note: This operational function can be seen as part of function 3.7.

Goal of operational function

Improve preparedness, especially important for rare scenario's. When incident command is planned and trained in the right way, proper incident command may be expected, which can help in reducing response time and increasing quality (minimize delays, mistakes, maximize knowledge about the use of equipment etc.).

Trigger for starting the function

This function has several triggers:

- availability of financial support for training/exercises,
- national and international political decisions to develop general and specific crisis management plans
- lessons learned from past incidents,
- defined need for decision making process improvement

Needed information to get started

- Gap analysis for training needs
- Procedures on how incident command has to be performed (standard operating procedures)
- Knowledge about the amount/type and number of organisations involved (who to command)
- Technical support that is available (or not)

Available scaling options

Normally this function is conducted on a regular basis, therefore scaling is not highly applicable.

Needed type of resources

All organisations involved in the incident need to take part in this function (also at different levels: community, regional, national) to assure optimal command during a crisis. Mostly the resources will be personnel related, but also knowledge about responsibilities will be needed.

Needed conditions

The strategic will to tune command between different organisations/ agencies.

What goes wrong in the current way of performing the function?

For national/international incidents there is a need to solve legal issues arising from foreign organisations helping across national borders (for example: quarantine regulations for search dogs, presence of armed forces, use of non-permitted medication).

At local/municipality and national level (SWE) different attitudes appear to exist to crisis management (not further specified).

Existing plans are not sufficient or detailed enough (NOR).

Improvement options

In general there should be more awareness towards the importance of command during an incident and the fact that developing plans (and training them) is vital for a smooth handling during real crisis.

Other remarks

- …..

Operational Function: 3.9 Develop communications network (for crisis management)

Note: This operational function can be seen as part of function 3.8.

Goal of operational function

Performing this function is part of the development of crisis management plans. The development of procedures and the development/acquisition of technical equipment to is needed to be able to support communications during a crisis.

Trigger for starting the function

This function has several triggers:

- Defined need for improvement; failures revealed in past responses,
- Political decision about the need for communications,

Needed information to get started

- Crisis management plans, contact information of personnel at relevant organisations
- Awareness about needs and current gaps,
- Lessons learned from past incidents.

Available scaling options

not applicable

Needed type of resources

- Compatible communication systems,
- Experts on communication
- Input from participating organisations,
- Alarm system with contact information

Needed conditions

- Officer on duty at all organisations; regularly update of the list with contact information

What goes wrong in the current way of performing the function?

- Lessons learned are not very commonly used e.g. not used after each incident as it should be – usually it is about lessons identified and not learned.
- At local/municipality and national levels different attitudes appear to exist to crisis management (not further specified). There is a need to improve communication lines and coordination on regional/national level. Organisations on all levels introduce communication and information systems for crisis management (that are provided by MSB) on their own initiative, which means that these systems are not necessarily all-inclusive.

Improvement options

- More support (resulting in funds) from higher level to point out the need for good communication.

Other remarks

- On local/regional level networks benefit from personal contacts!

Operational Function: 3.10 Ensure interoperability between first responders and crisis management (standard operating procedures)

Goal of operational function

To make sure that different stakeholders can cooperate during an incident and thereby improve the decision making process.

Trigger for starting the function

This function has several triggers:

- Lessons learned from past incidents where poor communication and cooperation between parties involved made the response to the incident worse (and therefore the, negative, impact of the incident larger than needed).
- Legislative demands.
- Common will of network partners (stakeholders) to share information and cooperate.

Needed information to get started

- …

Available scaling options

Normally this function is conducted on a regular basis, therefore scaling is not highly applicable.

Needed type of resources

- Appropriate training possibilities, specially focus on the interoperability.
- Common communication systems and procedures.
- resources come from crisis management structures at different levels (community, municipality, provincial, county), rescue and emergency services, inspectorates and/or military.

Needed conditions

- ….

What goes wrong in the current way of performing the function?

- Hard to find training relevant for both first responders and crisis management organisations, but the cooperation between the two are key to a successful operation

Improvement options

- ….

Other remarks

- …..

Operational Function: 3.11 Establish (inter)national subject matter expert teams

Goal of operational function

Rapid expert involvement in case of crisis, making sure that authorities (including first responders) can make use of current and correct information about the incident to increase in coherent and coordinated response.

Trigger for starting the function

This function has several triggers:

- Awareness of the needs in general (lessons learned from previous incidents?),
- Political/strategic decision by public authorities,

Needed information to get started

- Knowledge about the expertise that is required in case of certain incidents (not one expert can handle all types of incidents – this needs to be structured),
- Knowledge about how to contact the teams and what their expertise is

Available scaling options

If needed, there could be international experts that can be asked for help/advise. But here the same goes as with national experts: you need to make arrangements before a crisis actually occurs to make sure you retrieve the information and knowledge that you need.

Needed type of resources

- Expert organisations (experts),

Needed conditions

- The will from experts to cooperate with public authorities and other experts,
- Procedures for experts to inform authorities in case of crisis but also during preparation and/or even planning (threat assessment and prevention phase),
- Communication networks

What goes wrong in the current way of performing the function?

- Currently experts are contacted on a ad-hoc basis which makes the involvement unsure,
- Some experts come help on their own account which makes that authorities involved do not really know if someone is really an expert,
- Different services under different ministries, a need of data security in some cases, which limits communication possibilities,
- Lack of multiagency exercises in which experts are used for input/knowledge.

Improvement options

- Assign (experienced) experts for the long term,
- Common commitment of multiagency approach to crisis management (incl. exercises) on political level.

Other remarks

Cooperation benefits from personal contacts. For national/international incidents there is a need to solve legal issues arising from foreign organisations helping across national borders (e.g. quarantine regulations for search dogs, presence of armed forces, use of non-permitted medication)

Operational Function: 3.12 Cooperate and coordinate with international institutes/agencies to exchange information and experience

Goal of operational function
To learn from others (exchange of knowledge), having different experiences or different ways to solve tasks, as well as sharing own experiences.

Trigger for starting the function
Often a specific incident, but also routine meetings and larger seminars between responders internationally. Besides that, also political will / strategy and cuts in budget can increase the urge to cooperate.

Needed information to get started
- …

Available scaling options
Not applicable.

Needed type of resources
- Experts from different fields and countries,
- …..

Needed conditions
- Mandate to exchange information internationally (legal issues solved)
- Network building and information exchange agreements must be in place.
- Direct contact with groups on the same organisational level is helpful (who do you know).

What goes wrong in the current way of performing the function?
- At County level unclear how to request foreign help (although this is the responsibility of MSB) and how to handle that help (legal issues e.g. import of drugs (medicine) that are classified as narcotics in Sweden, import of rescue dogs without quarantine or required vaccination) (SWE).

Improvement options
- ….

Other remarks
- …..

Operational Function: 3.13 Implement lessons learned

Goal of operational function
Ensure that experience is recorded and transferred into actual actions (implementation) that help to improve the performance of (any) operational function, internally within organisations involved but also cross-agencies ((inter)national).

Trigger for starting the function
This function is usually trigged by the realisation that something worked well (best practice) or failed (need for improvement) in a specific situation. This could be during an actual crisis, but also during training or exercises.

Needed information to get started
- Knowledge about current best practices and what needs to be changed (improved),
- Knowledge about how to best change it,
- Organisation(s) involved in the function that need to take part in the improvement.

Available scaling options
Not applicable.

Needed type of resources
- Dedicated co-workers
- Organisations that are involved and that want to share best practices

Needed conditions
- Time to digest the information and make sure that changes are actually implemented (not only mentioned),
- Some people must have a dedicated role in the process to revise procedures accordingly if appropriate,
- Evaluation good and often immediate on low level (first responders), but at higher level of the crisis management organisation there often is too little or at least slow evaluation and implementation of lessons learned – this needs to be improved to make implementation of the lessons learned more optimal.

What goes wrong in the current way of performing the function?
Sometimes lessons are only identified (learned) and not implemented.

Improvement options
- ….

Other remarks
- All interviewees expressed content with how the experience transfer is working today (NOR)
- There are annual meetings of all County Physicians for exchange of experience, ambulance evaluate every work day (SWE)

Annex VI: Response phase

Operational function 4.1: First alert

Goal of operational function

The goal of the function 'first alert' is to initiate a response after an incident. It is seen as the first recorded alarm that is generated after an incident and that reaches a relevant organization.

The first alert can be generated in several different ways, including not only professionals but also civilians. A first alert can be given by a person close to an observable incident that calls the emergency services. It could also come from a professional that notices something unusual, for instance reporting the (more frequent) occurrence of a certain disease to the (national) center of disease control. This 'unusual event' can also be spotted by detection systems that give an alarm to the professional when a certain condition is met (for instance the presence of dangerous substances). In case of an intentional incident, the first alert could also be given by the perpetrators as an announcement (either directly to emergency services or through for instance the media, which will contact emergency services).

The first alert can be received by several different parties, depending on the type of incident and the circumstances. In cases where an incident takes place with clearly observable, immediate consequences, like an explosion or acute poisoning symptoms, the emergency services (police, fire brigade, ambulance) will be called. In cases that are less easy to observe (like the release of R particles) or that take place over a longer period of time (like the development of an epidemic), the first alert might go through different (specialized) organisations.

The first alert is an important trigger for many response functions; it initiates response with coordinated and adequate resources in order to control the incident and minimize its effects. It is important that the alert contains as much information about the incident as possible to determine how the response should be arranged.

Trigger for starting the function

There are many things that can trigger the first alert, as long as they are observable in some way; smell, visibility, immediate symptoms, suspicious behaviour, etc. Biological incidents might not have immediately observable consequences due to incubation time. These consequences might be observed through health and medical surveillance. In Sweden, for instance, there is a list of 60 reportable diseases; one patient diagnosed with such a disease will act as a trigger.

The first alert can also be triggered by intelligence or information from abroad. In case of nuclear incidents for instance, the trigger can come from the international atomic energy agency.

Needed information to get started

The information needed to start up this function is (basic) information about the incident: location and an estimation of the type of incident and the scale of the incident. Acquiring this information is part of the function. The recipient of a first alert (call) will try to obtain at least the basic information to start up response (which and how many emergency services have to go where to do what?). He will also try to obtain as much extra and relevant information as available from the person that gives the alert (the caller). The information available during the first alert can influence the execution of functions later in the response phase. Relevant information about the incident will

enrich the first alert and thereby allow more appropriate response, for instance packing of (personal safety) equipment for first responders (Sweden). If relevant information is missed however, this can be explored in following functions (determining cause of the incident, performing detection, search & rescue, etc.).

Available scaling options
Alerts can be generated at different levels, according to the scale of the incident. There is one officer on duty for receiving alerts at relevant organisations, this number can be increased if necessary.

Needed type of resources
Resources needed for this function are functional (tele)communication devices and officers on duty. This personnel at the emergency call centre needs to be trained for taking emergency calls. For B a health care system internal network for infectious diseases is needed.

Needed conditions
Awareness is a condition that is required for the First Alert. If someone does not realize that something is out of the ordinary, he will not generate an alert (or he will not provide the relevant information in the alert). Furthermore, an emergency phone number needs to be in place

What goes wrong in the current way of performing the function?
During very large events there are problems with overloads of the telephone network.

Improvement options
No improvement options were mentioned in the sources that were used.

Other remarks
The type of incident determines who would have a leading and coordinating role. For biological incidents incubation time of infectious diseases and the difficulty to recognize symptoms and diagnose the disease, will delay the first alert in both individual cases and the recognition of an epidemic.

Operational function 4.2: Determine scale of incident, propagation in time, appropriate security zones and level of response

Goal of operational function

The goal of this function is to allow response organisations to handle the situation in an appropriate manner, by determining the size of an incident to see which areas are safe and which are not safe. This allows rescue services to structure their actions according to the hot/warm/cold zone and to determine the required levels of response and (physical) protection. Furthermore, this allows the first responders to assess consequences for the people present (number of casualties, number of possibly exposed people) and to put them in safety (outside the hazardous zone).

Trigger for starting the function

This function is triggered by the first alert (OF 4.1).

Needed information to get started

The information that is used to start up this function is the information available in the first alert (information about the incident, location and region). This is updated after the first response units arrive at the scene. More accurate predictions will be done by specialized personnel/organisations. Meteorological data, topography and knowledge of (the amount of) threat agent and its properties will refine predictions.

Unique for CBRN incidents is the ability to recognise the signs pointing towards a CBRN incident. The responders need to suspect a CBRN incident in order to set up the appropriate zones and types and levels of response. This also determines the involvement of specialized forces to perform this task. For the different types of threat, the time it takes to perform this function differs: generally it takes less time for chemical incidents than for radiological or biological incidents.

This function is linked to other functions in the Situation Awareness category, like the determination of the type and source of the threat, detection and consequence assessment.

Available scaling options

Deploying more resources (for instance for more detailed analysis or for more reliable results), activation of operational resources support. Deployment of resources should be described in crisis management plans.

Reinforcements from own and neighbouring services (regional)

Asking (inter)national subject matter expert teams for support.

Needed type of resources

Resources needed are the results from operational function 4.3 (detection, sampling and identification) and knowledge or specialist bodies to give advice about interpretation of these results. Furthermore modelling tools and techniques are needed to predict dispersion of the substance and the consequences for people in the area.

Needed conditions

Local security personnel should be available, giving detailed information about the site.

What goes wrong in the current way of performing the function?
CBRN is often not considered as a possibility. There is not always security personnel with technical knowledge available in acute situations.

Wrong identification of the source of threat, occurrence of more incidents at the same time. Communication problems, difficulties with radiological threat detection by Fire Service units, difficulties with biological threat detection.

Measurement mistakes, transportation problems, failure of equipment.

For B in some cases it is difficult to assess range of threat zone (highly infectious disease – possible secondary infections). Nuclear: wide range of threat zone and difficulties with its assessment

Improvement options
Raising the awareness of first responders, by training and education.. Equipping fire service with instruments for radiological threat detection.

Other remarks
Ambulances are not allowed into the hot zone!

Operational function 4.3: Detect, sample, identify and monitor hazardous materials

Goal of operational function

The goal of detection and sampling is fast and effective identification of the hazardous material. This is done in order to determine (updated) risk areas (OF 4.2), the source of the incident (OF 4.4) and possible effects on the environment, first responders and population (OF 4.6). Monitoring the hazardous material allows constantly updated situational awareness.

The information coming from this function also allows correct diagnosis of patients symptoms.

Trigger for starting the function

This function is triggered by the combination of the emergency call and any unusual circumstances that may raise suspicion of CBRN materials (either intelligence or observations).

For B incidents (without an obvious 'crime scene') suspicious symptoms and supporting background information (diagnose disease), will trigger this function.

Next decisions are taken according to information from the scene ($\rightarrow$ who provides and assesses this information? how they will do it on-site, or is there someone that will provide some more information about the scene to coordinate the response of the detection team?). In response to R/N incidents the measurements will be done by the Central Laboratory for Radiological Protection (Poland). They will arrive with a delay, because as a first response the State fire Service will arrive at the scene (and they will contact them if needed?)

Needed information to get started

Before determining a sampling strategy, it is important to find out whether there is a secondary threat to take into account (OF 4.5). The sampling strategy is determined using information about the current status of the incident location, the meteo and other environmental factors and the registered casualties and symptoms, etc. An educated guess of what happened (the type of substance(s) that might have been released and the release mechanism) is important for determining the sampling strategy (deciding the right type of measuring equipment, selecting the appropriate countermeasures). This includes the fact that for identification it needs to be known to which laboratory the sample needs to be sent.

Available scaling options

Scaling up can be supported by reinforcements of own and neighbouring (regional) services. This decision will be taken by the coordinator of the response. Furthermore, additional expertise might be needed, for instance microbiological expertise for B incidents.

Needed type of resources

Safe working procedures under CBRN circumstances require appropriate measures. Some of the required resources are substance specific, so a preliminary assessment of the material needs to be done. Resources needed include:

Personal protection equipment,

detection equipment,

databases and software for dispersion simulation,

equipment for safe transport of samples to laboratory or on-site laboratory.

The laboratories mentioned in the last bullet should be suitable for the substance that needs to be handled (e.g. BSL1, BSL2, BSL3). Depending on the situation, detection, sampling and identification might be done by the rescue services or by specialized units.

Needed conditions

An important condition for this function is awareness of a threat. If no presence of CBRN material is suspected, the function might not be performed.

Knowledge, expertise and experience (for instance training in using the detectors and interpreting their results) are needed to perform this function.

What goes wrong in the current way of performing the function?

For some agents identification takes up to 24 hours. Furthermore, not al laboratories are on duty 24/7. What kind of problems this causes should be explored further.

Failure of equipment, lack of manpower

Improvement options

24/7 reach back capacity for all types of samples and novel identification techniques can speed up identification.

When lack of manpower poses a problem, drafting regional plans for reinforcement can help to guarantee sufficient manpower.

Other remarks

-

Operational function 4.4: Determine cause and origin of incident, preserve evidence

Goal of operational function

Determining the source of the threat will help in identifying the risks and consequences of the incident and in preventing further (or future) risks. Furthermore the cause and origin of the incident need to be known for finding out who is responsible for the incident and for prosecuting them. The main questions are "What has happened?", "Who or which criminal organization caused the incident?" and "Are there more incidents going to happen?".

It is important to preserve evidence as much as possible during the response to facilitate this. The preservation of evidence is not only important for intentional acts, even when an act is clearly unintentional investigation can be done to determine responsibility (e.g. due to negligence of a party concerned) to solve liability issues.

Trigger for starting the function

The occurrence of an incident will trigger this function. In case of an epidemiologic (biological) threat, reports via health systems (e.g. recorded increase of morbidity) will trigger the determination of the cause and origin. A suspicion of an intentional act will prompt the importance of preservation of evidence, this will result in a request by the law enforcement officials (public prosecutor, police officials) to start the forensic investigation.

Needed information to get started

The information needed to get started consists of:

- Location
- Context of the incident/threat
- Registration and location of first responders, casualties and witnesses
- Reports of involved substances and its circumstances
- Overview of communicated information
- Confirmation of (possible) involved substances
- Contour of area of danger
- Risk assessment

The information needed to start the forensic investigation is:

- the type of the incident
- a specified request which investigations should be done
- a short list of the possibly released materials to identify the necessary PPE
- the results of the field measurements of the first responders

Available scaling options

The forensic CBRN HazMat team should fit in the bigger investigation team.

Needed type of resources

Trained forensic team that can work under PPE conditions with specific skills on the C-, B-, RN agents, explosives and conventional forensic traces. For the field work each team consists of a so

called "clean" man, a "dirty" man and an observer for word done in the hot zone of the incident supported by a team leader and logistic and technical support.

The team should be equipped with a communication system, adequate materials for sampling, packaging and registration of the evidence.

A decontamination unit for the investigating team.

For working in the hot zone safety and security protocols as well as sampling protocols are needed. For the over all operation protocols for the rule of evidence are required. For cooperation with the first responders agreements should be made.

A multidisciplinary training and exercise with the first responders and the forensic HazMat team is necessary to optimize and sustain the operations.

Needed conditions

All threats for life and health need to be removed as much as possible before this function is performed. This requires for instance availability of PPE and a decontamination unit, communication systems and trained staff. The function can start during a rescue operation but might also start just after rescue operation is finished.

What goes wrong in the current way of performing the function?

Lacking awareness of criminal threats and the importance of preserving evidence. Countering immediate threats for life and health is often done without consideration for the preservation of evidence. Preservation of evidence has no priority over saving lives.

In the current situation mostly there is no role or position for forensic investigations at any CBRN incident. Due to this the forensic investigations at a CBRN incident can be hampered and there is a possibility that the evidence and the investigation results will not be admitted at a court of law. This when the rules of evidence have not been applied properly.

Improvement options

    a. a trained forensics awareness for policy-, decision makers and first responders (trained in reading and interpreting signs; knowing what can be used as a piece of evidence and how to perform the rescue operation without disturbing this evidence)

    b. clear working protocols for all organizations that will act at a CBRN crime scene

    c. multidisciplinary training for the first responders and investigation teams

Other remarks

For forensic investigations at incidents where C, B or RN agents are released, working in the hot zone will be done under different PPE conditions.

For conventional forensic investigations (e.g. human DNA, fingerprints and digital data carriers) usually evidence materials will be recovered at the incident scene, sent to a designated laboratory where the analyses can take place after decontamination of the evidence. Developments like lab-on-a-chip techniques, laser technology will make it possible in the future to perform some of the investigations, within the rules of evidence, on site. For this specific trained staff is required.

A 3-D recording of the incident scene can be helpful for a 3-D visualization for further investigation, as support in a court of law and for training purposes.

There is a municipality unit responsible for tracing origin of B agent in food/water supply. County physician responsible for tracing infected people.

Operational function 4.5: Check for and deactivate secondary threat (in case of intentional incident)

Goal of operational function

The goal of this function is making sure no more casualties occur and that the working conditions for response units are as safe as possible. This can be done by the elimination of secondary threats for incidents with a mixed character/incident type (for instance the release of a substance in a building and the presence of a suspect package just outside the building).

Trigger for starting the function

Assessment on the scene after arrival of first responders. Suspicion that the incident is intentional or (announced) threats of more dangerous materials at the scene.

Needed information to get started

Data concerning the incident, measurements results, substance identification, location characteristics.

Available scaling options

Depends on logistic support.

Needed type of resources

The type of resources that are required are mostly the same as in function 4.3; detection equipment, physical protection measures, etc. The check can be done by first responders on scene, but a special task force could also be involved.

Needed conditions

Guarding for their own safety should be covered in standard operating procedures for the rescue services and checking for secondary devices should be part of this. Local security personnel should be available to give detailed information about the site.

What goes wrong in the current way of performing the function?

There are several things that could go wrong in this function:

wrong assessment of the situation, not revealing the mixed/multiple character of the incident,

faulty interpretation of data available,

bio-threat not recognized in an early stage,

equipment breakdown

If a special task force is tasked to do perform this function, their response time of several hours can also be a problem.

Improvement options

Other remarks

Operational function 4.6: Assess consequences for (public) health, infrastructure and environment

Goal of operational function

The consequences of the incident that has occurred need to be assessed in order to determine the appropriate response scale and needs. For B, this would for instance be assessing risks of a pandemic in order to decide on appropriate countermeasures (for instance vaccination). Performing this function will help to minimize impact and will ease recovery after the acute phase.

This function is strongly connected to the other response functions on situational awareness. The process of consequence assessment will already start just after the first alert. This will lead to a very rough consequence assessment, that will be refined, using the information that is generated in the other functions (detection, determining scale, propagation in time, cause, etcetera).

Trigger for starting the function

The fact that there is an incident triggers the start of this function.

Needed information to get started

All information that could be relevant for consequence assessment will feed into this function. The quality of the assessment will depend upon the (amount and quality of) information available. Minimal information to get started would be the type of incident and the location.

Available scaling options

Involvement of resources and the coordination level depends on the scale and type of incident.

Needed type of resources

Consequence assessment requires various types of expertise, depending on aspects like the type and size of the incident. Assessment of the situation is routine operation according to procedures shortly after rescue services arrive. Especially for CBRN the need for expertise means that (external) expert advisors have to be consulted when expertise is not present at the rescue services on scene. The County Physician in Sweden is for instance part of the crisis management group and will act as expert advisor.

This function uses the information that is provided by other situational awareness functions. The results of those functions (like detection measurements) will be used for the assessments. Additional information might be needed about the incident context, like the weather characteristics and population distribution in the area at risk. The resources needed to process this information include IT equipment, databases and simulation software (for instance computer based dispersion/effect models). The type of analytic equipment and software needed depends on the type of incident.

Needed conditions

What goes wrong in the current way of performing the function?

Invalid selection of analytical operations, incorrect estimation of contaminated zone. Failure of equipment.

The procedure is time consuming

Improvement options

Pre-calculated scenarios/risk templates might solve the problem that the procedure is time-consuming.

Other remarks

Operational function 4.7 Report to higher command (chain of command)

Goal of operational function
The goal of reporting to higher command is to keep the higher levels of the command chain (management staff with formal responsibility) informed of operational information. This is done to continually update crisis management and to ensure optimal situational awareness (in functions 4.2, 4.4, 4.6, 4.8 and 4.9) for tactical/strategic decisions.

It is also important to enable the evaluation of the incident and identification of lessons (OF 5.10).

Trigger for starting the function
Reporting to higher command is part of standard operating procedures that are not unique to CBRN incidents. It is part of reporting/supervision regulations, and the process is continuously updated.

Needed information to get started
Information about the incident.

Who has the responsibility in this particular situation? Different specialist (governmental) organisations will be involved depending on the type of incident (C, B or R/N, size, etc)

Available scaling options
If larger scale response is required, an expanded crisis management group with specialized tasks can be formed. This also expands the chain of command.

Needed type of resources
Communication devices and communication plans (including who reports to who, what to report and in which format)

Needed conditions
Depending on the scale of incident, crisis management will be organized at several levels (on-site, regional, national) which will require reporting to higher command during the incident. Afterwards the incident will be reported to a higher tier organization. This demand for information to higher levels will be higher is terrorism is suspected.

Both during and after, crisis management systems and plans for communication must be in place. A common message must be agreed upon.

For B there is a health care internal network in place to feed information into.

What goes wrong in the current way of performing the function?
Equipment breakdowns

Improvement options

Other remarks

During a crisis the command lies with the officer on duty or crisis management group. This group is composed of representatives of several organisations, depending on the incident. In Sweden, no organization or authority is subordinate to the other. Therefore command lines only exist within the organisations.

For biological incidents in Sweden, the County Physician is subordinate to the National Board of Health and Welfare.

Operational function 4.8 Communicate with the media

Goal of operational function

The goal of this function is to keep media informed of the current status of the incident, threats and consequences. An appropriate communication strategy prevents sensational media coverage with adverse effects on human behaviour. Appropriate communication to the media will help transmit important information to the public, rather than frighten people unnecessarily and assuring public support of measures. Therefore this function supports other functions connected to communication with the public: 3.2 (creating public awareness), 4.27 (informing public in surrounding areas) and 4.32 (informing the general population).

Communication with the media can also support 4.24 (identifying population at risk and distributing mass prophylaxis), 4.28 (evacuation of surroundings), 4.29 (tracing and registering exposed people), 4.33 (managing public order) and 5.8 (restoring trust in society, government and economy).

The function is performed by the person assigned by the rescue action coordinator ((s)he is representative of the rescue services). The number of people assigned to this task depends on the scale of the threat. Involved organisations are the crisis management group, relevant first responders on-site (ambulance personnel responsible for medical logistics, leader of the rescue services), journalists/mass media. During a B crisis this function is one of the main tasks of the County Physician.

The goal of communication with the media is also making sure that the information that is published by these media is as accurate as possible.

Trigger for starting the function

The function starts when initial media reports come through after an incident or even after a warning for an incident (or hoax). This is done either through proactive communication from the lead responding agency, or it is triggered by a demand of the media (via responding to a request for a press release). A situation update will trigger updating of this function. Most government departments have terrorist/CBRN and other incident plans that include a media communication plan. In case of the H1N1 flu epidemic, the communication by Dutch government was triggered by reports of a pandemic by the World Health Organisation (WHO).

Sometimes there might be a necessity for announcing an alarm or warning information for the society (see 4.27). This can be done through communication with the media.

Needed information to get started

To start communication to the media an overview is needed of the information available about the situation; information about type and range of threat. This information needs to be updated continuously and the communicator needs to know which information is not classified. Determining what is the right communication strategy should be done keeping cultural differences in mind. In the UK, the strategy is to communicate the truth 'as much as you know it'. However, this might be different in other countries. Established Communication teams will communicate with the media through established channels. This requires a cohesive multi-agency communications and media plan coordinated in a timely manner by Gold Command (strategic command)

The contents of the communication are scenario specific and will be tailored to the risks. .

Available scaling options

Not many resources are needed for performing this function so upscaling is feasible. The scale at which this function needs to be performed (for instance is there need for a press conference or press release?) is determined mainly by the level of threat and the engagement of the media.

Needed type of resources

Communication with the media does not require much more than appropriately (media-)trained and experienced staff. Communication channels will facilitate this communication and an information officer helps to create the right time and place for the (unambiguous and appropriate) message. Usually the number of resources needed, and the type of resources will vary depending on the nature of the incident/agent.

Needed conditions

Conditions will readily be conducive to communication with the media - they will want to know what is happening. Conditions will vary depending on the lead organisation - this could be police for deliberate release, but others for accidental and depending on the type of agent.

Decision of incident coordinator

The person communicating with the media must be able to communicate a complex matter in an understandable way, hitting the balance between enough and too much information.

What goes wrong in the current way of performing the function?

There is some scope for improvement. A well-established provision exists for response, but further public awareness and tests of response that provide realistic challenges are needed. Development of response needs to be evidence-based and constantly evolving. In general, communication with the media is well-organised but it might be good to strengthen links to scientific community. In the UK this is being dealt with by ECOSA (Emergency Coordination of Scientific Advice)/STAC (Scientific and Technical Advisory Cell) /SAGE (Scientific Advisory Group for Emergencies).

The communication must be, where possible, agent/scenario specific. However, identification of a generic 'one size fits all' solution also needed that would then need to be adjusted.

Something that goes wrong is that rescuers sometimes do not give full or relevant information. The media can give a wrong interpretation to the message and sometimes searches for sensation.

The initial communication strategy about the H1N1 pandemic in the Netherlands (leaning on one 'independent' key figure that is not associated with the government) led to limited visibility of governmental actions/interventions. Reassuring statements of the government prevented commotion in society at first, but finally (after some incidents) led to discussions in media and society and therefore influenced the success of crisis management measures.

The evaluation of a natural epidemic showed that decision makers that are forced by practical and pragmatic reasons to take decisions that do not completely comply with expert advice feel restrained in communicating this.

Risk of inconsistency in given information.

Improvement options

Communication with the media can be improved by coordinated information plans.

In the case of the communication strategy on H1N1 in the Netherlands, an official government view was needed. They should not try to reassure the public, but provide information about risks and free choice about vaccination. Risk perception and need for information have to be monitored and the communication strategy should be adjusted to this rapidly.

Other remarks

Most LRFs (local resilience forum) have a local multi-agency policy nominating Police as primary spokesperson.

In Norway. Police is always responsible for media communication at incidents representing a risk to life and health. Specialist governmental bodies will handle much of the information related to threat agent, risk assessment and advice to the public.

Media interest will be much higher if terrorism is expected!

Operational function 4.9 Involve (inter)national subject matter expert teams

Goal of operational function

Receiving professional and qualified support in a (knowledge based) decision making process concerning tactics and rescue operations as well as cooperation with media. Advisory group of experts depends on type of threat, actions taken and estimated cause of an incident. The number and specialization of experts being a part of advisory group depends on the scale of incident and the actions taken. In Poland the experts are registered in a database of the rescue services, they are the advisors of crisis management teams.

Trigger for starting the function

Insufficient expertise in crisis management group will trigger the need for subject matter expert teams. During an incident the need may arise for additional information, which is not (yet) available for action coordinator.

Needed information to get started

-

Available scaling options

-

Needed type of resources

For this function the following resources are needed:

- Organisation network / expert network
- Connections to experts.
- Telecommunication and IT tools and/or source of transportation.

Needed conditions

For this function insight into the rescue organizations own limitations is needed (when do we need help from someone with additional expertise?). That should trigger a decision of the action coordinator to involve experts.

What goes wrong in the current way of performing the function?

There are several things that could go wrong:

- Temporary unavailability of experts,
- telecommunication or transportation problems,
- failure of equipment,
- The expert network doesn't cover the whole spectrum of needed expertise.

Improvement options

If the involvement of one expert goes wrong, another expert can be asked to become member of the advisory group. Creating a broader expert network would diminish the problem of low availability of the right expertise.

Other remarks

-

Operational function 4.10 Remove debris/hazmat, (instable) constructions and vegetation

Goal of operational function
This function deals with the prevention of cascade effects by reacting proactively on any dangerous situations that can occur after the incident (for instance removing debris caused by an explosive device that can be a secondary threat to people on scene). Elements, like vegetation, that act as an obstacle for the rescue services also need to be removed to allow them to work as safe and effective as possible.

Trigger for starting the function
This function will be started up if there is an awareness of the risk. The incident coordinator will decide that this function needs to be performed.

Needed information to get started
To start this function, information is needed about the type and scale of the incident, the prognosis of the spread of the substance and the action area.

Available scaling options
Private companies can assist in this function. They will have to be compensated financially (afterwards)!

Needed type of resources
-

Needed conditions
Secured dumps for the (contaminated) debris are required.

What goes wrong in the current way of performing the function?
Dumps for contaminated debris have not been assigned (on regional level). It is not clear who takes responsibility if staff from a private company is harmed during the operation.

Other things that could go wrong are bad assessments of the situation, incorrect estimation of building parameters (for example during their demolition) and failure of equipment.

Improvement options

Other remarks

Operational function 4.11 Handle/dispose of contaminated waste

Goal of operational function
The goal of removal of contaminated waste is the reduction of secondary contamination risk.

Trigger for starting the function
This function often starts in the last stage of the rescue operation or when the operation is finished. However, awareness of the risk of secondary contamination is important from the start of the incident, because it is an important factor in minimizing impact.

Needed information to get started
Information needed to start this function is the type of contaminating agent and knowledge of the best way of decontaminating (destroying that agent). For B for instance, destroying the agent might be done by burning materials on-site. If the CBRN substance cannot be destroyed easily, a secure waste site should be found; for this the amount of waste needs to be known, and a place designed for storage and utilization procedures is needed.

Available scaling options
If needed, another administrative unit and entity can be involved on a larger scale.

Needed type of resources
The crisis management group is needed for the decision to remove the contaminated waste. The police generally is responsible for personal belongings. Do rescue services have to dispose of contaminated waste?

Resources needed are the resources of State Fire Service, Voluntary Fire Service, National Atomic Energy Agency, Municipal Police, private entities, hazardous waste dumps, private utilization entities (chemical plants, refineries, cement plants, steelworks etc.). (depending on type of waste)

Needed conditions

What goes wrong in the current way of performing the function?
For B it is unclear which organization is responsible, the rescue services or the County Council/health care system.

Improvement options

Other remarks
Will people be reimbursed for personal belongings that needed to be destroyed?

Operational function 4.12 Secure affected area

Goal of operational function

The goal of securing the affected area is to keep bystanders from the area for their own safety and not to disturb the first responders (rescue). This is done by the crisis management group and the police. It is also important for protection of victims' properties and collecting and securing of evidence.

Trigger for starting the function

Suspicions of a dangerous substance release or the actual substance found on-site, for instance by observations at this site. At the beginning of the rescue operation, this function will start immediately. It will be influenced by weather conditions.

Needed information to get started

Assessment of the situation (OF 4.2-4.6: type of threat, range of security zone, risk distances) is needed to decide what area needs to be secured. The results from 4.2 feed into this function (but it will be iterative). For B, microbiological information is needed: type of pathogen and its persistence in the environment under the given circumstances (humidity, etc.).

This function will be performed in several steps. It will start by securing a certain area after rough estimation of the spread of the substance. This can be refined (probably made smaller) after further analysis, assessment, measurements, etc.

Available scaling options

The scaling options depend on logistical support.

Needed type of resources

Police staff is required to guard the area and they will need some type of barricades or fences.

Needed conditions

An estimate of the risk area and the decision of an incident coordinator are needed. Ending the function by passing the incident area to the owner (if necessary after inspection) also needs to be decided by the incident coordinator.

What goes wrong in the current way of performing the function?

The procedure of OF4.2 is time consuming, also putting optimal execution of this function on hold.

Other things that can go wrong are:

- Finishing rescue operation too soon
- wrong estimation of resources required,
- failure of equipment.

Improvement options

Pre-calculated scenarios/risk templates could help to get faster results from 4.2.

Other remarks

Operational function 4.13 Manage traffic (emergency transport, managing other traffic flows)

Goal of operational function

During the response, operation of the traffic in and around the affected area needs to be managed. This will ensure optimum use of the response vehicles and optimal emergency transport. Furthermore, other traffic flows in the surrounding areas should be coordinated to prevent large traffic jams (for instance caused by road blocks). In case a large scale evacuation is needed, it is also important to manage traffic flows as good as possible.

Police and ambulance are involved for B incidents; there is 1 person responsible for the health care logistics.

Trigger for starting the function

This function is started up when the emergence call is received. It is part of standard operating procedures.

Needed information to get started

Information needed is the location of the incident, the type/character of the incident, approximate dimension of the threat zone, information about the terrain, information about the current and possible traffic flows.

Available scaling options

In case of a large scale incident there are resources/reinforcements launched from some municipalities and districts, further provinces and at the end operational reserves from the state level.

Needed type of resources

Software for choosing and directing vehicles, operated by experienced personnel with knowledge of local roads.

Needed conditions

Command of the 112 dispatcher.

What goes wrong in the current way of performing the function?

Not all addresses are unique or might be difficult to find, vehicles may be sent to the wrong location. In locations with one way in, one way out, the first ambulance to arrive may be the last to depart. This locks down vehicles for longer periods than necessary.

Improvement options

Other remarks

Operational function 4.14 Coordinate crisis management organisations

Goal of operational function
The goal of this function is optimal cooperation between the different parties involved in handling the incident. This is done by providing communication and liaison between rescue services as well as between rescue services, rescue action coordinator and incident coordination entity. This should allow efficient efforts towards the same goal. For the H1N1 pandemic case this for instance includes that the incident coordinator makes sure that national measures taken against a flu pandemic will not be hindered by measures (not) taken in other countries.

The crisis management group will have several levels depending on the scale of the incident (on-site, local/regional, national). This function is connected to OF4.7 and 4.9.

Trigger for starting the function
This function will start according to procedures immediately after first rescue units arrive at the scene. In case it is impossible to built communication platform additional time is required for assignment liaison officers and providing them necessary equipment.

Needed information to get started
Information about the incident and location. For the H1N1 case, the required information to perform this function included the current status of national decision making, possible countermeasures and disease figures.

Available scaling options
The scaling options depend on resources available for rescue services and on technical parameters of the equipment.

Needed type of resources
Coordination of the crisis management organisations requires communication means, like radio communication equipment, GSM technology and the Web. Specific conditions might apply for communication equipment in a danger zone. A cooperation communication channel should be assigned and meeting(s) should be planned. In the H1N1 case for instance, meetings with representatives of (EU) countries were held to coordinate preventive and reactive measures to tackle the flu pandemic.

Needed conditions
There needs to be (political) will to cooperate and coordinate measures on all different levels (local to international).

What goes wrong in the current way of performing the function?
There are several thing that can go wrong in this function. Some are of a technical kind, like:

Incompatibility of communication systems,

net overloading,

connection clutter in the area of rescue operation,

possible problems with connection in a close area

other failure of equipment.

There are also organizational issues that can hamper the execution of this function, like no coordination between countries, so no common (national/EU) strategy. In the H1N1 case, this might have hampered containment of the disease and caused international competition in the purchase of vaccines.

Improvement options

Possible solutions for the issues above are:

Coordinated plans

Replenishment of communication resources from store reserves of services involved into rescue operation.

Stressing importance of coordination

Other remarks

Operational function 4.15 Scale up/down emergency response

Goal of operational function

The aim of scaling up or down the emergency response is to customize the response to the severity of the crisis situation. In case the local rescue services can not handle the situation by themselves, effective rescue and operation coordination will be provided by launching higher crises response levels.

Trigger for starting the function

The assessment of the situation in order to activate the right response level starts immediately when the first alert is received. It is updated constantly, and when the end of the tactical and technical possibilities of a particular crises management response level is reached, the response can be scaled up. Scaling down will happen when the situation is under control and not all response units are needed any longer.

Needed information to get started

In order to scale up or down, information is needed about the type and dimension of the threat, population being at risk, threat development prognosis, information about the terrain, etc. This information can be provided or updated by functions 4.2-4.6.

Available scaling options

Scaling up or down actually is a scaling option. This will be done according to procedures of the services or crises management plans.

Needed type of resources

No specific type of resource; the goal of this function is to provide the right level of response, so also to guide responders in choosing the right type of resources.

Needed conditions

To scale up or down a decision of the incident commander or incident coordinator is needed. Crisis management organization will follow NATO concepts for this. Implementation of this concept in all organisations involved in crisis management helps cooperative efforts. In Sweden, the County physician is involved as an expert advising the crisis management group during B crises. He has contact with the physician in charge of the treatment of affected patients.

What goes wrong in the current way of performing the function?

Things that could go wrong in the current way of performing this function are faults in the process of operational planning/civil emergency planning or crises management response plans or equipment breakdowns.

Improvement options

Other remarks

Operational function 4.16 Control and monitor hazardous material on-site

Goal of operational function

The aim of this function is prevention of further dissemination of the hazardous material and thereby mitigation of effects.

Trigger for starting the function

Needed information to get started

Available scaling options

Scaling up can be realized by reinforcements from own and neighbouring services.

Needed type of resources

To perform this function, the responders need personal protection suits, suitable container and/or decontamination and detection instrument/laboratory resources. These resources are often substance specific.

Needed conditions

What goes wrong in the current way of performing the function?

Rescue services are ill-prepared for B-incidents.

Improvement options

Other remarks

The county physician has the primary responsibility for tracing contagious and/or exposed people (see functions 2.2, 4.22 and 4.29).

Operational function 4.17 Command and control

Goal of operational function

The goal of this function is to ensure the appropriate tactical approach for the situation. It is important that all parties in the incident response receive the information they need and share their information with the right people. It includes properly documenting information in case it is needed later on (for instance for prosecution of suspects).

Involved organisations are the temporary and incident specific crisis management group; depending on scale of incident crisis management can be a multi-layered organisation (on-site, local, regional, national) composed of representatives (officers on duty) from all organisations involved including experts. Nevertheless, each layer and each organisation will have its area of responsibility; each authority is responsible for its own operation as long as possible. County Council Physician included as expert.

Trigger for starting the function

At the time the first units arrive at the scene.

Needed information to get started

Type, scale, location and geographical information of the incident. If there is immediate threat to lives, all possible help will be initiated; but if there are choices, rescue activities will be prioritized according to available budget.

Available scaling options

The magnitude of the incident will determine how many different parties and expertises need to be included in the chain of command. The scaling options depend on logistic support. If needed, a higher response level can be activated and operation headquarters can provide support.

In Sweden, the goal on County level is to have crisis management for B incidents functioning continuously for up to 7 days. The County Administrative Board will take control of the rescue services if the municipalities involved cannot agree on the way forward.

Needed type of resources

Clear structures and/or procedures for information sharing, a system that allows for information sharing.

Needed conditions

A pro-active mentality in information sharing and finding; awareness of all parties that information sharing is important for the entire chain of response

What goes wrong in the current way of performing the function?

Since many organisations can be involved, valuable time might be spent on meetings and discussions.

The process can also be hindered by incorrect analysis or assessment of the situation or telecommunication problems.

Furthermore, several municipalities do not have a clear structure or procedure for information sharing. Not everyone realizes that other parties depend on information that is available in

different parts of the chain (so more people rely on their information than they think!). So one team does not receive enough information, but in turn, this team does not provide enough information to others either. During field trials mentioned in a Dutch evaluation report, officers that lacked information did not try to find it themselves, partly because they did not know where to find the information, partly because they did not know what to do. This lack of incident information has led to undesirable delays in incident response and undesirable or incomplete decisions during several field trials. Furthermore, field trials showed that the available information is not always reported clearly or completely, making it difficult to find the right information afterwards.

Improvement options

Regions that used an information manager and a net centric approach (sometimes supported by a net centric information system) were able to achieve the goals that were set during the practical examination.

Other remarks

In Sweden the aim is to have the bio-crisis management functioning continuously for up to 7 days. With the current staff available this is not realistic.

Operational function 4.18 Search and Rescue

Goal of operational function
To rescue and register casualties, animals and objects, and transfer them out of the hazardous zone.

Trigger for starting the function
Received information about an incident; this could range from information given by victims or witnesses to information from monitoring systems or automatic alert instruments.

Needed information to get started
The following list of information is needed to start the function search and rescue:

- Location of the incident
- Context of the incident/threat
- Assessment of number of people to be rescued
- Assessment of the accessibility of the casualties
- Sequence of casualties to be rescued
- Way of registration of casualties
- Way of transfer of casualties
- Confirmation of (possible) involved substances
- Contour of area of danger
- Risk assessment
- Overview of encountering measures
- Handling-perspective of first responders (including order of people to be rescued)

Available scaling options
Deployment of taxis for transport. Reinforcement from part time/volunteer rescue service personnel and neighbouring/collaborating municipalities/counties/countries.

Needed type of resources

Needed conditions
Decision of an incident coordinator.

What goes wrong in the current way of performing the function?
The function can be hindered by bad weather conditions, failure of equipment or wrong interpretation of location indication instruments. Lack of manpower also poses a problem in many cases.

Improvement options
Creating more awareness and knowledge on interpreting results of the instruments mentioned above.

Other remarks
Search and rescue will be carried out in normal PPE until CBRN threat or release is proven. The rescuers will only then be pulled back for a fresh assessment of the situation.

In the Netherlands the fire department perform the search and rescue function. However, they aren't educated to perform triage.

Sweden does not have a tradition of volunteer organisations. They exist, but will have to be asked to help and will have to be reimbursed afterwards. It is not clear where the responsibility lies for protecting volunteers from harm while they are helping, for instance in Search and Rescue.

Operational function 4.19 Manage casualties on-site (triage – stabilization – treatment)

Goal of operational function
To triage, treat and stabilize casualties on-site.

Trigger for starting the function
After people are rescued on-site and transferred outside the hazardous zone, they will be treated if necessary.

Needed information to get started
The following list of information is needed to start the function:

- Location of the incident
- Context of the incident/threat
- Assessment of number of casualties
- Type of registered symptoms
- Confirmation of (possible) involved substances
- Contour of area of danger
- Risk assessment
- Overview of encountering measures for first responders and the population
- Handling-perspective of first responders

Available scaling options
Depends on logistic possibilities and deployment of additional resources (e.g. reinforcement from volunteer rescue services and neighbouring municipalities/counties/countries) due to procedures and crises management response plan.

Needed type of resources
Medical equipment / antidotes

If the triage and treatment is performed inside the hazardous zone, the medical first responders need PPE capabilities.

Needed conditions
Decision of incident commander.

What goes wrong in the current way of performing the function?
The actual time of mobilization does not match with the necessary time of mobilization.

Furthermore, faults in medical diagnosis occur, shortage of transportation means, communication problems.

In practice, when an incident has occurred the involved substance are usually not known. Therefore, when managing casualties on-site this information is lacking and particular resources that are needed (e.g. antidotes) can not be used.

Improvement options
SA

Other remarks
The medical first responders of the Netherlands do not have access to capabilities in order to triage in the threat zone.

Operational function 4.20 Decontaminate people, animals, equipment and vehicles

Goal of operational function
To decontaminate casualties, animals, equipment and vehicles from substances in such a way that they aren't a threat for the environment and – in case of people and animals - themselves.

Trigger for starting the function
When contamination is proven or strongly suspected the rescued casualties should be decontaminated.

Needed information to get started
The following list of information is needed to start the function:

- Location of the incident
- Context of the incident/threat
- Assessment of number of people to be decontaminated
- Condition of the casualties
- The obtained performance
- Way of registration of decontaminated casualties
- Way of collecting polluted waste water
- Confirmation of (possible) involved substances, symptoms and manifestation
- Contour of area of danger
- Risk assessment
- Overview of encountering measures for first responders and the population
- Handling-perspective of first responders

Available scaling options
Reinforcement from part time/volunteer rescue service personnel and neighbouring/collaborating municipalities/counties/regions/countries

Needed type of resources
Decontamination stations.

Needed conditions
An order from an action coordinator.

Some way to keep decontaminated people warm until further transport.

The water should be caught in case of B/R incidents. This isn't necessary with a C-incident since the water is diluted. Processing other kind of waste (e.g. contaminated clothing) should be organized as well.

What goes wrong in the current way of performing the function?
It is not always clear which organization is responsible for what.

The extent of the obtained performance is to determine. When is someone decontaminated and therefore 'clean'?

The waste water used for decontamination circulates. After a while the water is highly polluted. It isn't clear how this water should be changed. Furthermore, carefulness is needed to prevent possible contamination of environment and ground water through waste water.

The response time is too long; the actual time of mobilisation does not match with the necessary time of mobilisation. Furthermore, few systems are designed to manage mass casualty events, or the start-up time is so long it is no longer relevant when in place.

Understanding the need of decontamination (often overdone).

Non ambulant contaminated casualties need medical care. However – in the Netherlands – medical first responders do not treat contaminated casualties, therefore the need to be decontaminated as soon as possible.

Improvement options
Simple procedures could replace advanced systems.

Educate to extend understanding, awareness and knowledge.

Other remarks
Who pays for damage/destruction due to decontamination?

The type of agent (persistent or volatile) is highly desired information.

Possible decontaminated people could report themselves to hospitals or other health care institution. These health care institutions should be prepared for this.

Operational function 4.21 Register and evacuate injured people

Goal of operational function
Collecting information about amount and displacement of evacuees from threat zones and moving injured people from threat zone.

Trigger for starting the function
Moment of receiving information about an incident or about spread of threat. This function will start after the casualties are decontaminated and when necessary treated.

Needed information to get started
The following list of information is needed to start the function:

- Context of the incident
- Location of the incident
- Contour of area of danger
- Progress prognosis
- Assessment of number of people in threat zone
- Assessment of amount of disabled people in the threat zone
- Directions of evacuation and places of temporary stay for evacuees
- Time limits of evacuation

Available scaling options
Reinforcement from part time/volunteer rescue service personnel and neighbouring/collaborating municipalities/counties/countries

Needed type of resources

Needed conditions
Decision of action coordinator or head of crisis management team.

What goes wrong in the current way of performing the function?
Possible decontaminated people could have moved from the threat zone themselves. Therefore, not everybody will be registered (and evacuated).

Improvement options

Other remarks

Operational function 4.22 Isolate infected people

Goal of operational function
To isolate infected people in order to prevent the infection of spreading.

Trigger for starting the function
Confirmed diagnosis or suspicious symptoms and supporting background information lead to the knowledge or suspicion of infected people.

Needed information to get started
The following list of information is needed to start the function:

- Location of the infected people
- Number of infected people
- Type of threat
- Symptoms of infected people

Available scaling options
Patients with less severe influenza symptoms are advised to stay home to avoid spreading the disease. Capacity of hospital beds at clinic for infectious diseases/intensive care unit can be extended with few beds, otherwise transport to neighbouring/collaborating hospitals.

Needed type of resources
- At emergency unit/local health care centers/hospitals separate room(s) with sanitary facilities (and air lock)
- For highly contagious patients possibly even suitable analysis laboratory nearby
- Special ambulance for medical transportation or an different means of public and private transportation (according to the crisis management plan)
- Protective clothing for health care personnel and special routines, logg for all contacts (personnel, visitors)

Needed conditions
According to the decision of incident coordinator.

What goes wrong in the current way of performing the function?
If there is a delay of diagnosis, then the required isolation can be delayed and human-human transmission may occur.

There is little capacity to isolate and to treat contagious patients at hospital even less capacity in combination with intensive care.

The medical transportation capacity is also quite small. There is one ambulance available in Linköping for transport of highly contagious patients that need intensive care. Only one of the two (nighttime) or three (daytime) ambulance cars in Umeå will be used for transporting contagious (influenza, EHEC) patients during the incident with decontamination post incident.

Improvement options
-

Other remarks

-

Operational function 4.23 Treat patients in hospitals

Goal of operational function
To save lives and minimize health damage by providing victims medical assistance in hospitals.

Trigger for starting the function
When the medical transportation sets off from the scene and victims arrive in hospital.

Needed information to get started
The following list of information is needed to start the function:

- Number of victims to be treated in hospital
- Symptoms of victims
- Confirmation of (possible) involved substances

Available scaling options
One or two beds for all of Sweden are at special intensive care unit for infectious diseases at Linköping hospital (but there are plans to handle highly contagious patients at other locations although they are not as well equipped).

Needed type of resources
Public and private hospitals, Ministry of Defence and Ministry of Interior hospitals

Needed conditions
- Laws regulating duties of health care personnel.
- Medical specialists having knowledge about treatment of infected patients and hospital possibilities (capabilities) to admit and treat infected patients.
- In order to give the right treatment a secured diagnosis (sampling and sample analysis) is needed.

What goes wrong in the current way of performing the function?
Health care personnel can be ordered to treat contagious patients, but might avoid contact with such patients (by reporting sick themselves or taking vacation). If discovered, such behaviour will have disciplinary consequences.

Confirmation/disproof of specific agent is important information before starting the treatment. However, sampling and analyzing the agent may take some time.

The number of infected people may be too large to handle in hospitals; the capacity of hospitals might not be sufficient.

The flow of (possibly) infected people towards hospitals is not structured; a sufficient number of infected people will enter hospital on one's own initiative.

Information flow from scene to hospital is not always efficient.

There is little capacity to treat contagious patients at hospital, even less capacity in combination with intensive care.

Improvement options

Plans for alternative locations for care of lightly injured.

Other remarks

-

Operational function 4.24 Distribute mass prophylaxis

Goal of operational function
To increase resistance of the general population to pathogens and prevent infections by vaccinating people.

Trigger for starting the function
Decision of authorities guided by national/international health care recommendations.

Needed information to get started
The following list of information is needed to start the function:

- Number of people to vaccinate
- Type of threat
- Locations of medical health institutions
- Municipality and county administration need to prioritize personnel to be vaccinated in order to secure their operation and public service

Available scaling options
In case of national range threats reserves can be transferred from another provinces/regions.

Needed type of resources
Vaccine development, production, distribution, local storage and transport. Furthermore, operational plans for vaccination (including prioritizing target groups because of limited availability of vaccine), medical specialists to perform vaccination and plans for informing the public.

Needed conditions
Decision of authority

What goes wrong in the current way of performing the function?
It isn't always clear who should perform the vaccinations; the general practitioners or the municipal health services. Issues that are relevant in this discussion are level of experience with vaccination, financial benefits and possible excessive workload.

Medical experts do not always consider financial and operational aspects in their recommendations. Their advice should also be based on a cost benefit analysis and other practical considerations (like operational planning of vaccination).

Urgently developed or adjusted vaccines might not be fully tested for putative long-term side effects.

Prioritizing personnel for vaccination is not always done according to uniform rules at all units of the municipality/county administrative board.

There could be lack of capabilities when threat occurs in many countries at the same time (serious nuclear failure, continental epidemic, pandemic).

Improvement options

Increase of material reserves.

Other remarks

Operational function 4.25 Organise (additional) medical capacity

Goal of operational function
To organise and distribute (additional) resources of medical means.

Trigger for starting the function
Decision of Ministry of Health according to the provincial and national distribution plan.

Needed information to get started
The following list of information is needed to start the function:

- Scale and level of threat
- Scale, level and location of endangered population

Available scaling options
Capabilities can be transferred from other (neighbouring or collaborating) regions or hospitals.

Needed type of resources
Pharmacies, Health Care Policlinics, Air transportation means.

Needed conditions
Knowledge about available resources (personnel, equipment/facilities).

Decision of the Ministry of Health.

What goes wrong in the current way of performing the function?
Simultaneous threat occurrence in many countries (serious nuclear breakdown, continental epidemic, pandemic) lead to a lack of capabilities.

Improvement options
Increase of reserves.

Other remarks

[PRACTICE]

Operational function 4.27 Warn population in surrounding areas

Goal of operational function
To inform the general population of 1) the risks of existing and up-coming threats, 2) on how to behave to ensure they do not get exposed to agents, and 3) activities of emergency responders in order to minimize people at risk.

Trigger for starting the function
(i) Via emergency services or the media - triggered by identification of risk to population. On scene risk assessments filter back, or modeling/weather information coupled with incident information, identify areas at risk. (ii) Tactical considerations of the multi-agency group with media messages such as "Go in, stay in, tune in" (iii) Declaration of emergency by government instigates emergency plans by most government departments that in turn kick-off public communications that is coordinated by local police forces.

Needed information to get started
The following information is needed to start the function:
- Area of proclaiming the warning
- Message/content of warning
- Frequency of warning

In order to determine the area of proclaiming the warning and the message of the warning one needs to know the nature of the risk, agent characteristics, extent of the contamination, likely fate of the agent, proportion and location of people at risk, assessment of risk translated into specific actions ('shelter or evacuate', and 'what symptoms to look out for') etc.

Furthermore, cohesive multi-agency public communications and plans are necessary. Accurate and timely coordinated multi-agency information.

Available scaling options
Through assistance from partner organizations and the media. Social media is also an option (e.g. twitter feed and web presence).

Needed type of resources
- (Mobile) command center.
- Media trained teams
- Access to latest scientific information and advice (both in-house and shared across agencies), and means of wider communication to the population (usually via traditional media).

Needed conditions
- Warning and communication systems
- Arrangements with the media for communicating key public health messages.
- Decision of the incident commander
- The message of warning should be ready and proclaimed as soon as possible

What goes wrong in the current way of performing the function?

- The small staff available in each County is easily overwhelmed in case of major crisis.
- Not everyone can be reached
- Communicating a zone of evacuation is often unclear to the population: what is within and outside the zone.
- Substantial evacuation overreaction by the population
- Well-established provision exists for response, but further public awareness and tests of response that provide realistic challenges needed. Development of response needs to be evidence-based and constantly evolving.
- In general, well-planned but links to scientific community need strengthening to get better assessments   (through ECOSA (Emergency Coordination of Scientific Advice)/STAC (Scientific and Technical Advisory Cell) /SAGE (Scientific Advisory Group for Emergencies)).

Improvement options

A clearer message to the people clarifying the evacuation zone using landmarks (streets, buildings, parcs).

Taking into considerations characteristics of the population (e.g. language).

Other remarks

Most LRFs (local resilience forum) have a local multi-agency policy nominating Police as primary spokesperson.

Operational function 4.28 Evacuate surrounding areas

Goal of operational function
The surrounding areas need to be evacuated in order to minimize exposure to the threat.

Trigger for starting the function
In case of a suspicion of (possibility for) a spread of a threat agent, the authorities will decide to evacuate surrounding areas.

Needed information to get started
The following information is needed to start the function:
- Knowledge of the threat agent and its properties
- Meteorological data
- Topography is necessary to determine the evacuation zone.
- Assessment of number of people to be evacuated
- Assessment of number of non ambulant people

Available scaling options
-

Needed type of resources
Transport options (e.g. busses and trains)

Needed conditions
-

What goes wrong in the current way of performing the function?
-

Improvement options
-

Other remarks
In case of the hospital scenario an additional difficulty is the bed bound patients. Will they accept being evacuated to another part of the large building rather than outside?

Operational function 4.29 Register and trace exposed people

Goal of operational function
To minimize secondary contamination and ensure that the exposed people get the medical help needed.

Trigger for starting the function
Receiving information about the incident and people potentially exposed (suspicious symptoms and supporting background information, confirmed diagnosis).

Needed information to get started
The following list of information is needed to start the function:

- Location of the incident
- Context of the incident/threat
- Contour of area of danger
- Confirmation of (possible) involved substances and its circumstances
- Risk assessment
- Handling-perspective of first responders
- Assessment of number of people presence at incident and their destination afterwards.

Available scaling options
Patients with less severe influenza symptoms are advised to stay home to avoid spreading the disease. Give them a telephone number to contact if needed.

Needed type of resources
At emergency unit/local health care centres/hospitals separate room with sanitary facilities (and air lock); for highly contagious patients possibly even suitable analysis laboratory nearby, special ambulance for transport, protective clothing for health care personnel and special routines, log for all contacts (personnel, visitors).

Way of communicating with large crowd that possibly is auto-evacuating.

Needed conditions
Decision of the incident commander or the incident coordinator.

The registration of people being rescued and decontaminated should fit in with the registration for tracing people.

What goes wrong in the current way of performing the function?
- incorrect or incomplete information about the passengers' trip destination
- broad area of the incident is a challenge as well as incident in big cities
- There is little capacity to isolate and to treat contagious patients at hospital, even less capacity in combination with intensive care.
- The capacity for laboratory analysis of patient sample is rather small.
- Also the capabilities for transport of highly contagious patients that need intensive care is limited.

- Not every communication channel will reach all exposed people. Therefore, different types of communication channels are needed to reach as much people as possible.
- Since not all agents give acute symptoms, exposed people may have self-evacuated or not even be aware of the incident.

Improvement options

A central web-based "crisis portal" for all types of incidents has been suggested.

Other remarks

-

Operational function 4.30 Provide shelter, nutrition, water, sanitation and hygiene to evacuated people

Goal of operational function
To support the evacuees by providing temporary shelter, food, water, sanitation and hygiene.

Trigger for starting the function
Once an area is decided to be evacuated, shelter, nutrition, water, sanitation have to be arranged.

Needed information to get started
The following list of information is needed to start the function:

- Location of the incident
- Number of evacuees
- Composition of the group of evacuated people (children, elderly, non-ambulant, …)
- Duration of the evacuation

Available scaling options
Local agreements might exist between municipalities to help each other. Scaling also depends on the available logistic support.

Needed type of resources
Possibilities for sheltering (e.g. hotels, dormitories, cinemas, theatres, community centres, sport facilities, canteens, restaurants, private entities facilities)

Resources of Humanitarian Aid NGOs or the military.

Needed conditions
Decision of an incident coordinator.

What goes wrong in the current way of performing the function?
-

Improvement options
-

Other remarks
-

Operational function 4.31 Register and handle belongings that were left behind

Goal of operational function

To provide protection to the goods left by evacuees on-site and to facilitate the process of returning goods to the owners if possible.

Trigger for starting the function

This function can start when the evacuation process starts, however it will probably not start before the acute phase of the incident is over.

Needed information to get started
- Location and dimension of the threat zone
- Threat level generated by the goods left in danger zones
- Possibilities of decontamination of the goods

Available scaling options

-

Needed type of resources

-

Needed conditions

-

What goes wrong in the current way of performing the function?

-

Improvement options

-

Other remarks

-

Operational function 4.32 Inform the general population

Goal of operational function

The goal of this function is informing society (the not directly affected people) about threats and required standards of behaviour. Informing them is important to avoid any unwanted or misdirected actions: To make sure that health systems are not overburdened by worried wells and emergency services have easy access to the incident sites. It will also help to keep public order, avoid speculation and spread of rumours.

Trigger for starting the function

(i) Via emergency services or the media - triggered by identification of risk to population. On scene risk assessments filter back, or modelling/weather information coupled with incident info, identify areas at risk. Real time information about risk and threat. (ii) Evacuation/shelter, traffic and transport plans all inform the communications strategy that would be implemented in accordance with strategic/Gold command aims and objectives.

At the moment of threat identification.

Reports of a pandemic by the WHO

Needed information to get started

Cohesive multi-agency public communications and plans are needed to timely provide accurate coordinated multi-agency information via Gold Command. This requires early and accurate assessment of agent(s) involved (shelter or evacuate / how to decontamination = required or not? then if so then how to self help / what symptoms to look out for and to get help (NHS direct or present to hospital/GP). Furthermore the following information needs to be communicated:

- Basic survival and self-rescue skills, along with information gathering techniques (i.e. what to inform emergency services about)
- Information needed includes nature of the risk, agent characteristics, extent of the contamination, likely fate of the agent, proportion and location of people at risk etc.

Available scaling options

There are not much resources required for upscaling, hence, this is feasible. Scaling up can be done through assistance from partner organisations and the media. Social media is now also an option (e.g. twitter feed and web presence)

Needed type of resources

- Media trained teams
- Access to latest scientific information and advice (both in-house and shared across agencies)
- Means of wider communication to the population, for instance announcement equipment of State Fire Service, Voluntary Fire Service, Police, Municipal Police, Civil Protection alarm sirens, local and national mass-media, leaflet prepared in the frame of emergency rescue plans of works and as a part of information activity of administrative authorities.
- Clear-cut delegation of how the information procedures should be handled One unambiguous name, picture and place for information on the pandemic.

Needed conditions
- Arrangements with the media for communicating key public health messages.
- Command of an incident coordinator.
- Message must be clear and unified. Because most of the public is unfamiliar with CBRN, relevant and correct information is even more important.

What goes wrong in the current way of performing the function?
The little staff available in each County is easily overwhelmed in case of major crisis.

Well-established provision exists for response, but further public awareness and tests of response that provide realistic challenges are needed. Development of response needs to be evidence-based and constantly evolving. In general, it is well-planned but links to scientific community need strengthening to get better assessments (through ECOSA (Emergency Coordination of Scientific Advice)/STAC (Scientific and Technical Advisory Cell) /SAGE (Scientific Advisory Group for Emergencies)).

Decision-makers that are forced by practical and pragmatic reasons to take decisions that do not completely comply with experts advice feel restrained in communication about this.

An example of the communication strategy of the Dutch government about the H1N1 pandemic, shows that the initial communication strategy (leaning on one 'independent' key figure that is not associated with the government) led to limited visibility of governmental actions/interventions. Reassuring statements of the government prevented commotion in society at first, but finally (after some incidents) led to discussion in media and society and therefore influenced the success of crisis management measures.

Not all people are reached through the same channels

Improvement options
An official government view is needed. Don't try to reassure the public, but provide information about risks and free choice about measures like vaccination. Monitor risk perception and need for information and adjust communication strategy to this rapidly.

A central web-based "crisis portal" for all types of incidents has been suggested

Other remarks
Continuous and understandable information is one of the main responsibilities of the County Physician and important for avoiding panic and discontent of the population

Most LRFs (local resilience forums) have a local multi-agency policy nominating Police as primary spokesperson

Operational function 4.33 Manage public order

Goal of operational function
Providing public order in case of a threat. This is done by preventing trespassing and looting, managing mobility towards and from the incident, monitoring and controlling the affected area and crowd management.

Trigger for starting the function
This function starts when the alerting call is received.

Needed information to get started
The following list of information is needed:

- Location
- Context of the incident/threat
- Boundaries of tolerance / profile of treatment
- Confirmation of (possible) involved substances
- Contour of area of danger
- Risk assessment
- Overview of encountering measures for first responders and the population
- Handling-perspective of first responders

Available scaling options
The scaling options depend on logistic support.

Needed type of resources
Resources of Police, Municipal Police, security agencies, Military Police.

Needed conditions
Decision of the incident commander or incident coordinator.

What goes wrong in the current way of performing the function?
-

Improvement options
-

Other remarks
-

Operational function 4.34 Provide psychological care

Goal of operational function
To prevent and mitigate the effects an incident has on psychological (mental) health, by ensuring psychological support for those affected.

Trigger for starting the function
A traumatic incident.

At the moment of beginning of evacuation or according to the decision of an action coordinator.

Needed information to get started
The following information is needed to start the process: Location, type and scale of threat; prognosis of a threat development; number of population in a threat zone; amount of victims and type of their injures.

Available scaling options
-

Needed type of resources
Psychological expertise (specialised psychologists and social workers), like intervention Psychology Teams of Police, State Fire Service and Ministry of National Defence, hospital psychologists, University employees of psychological profile departments, clergymen.

Needed conditions
A single intervention is often not enough. Long(er) term help is required.

What goes wrong in the current way of performing the function?
- Medical personnel often does not recognise psychological problems.
- The focus of first responders and crisis managers is on physical problems, not on 'vague' psychological problems.
- Unclear responsibility which organisation has to develop a long term program.
- Communication or transportation problems.

Improvement options
- Deployment of specialised personnel
- Specific programs for vulnerable groups (see Other Remarks) to return to a normal state.
- There is a knowledge gap about what to do exactly to provide mental health care. The majority of the past interventions were done without clear description of activities or reporting afterwards.

Other remarks
Religious communities engage voluntarily

Psychological problems are particularly a risk for mothers with young children, pregnant women, evacuated people and mentally disordered persons.

The psycho-social impact from is caused by 7 specific aspects of chemical incidents: The acute stress reaction can induce terror due to breathing problems; uncertainty of long-term effects (for instance birth defects and cancer); housing and job security; media siege, reinforcing negative aspects of an incident; social rejection of survivors which, for instance, leads to decreased chances of finding a partner; conflicting cultural pressures, such abortion vs. catholic ideas; inadequate medical follow-up and compensation.

Media reports on the incident may trigger psychological problems in those not directly affected

Annex VII: Recovery phase

Operational function 5.1: Decontaminate infrastructure and environment (static)

Goal of operational function
Decontamination of infrastructure and environment is done in order to ensure that there is no hazardous material left which might threaten people and livestock. Restoring the situation to normal, i.e. making it possible that infrastructure and environment can be used again or is accessible, is the end state.

Trigger for starting the function
Decontamination of infrastructure and environment is started after a sign that the initial life saving activities are over.

Needed information to get started
Information about the kind of material and the reach of contamination. It also essential to have a clear understanding about what is 'clear'.

Available scaling options

Needed type of resources
Specialised companies in the field decontamination.

Needed conditions

What goes wrong in the current way of performing the function?

Improvement options

Other remarks
The aspect of costs for decontamination is an important issue. It is often not entirely clear who is responsible for paying all the costs of decontamination.

Decontamination include outdoor and indoor cleaning of infrastructure.

Operational function 5.2: Clear debris

Goal of operational function

The goal of clearing debris is to remove all debris from the site which might be a safety risk to people and livestock. It is also done to make way for reconstruction activities or to regain access to places.

Trigger for starting the function

Clearing of debris during the recovery phase clearly continues clearing activities during the response phase. However, there are some important aspects about when to start.

Needed information to get started

Available scaling options

Needed type of resources

Specialised organisations in clearing contaminated debris

Needed conditions

What goes wrong in the current way of performing the function?

Improvement options

Other remarks

Clearing debris has to be closely coordinated with decontamination. Is debris decontaminated on site or somewhere else? In the latter case, transport of contaminated debris will be a precarious operation.

The destruction of debris, waste management, is also something to take into consideration.

Reimbursement of volunteers, for instance helping company employees, is not always clear. It is often a matter which organisation is responsible and has to reimburse the volunteers.

Clearing debris is not relevant in B-scenarios.

Operational function 5.3: Determine residual contamination level

Goal of operational function
Determining the residual level is meant to control the remaining risk level. In which areas is the risk acceptable and may normal live be restored, and which locations have to be closed for the general public. Division into zones will be the resultant of the execution of this function.

Trigger for starting the function
This function will only be started after an incident.

Needed information to get started
Information is needed to determine the spreading of the hazardous material, like for instance the weather conditions. Also information about the exact material and its characteristics. Knowledge about other means of spreading the material is also important to determine the affected areas. In case of B, insight in food production processes is important to analyze the extent of the contamination.

Available scaling options

Needed type of resources
Portable equipment to determine levels on site combined with laboratories to analyse the exact amount.

Needed conditions
A shared understanding of acceptability with regard to residual levels. This means agreement also from people who are dependent on living and working at a certain location; think of company employees, but also farmers (and their crops and life stock).

What goes wrong in the current way of performing the function?
Not every country has the means to determine residual levels.

Improvement options

Other remarks
Acceptable risk is at the core of determining residual contamination level.

Operational function 5.4: *Reconstruct basic services, infrastructure and environment*

Goal of operational function

Reconstruction tasks will focus on restoring all services, infrastructure and environmental aspects in order to allow normal life to be resumed.

Trigger for starting the function

Needed information to get started

Available scaling options

Needed type of resources

Needed conditions

What goes wrong in the current way of performing the function?

Improvement options

Other remarks

Operational function 5.5: Provide long term health care

Goal of operational function
Providing long term health care is to monitor health developments over an extended period in order to notice and treat possible effects of an incident.

Trigger for starting the function
Providing long term health care may be started as a routine operational function after an incident. Some groups in society are more vulnerable to health problems. However, health care may also be started after rumors in society about health problems related to an incident.

Needed information to get started
Identity of potential participants in long term health care programs are important. The first step will be to determine whether or not persons were exposed, even if do not feel ill at the start of the program.

Also knowing which materials they have been exposed to is needed and data about 'comparison' groups.

Information whether there were persons from high risk groups were exposed is helpful.

Available scaling options

Needed type of resources

Needed conditions
Information about treatment for CBRN-specific related illnesses.

What goes wrong in the current way of performing the function?
It takes sometimes to much time to start up a program. Valuable time may be lost. Furthermore, it is likely that multiple organisations are involved, which make a clear treatment more difficult. A challenge may also be to reach the (right) persons.

Not every persons wants to be included in the program.

Improvement options

Other remarks

Operational Function 5.6: Provide long term psychological care

Goal of operational function

Long term psychological care is provided in order to prevent people from developing serious psychological and psychosomatic problems as a result of an incident.

Trigger for starting the function

Directly after the incident, people need to be brought into contact with psychological health care professionals.

Needed information to get started

Insight in psychological situation of people involved in the incident.

Available scaling options

Needed type of resources

Psychological and social workers.

Needed conditions

What goes wrong in the current way of performing the function?

Often, especially in underdeveloped countries, psychological health problems are overlooked. The focus lies at physical problems. Valuable time in helping people is lost.

Improvement options

Include psychological health care programs in a general program to help people to return to normal.

Other remarks

Some groups in society are more vulnerable to developing psychological problems. Young mothers or mothers with unborn children are a good example. Also, those people who have been evacuated or have experienced a severe psychological shock have increased chances.

Special programs for children may help them overcome the shock of an incident.

Operational Function 5.7: Restore first response capabilities

Goal of operational function
Responding to an incident requires resources. This include firefighting resources, vaccinations etc. Restoring the capabilities to operational level again and resupply shortages is needed to prepare for the next incident.

Trigger for starting the function

Needed information to get started
Exact information about the used materials and shortages in capabilities. Lessons learned may lead to acquiring new resources.

Available scaling options

Needed type of resources

Needed conditions

What goes wrong in the current way of performing the function?

Improvement options

Other remarks

Operational Function 5.8: Restore (trust in) society, government and economy

Goal of operational function
An incident may deeply shock society, trust in government (including first response and crisis management professionals) and have severe economic consequences. Restoring these aspects will bring back tranquility in society.

Trigger for starting the function

Needed information to get started

Available scaling options

Needed type of resources
Communication plans. It is important that clear guidelines for safe levels are set and communicated; people want to know that there is no more hazard.

Needed conditions
Strong political leadership will strongly add to restoring trust from the population in governmental organizations, economy and society in general.

What goes wrong in the current way of performing the function?
Guidelines are not always clear, even (so called) can have different opinions. In Europe, the countries have different levels of for instance nuclide.

Improvement options
Europe wide agreement about what is clear and safe and what is still contaminated.

Other remarks

Operational Function 5.9: Prosecute perpetrators

Goal of operational function
Prosecuting perpetrators is done to punish those responsible for the incident.

Trigger for starting the function
Capture of the accused will be start of the legal process.

Needed information to get started
Legally solid information that proves that the accused individuals are responsible.

Available scaling options

Needed type of resources

Needed conditions

What goes wrong in the current way of performing the function?

Improvement options

Other remarks

Operational Function 5.10: Evaluate incident response and retrieve lessons learned

Goal of operational function
The goal of evaluating an incident and retrieve lessons learned is to improve all aspects of preventing future CBRN incidents of happening. This loop feeds back to all operational functions

Trigger for starting the function
The function will be started shortly after the incident.

Needed information to get started
After incident research and lessons learned may be started if there is reason to believe errors were made. However, this operational function can also be part of standard (national) procedure.

Available scaling options

Needed type of resources

Needed conditions

What goes wrong in the current way of performing the function?
Ideally, evaluating and drawing lessons learned is started as shortly after the incident as possible. How longer the delay takes, the more difficult the recollection of data – especially clear eye witness statements – will become.

This function requires openness from all involved organizations in CBRN-incidents. However, fear of prosecution may hamper truth finding.

Especially on higher levels in crisis management the evaluation of the incident response is often slow, let alone the implementation of lessons learned.

Improvement options
Systematic approach for retrieval and implementation

Other remarks
In Sweden, municipality reports go to County Administrative Boards. Further analysis is done by the National Board of Health and Welfare (MSB).