PROJECT REPORT, MAY 2015

LEARNING FROM INCIDENTS

Towards the Development of an Incident Evaluation Tool

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OTO LIMBURG VOORBEREIDING OP RAMPEN EN CRISES

Executive summary

In 2008, a report of the Dutch Ministry of Volksgezondheid, Welzijn en Sport (VWS; 'Health, Wellness and Sport') showed that healthcare organizations in the Netherlands are not sufficiently prepared for incidents. By investing in OTO (Oefenen, Trainen, Opleiden; 'Educate, Train, Exercise') activities, healthcare organizations learn to be better prepared for incidents.

OTO Limburg however also acknowledges the fact that healthcare organizations do not only learn from OTO activities, but can also learn from incidents. In order to learn from them, healthcare organizations should be able to evaluate these incidents appropriately. Therefore, the goal of our project was to develop a generic science-based incident evaluation tool (IET), which can provide healthcare organizations and its employees with learning opportunities, based on how they proceeded in the occurrence of an incident.

We defined incidents as situations that force the healthcare organizations to deviate from the daily situation, where potential threat to public safety or health was involved. The healthcare organizations that can use our IET include hospitals, ambulance services, GGD (Gemeentelijke Gezondheidsdienst; 'Municipal Health Service'), nursing homes, and general practitioners.

To create the IET, we gathered information from different sources of data: scientific literature (e.g. academic insights from incident management, incident evaluation, learning from failures, and organizational learning), interviews with experts in the field of incidents (e.g. persons in a position related to crisis management and safety control), and practical articles (e.g. existing incident evaluation tools).

The vision of the tool developed is 'Evaluate – Learn – Improve' and can be shown in a scheme (Figure 1). It is a guideline which supports healthcare organizations in evaluating incidents. The following chronological steps are presented in the IET: (1) incident, (2) psychological debriefing, (3) After-Action Review (AAR) & Quick Scan, (4) incident evaluation instrument, (5) final feedback meeting, and (6) report of the incident evaluation. Between steps 3 and 4 a decision moment is included which deals with the choice for further evaluation or not. Based on the AAR and Quick Scan an organization can choose to evaluate the incident thoroughly (steps 4, 5 and 6) or not.

In addition to the steps mentioned, the IET also incorporates three learning opportunities, which are connected to steps 3, 5 and 6. These learning opportunities represent points in time from which a healthcare organization, and its employees, can learn from how they proceeded in the occurrence of an incident. The AAR and Quick Scan, the final feedback meeting, and the report of the incident evaluation all have the potential to support learning from what happened during the incident.

Image via Alexander Kaiser, pooliestudios.com

Content

Preface

Building upon the research from previous years, this project focused on the development of a generic science-based incident evaluation tool, which can provide healthcare organizations and its employees with learning opportunities, based on how they proceeded in the occurrence of an incident. The project group consisted of five students with different expertises, experiences and cultural backgrounds. This made it possible to contribute to the project from various perspectives. Solid teamwork, the combination of strengths, and motivation led to the development of this report.

This project would not have been accomplished without the support and kind help of many professionals. First of all we want to thank our organizational coach Gerrit Vernimmen for his enthusiasm and dedication to the project. Despite his tight schedule,

Gerrit supported us throughout the whole project by offering valuable information about the organization, the project, and potential contact persons. In addition, we would like to thank all the interviewees that cooperated for their time, willingness to share their insights and enthusiasm towards the project.

Furthermore, our gratitude goes out to Selma van der Haar, who provided us with critical feedback and additional information so we could continuously improve our report. Her expertise and support were important factors for the success of our project. Moreover, we would like to thank our academic coaches Dr. Ruud Gerards, Dr. Andreas Gegenfurtner, and Dr. Sonja Zaar for their meaningful inputs during the academic coaching sessions in the first stages of the project.

Last but not least, we want to show our appreciation to Maastricht University for providing us the unique opportunity to be part of this project. It allowed us to apply our theoretical knowledge in practice. It has been a fruitful and amazing learning experience.

Introduction

When an incident occurs, all healthcare organizations have to be ready to step out of their routines and intervene in order to minimize catastrophic consequences. Some examples of large incidents involving healthcare organizations during the past couple of years include a fire-outbreak in the Operating Room of a hospital in Almelo (Inspectie voor de Gezondheidszorg, 2008), a power outage in a hospital in Roermond (Laarman, 2014), or the fireworks disaster in Enschede (IJzermans, Dirkzwager, Kerssens, Cohen-Bendahan, & ten Veen, 2006). All incidents are unique, can be caused externally or internally, and can be monodisciplinary or multidisciplinary. However, they have in common that they cause a deviation from the daily situation.

This implies that healthcare organizations have to be prepared for the unforeseen and that they have to be able to successfully manage incidents, even when the low frequency of incidents might cause the healthcare organization to be inexperienced in doing so. What makes successful incident management extra important for healthcare organizations is the fact that they operate in an environment that is defined as weak or invalid (Hogarth, 2001). This kind of environment leaves no space for experimenting or trying out possible alternatives before choosing the right one; professionals need to decide about what actions should be taken during a crisis and this decision has immediate consequences. At the individual level, this implies that individuals who are less experienced, lack the key competencies or are not properly trained might engage in imperfect decisions. In addition to that, healthcare organizations need to know whether their organization is prepared for an incident and if not, what needs to be improved. This is important because a high level of preparedness is one of the predictors of the outcome of an incident (WHO, 2007). In their definition of an emergency situation, the World Health Organization (WHO) determines the level of risk for harm by the following equation: Risk = Hazard x Vulnerability / Level of Preparedness (WHO, 2007). This underlines the importance for healthcare organizations to constantly learn in order to prepare themselves for incidents.

However, in 2008, a report of the Dutch Ministry of Volksgezondheid, Welzijn en Sport (VWS; 'Health, Wellness and Sport') showed that healthcare organizations in the Netherlands are not sufficiently prepared for incidents. To improve this preparedness, the VWS decided to annually provide healthcare organizations in the Netherlands with €10 million. This money is distributed among the 11 Landelijk Netwerk Acute Zorg (LNAZ; 'Nationwide Network Acute Care') regions of the Netherlands. All money has to be invested in so called OTO (Oefenen, Trainen, Opleiden; 'Educate, Train, Exercise') activities, which are all aimed at improving the level of preparedness for incidents of healthcare organizations (Jonkman & Damen-Koolen, 2012).

Consequently, the OTO Limburg steering committee was initiated, together with an OTO steering committee for every other LNAZ region. Their mission is to contribute to the adequate preparedness for crises and disasters of healthcare organizations. The main role of OTO Limburg is to allocate the governmental investment – which Netwerk Acute Zorg Limburg (NAZL; 'Network Acute Care Limburg') manages – to various healthcare organizations in the region and to monitor the OTO activities taking place. OTO Limburg does so by developing and bundling the expertise of healthcare organizations and by supporting healthcare organizations within and between regions. Accordingly, OTO Limburg's goal is to increase and improve incident preparedness in healthcare organizations (Jonkman & Damen-Koolen, 2012).

OTO Limburg acknowledged the need for an instrument to objectively measure the level of preparedness for incidents in healthcare organizations. Such an instrument has the potential to help healthcare organizations enhance their preparedness, because it gives insight in what aspects of incident preparedness are sufficient, and what aspects need improvement. Therefore, in 2012, the first of currently four project phases was initiated by representatives of OTO Limburg at Maastricht University. The previous three project phases were aimed at (1) examining whether it is possible to objectively measure preparedness (project phase I – 2012), (2) developing competencies profiles (project phase II – 2013), and (3) developing an incident preparedness tool (project phase III – 2014). The results of these projects are all components of the so-called 'Thermometer Incident Preparedness' and can be used by healthcare organizations as support to OTO activities.

By investing in OTO activities, healthcare organizations educate, train, and exercise their personnel with the aim to improve incident preparedness. OTO Limburg however also acknowledges the fact that healthcare organizations do not only learn from OTO activities, but can also learn from incidents. In order to learn from them, healthcare organizations should be able to evaluate these incidents appropriately. Therefore, the goal of the current project is to develop a generic science-based incident evaluation tool. This tool should be generic, thus useable for all healthcare organizations, and applicable for all types of incidents. It is a guide for dealing with incidents; it offers healthcare organizations a structured way to evaluate and accordingly learn from incidents. To be more precise, the purpose of the tool is to provide healthcare organizations learning opportunities about their processes in the occurrence of an incident, such as their procedures, behaviors and decision-making. This project is therefore directly supporting OTO's goal of increasing and improving incident preparedness in healthcare organizations.

The incident evaluation tool we will develop will be offered by OTO Limburg and used by healthcare organizations in Limburg. These healthcare organizations include hospitals, ambulance services, GGD (Gemeentelijke Gezondheidsdienst; 'Municipal Health Service'), nursing homes, and general practitioners. See Appendix 1 for a more elaborate description of the organizational context of OTO Limburg.

The aim of the current report is to provide an incident evaluation tool that is supported by academic and practical insights. The report will elaborate on these insights, which will serve as the basis for the development of the incident evaluation tool. Additionally, an extensive explanation is given about all aspects of the incident evaluation tool itself.

Reading Guide

Introduction
This chapter provides the background and context of our project. It shows why the project was initiated and what the aim is; development of an incident evaluation tool.

Objectives of the Current Project
This chapter describes crucial factors with regard to the purpose of the tool. It names the conditions which the developed tool should possess.

Chapter 1. Approach
This chapter describes which different sources were used for the creation of the incident evaluation tool.

Chapter 2. Incident Evaluation and Learning Scientific and Practical Insight
We recommend to read this chapter if you are interested in the academic and practical (interviews) insights that formed the basis for the development of the incident evaluation tool. If you want to catch the main points mentioned during this chapter we advise to only read the summary boxes provided throughout the chapter.

Chapter 3. Development of the Incident Evaluation Tool
We recommend to read this chapter if you are interested in the method of the development of the Incident Evaluation Tool (IET). In this chapter, a thorough explanation of each component of the tool is given, including the argumentation for why it is included and what it implies. At the end of Chapter 3 a table is provided which summarizes the main components of the tool.

Chapter 4. Recommendations
We recommend to read this chapter if you are interested in our advice with regards to the developed tool. The recommendations provided are aimed at (1) the use of the developed IET and (2) directions for future research.

Objectives of the Current Project

As has just been introduced, the aim of this project is to develop an incident evaluation tool that can be used by healthcare organizations. The following factors are crucial with regards to the purpose of the tool:

THE TOOL HAS TO PROVIDE A LEARNING OPPORTUNITY.

THE TOOL HAS TO BE SCIENCE-BASED.

THE TOOL HAS TO BE GENERIC; IT HAS TO BE USED BY ALL HEALTHCARE ORGANIZATIONS AND FOR ALL TYPES OF INCIDENTS.

THE TOOL NEEDS TO FOCUS ON THE PROCESSES TAKING PLACE DURING THE OCCURRENCE OF AN INCIDENT.

THE TOOL NEEDS TO BE IMPLEMENTED IN AN ONLINE WEB-APPLICATION.

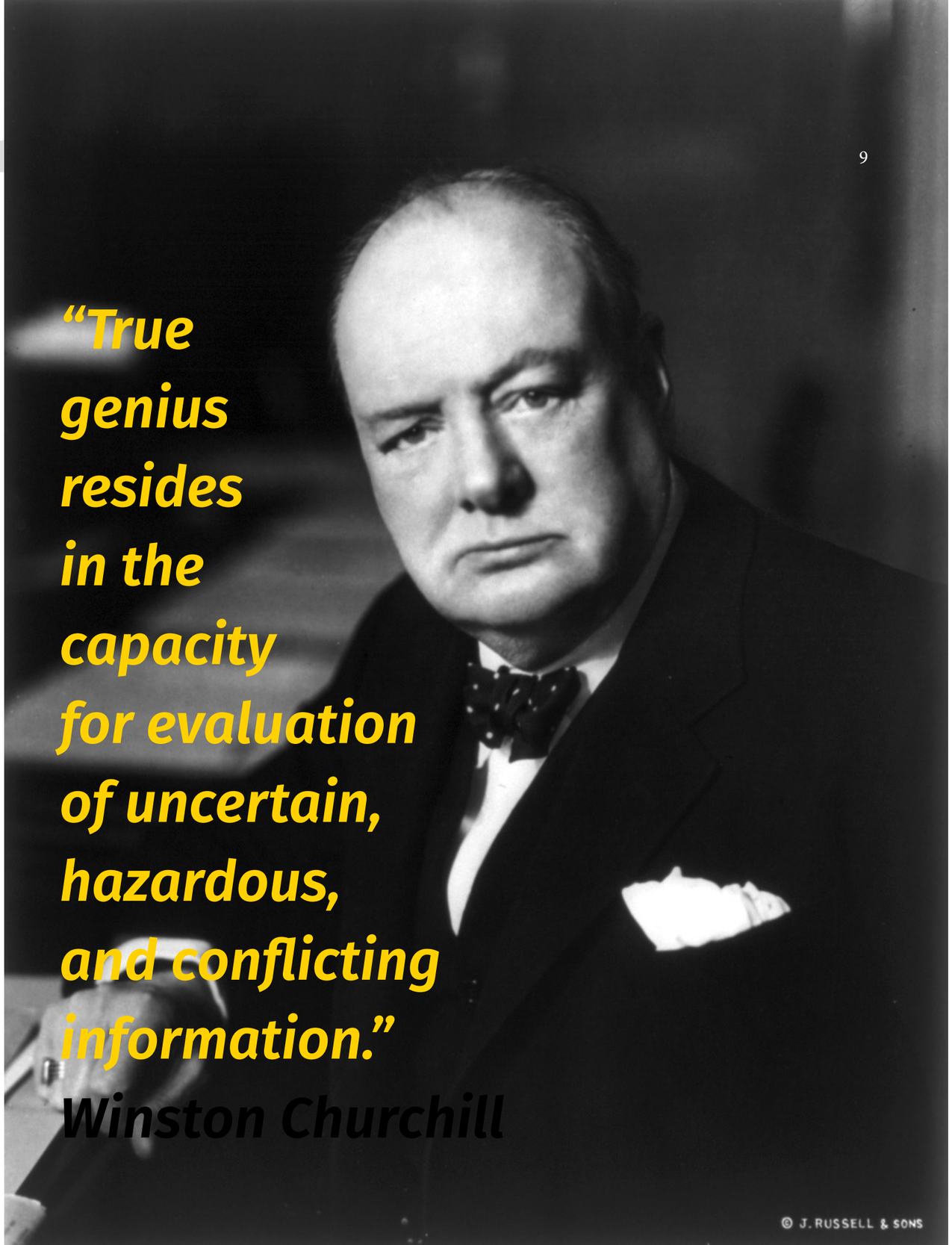
The purpose of this tool is to evaluate incidents in a manner that is as objective as possible, thereby providing the organization with a learning opportunity. The tool will provide insight in how healthcare organizations proceed in case of an incident. The learning consists of identifying the processes, such as procedures, behaviors and decision-making, that can be improved, and formulating concrete learning points that can be implemented within the organization. The incident evaluation tool should demonstrate if current processes are sufficient or if there exists a necessity to change practices. As such, it can be seen as a learning tool. Accordingly, the healthcare organization can learn from an incident and potentially improve its preparedness for incidents.

Another crucial factor in developing the incident evaluation tool is to ensure it is science-based. The different aspects of the tool should all be based on academic findings. This means the possibility to learn from these aspects will be founded on scientific insights as much as possible. Therefore, substantial attention will be given to this throughout the report. In Chapter 2, academic insights will be discussed elaborately that serve as the basis for the vision of the incident evaluation tool as a whole. In Chapter 3, additional academic findings will be provided that argue for specific criteria used in parts of the incident evaluation tool.

Additionally, it should be possible for all types of healthcare organizations and all types of incidents to use the incident evaluation tool. The healthcare organizations include hospitals, ambulance services, GGD, nursing homes and general practitioners. The tool will take both externally and internally caused incidents into consideration, as well as incidents of different scales.

Furthermore, the incident evaluation tool will focus on processes. It will therefore not concentrate on the causes of incidents. The core of the tool is in evaluating the processes taking place during the occurrence of an incident. This will provide healthcare organizations with most opportunities to learn about their own functioning.

Lastly, the tool will be implemented into an online web-application. This web-application will be offered by OTO Limburg to healthcare organizations, and will provide a complete set of tools that can help healthcare organizations improve their incident preparedness. This includes the 'Thermometer Incident Preparedness' and all its components, and the incident evaluation tool. Additionally, the web-application can also help healthcare organizations to share knowledge and learn from each other. Although the digital implementation of the tool will be further executed by an external party, the incident evaluation tool will be designed with the knowledge that it should be used digitally.



Chapter 1: **Approach**

To create the incident evaluation tool, we gathered information from different sources of data to draw from:

Scientific literature
Interviews with experts in the field of incidents
Existing incident evaluation (tools)

Together, these scientific and practical data provided the insights needed to create the basis for the incident evaluation tool. An elaborate description of the development of the tool is given in Chapter 3.

1.1 Scientific Literature

To ensure a scientific base for the incident evaluation tool, academic insights from the following fields and about the following topics were collected:

Incident management
Incident evaluation
Learning from failures
Organizational learning

The scientific insights derived from these fields and topics helped to find answers to the following questions:

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How can we define and scope the concept of incidents?
What is the importance of incident evaluation?
How can organizations learn from failures, such as the inappropriate management of incidents?
What are conditions to ensure effective learning in organizations? What are critical factors contributing to the success of the incident response?

1.2. Interviews with Experts in the Fiel

Additional to drawing from scientific literature to find a basis for the incident evaluation instrument, we also gathered data that could give us insights from a more practical perspective. We therefore conducted a number of semi-structured interviews with experts in the field of incidents. In total, we interviewed four experts individually, and conducted one additional interview in the setting of a focus group of crisis coordinators. Interviewees fulfilled a variety of positions related to crisis management and safety control. They were employed at healthcare organizations, governmental organizations, or a chemical complex. Table 1 provides a brief list with information about the interviewees.

Type of interview	Function interviewee	Type of organization interviewee
Individual Interviews	Trainer crisis team	Chemical complex
	Advisor operational control	GGD (municipal health service)
	Senior inspector	Governmental safety institution
	Safety controller	Medical center
Focus Group	OTO coordinator	Hospital
	Six crisis coordinators (potentially safety controllers)	Hospitals/Medical centers

Table 1: Overview of the interviews conducted

Considering the importance of incident management for these types of organizations and the extensive experience in incident management of all interviewees, the information gathered during the interviews provided valuable insights about their own incident evaluation and suggestions for the incident evaluation tool. During the interviews, the following main topics were discussed:
The definition of an incident
Dealing with incidents
Evaluating incidents
Learning from an incident evaluation. A summary of all interviews can be found in Appendix 2.

1.3. Existing Incident Evaluation Tool

Additional practical insights were obtained by collecting several existing incident evaluation tools. These could be used within or outside of healthcare organizations, and could be used within or outside of the Netherlands. The following areas were scanned for relevant information concerning the performance of an incident evaluation: healthcare, fire departments, military, and road infrastructure safety.
These evaluation tools were of value in a number of ways: (1) they provided best practices in incident evaluations, (2) they gave information about the extent to which current evaluations are already based on scientific findings, (3) they gave information that cannot be covered by scientific literature.

Chapter 2:

Incident Evaluation and Learning in Organizations

The current chapter aims to provide an overview of the obtained academic and practical perspectives, in order to provide a vision for the incident evaluation tool. To do so, it is important to give insights about the following:

Defining the scope of the concept of incidents,
An input-process-output-based perspectives on incidents
Learning from incidents
Conditions needed to learn from incidents.

For these aspects, information will be given that was derived from academic articles and interviews. Furthermore, the importance of these aspects for the incident evaluation tool will be shortly discussed. This chapter will present the broader ideas for the incident evaluation tool. In Chapter 3, a more elaborate argumentation will be given for the use of specific elements that are included in the incident evaluation tool.

2.1 Defining the concept of incidents

Key findings

Incidents occur on different scales. We work with the following definition of incidents: situations that force the healthcare organizations to deviate from the daily situation, where potential threat to public safety or health was involved.

Key takeaways for the incident evaluation tool

The tool will be suitable for all types of incidents that match the definition given above, regardless of their scale and cause. In addition, given the wide variety of possible incidents, the tool will be able to distinguish between different levels of incident severity.

Many interpretations of the term incident can be found in literature, even when narrowing down to the perspective of healthcare organizations. The differences are, for example, in industry involved, severity of the incident, procedures required or people involved (Burnett, 1998). Incidents are generally defined as being part of a scale. It may be hard to differ between different terms used that are part of this scale, such as disaster, emergency or hazard. Even in literature, these terms are sometimes used interchangeably (Shaluf, Ahmadun & Said, 2003). To clarify the terms, a list of definitions of the World Health Organization (WHO) can be used to explain the different terms relating to incidents. This overview can be found in Appendix 3.

Furthermore, incidents can have different causes. Although the focus of the incident evaluation tool will not be on the causes of incidents, it is valuable for the comprehension of incidents to acknowledge the different situations that can cause an incident. The United Nations International Strategy for Disaster Reduction (UNISDR, 2004) considers two main origins of an incident. These can be natural (floods, earthquakes and epidemics) and technological (industrial accidents, transport accidents, and miscellaneous accidents, such as the collapse of domestic structures, explosions or fires). These causes are referred to as hazards and have the potential to result in an incident.

Additionally, incidents can occur outside the healthcare organizations as well as inside of them. External incidents, such as the Enschede fireworks disaster in 2000 (IJzermans et al., 2006), can lead to a large amount of victims, forcing the healthcare organization to deviate from daily routines. Incidents can also take place inside a healthcare organizations, such as power outages. They form a separate category of miscellaneous incidents, since there might be hospitalized patients who are often unable to follow the evacuation instructions by themselves in case of an incident (Interviews). Furthermore, incidents might endanger the lives of patients present in the healthcare organization. For this reason, incidents in hospitals or other healthcare organizations pose a threat to public health. An event like this can be described as a hazardous situation with potential harmful consequences for health, which might evolve into a crisis.

All interviewees indicated that it was hard to give an exact definition of an incident. However, they all noted that an incident could be seen as an unexpected situation that causes a deviation from and disruption in the daily, regular situation. Similar to what was found in scientific literature, interviewees also made a distinction between smaller incidents and bigger incidents that involve upscaling. However, the focus of the interviews was mostly on the latter: bigger incidents that involve upscaling. One interviewee referred to a bigger incident as a 'crisis'. In these kinds of incidents, the crisis team is called into action.

To clarify and define the goal of this report, the tool developed will serve to evaluate incidents that are defined as situations that force the healthcare organizations to deviate from the daily situation, where potential threat to public safety or health was involved (WHO, 2007; Interviews). This definition will also be used throughout the report when referring to incidents. In the occurrence of an incident, an immediate action and instant decisions are required to respond appropriately to prevent a disaster. For healthcare organizations this means preventing injury and the loss of human lives, while maintaining a well-functioning organization.

2.2 An input-process-output based perspective on incidents

Key findings

During the occurrence of an incident, a distinction can be made between input (preparedness of a healthcare organization), processes (such as decisions and behaviors during the incident itself), and output (harm caused to people involved, public health and the organization). As such, an incident can be placed in the input-process-output model.

Key takeaways for the incident evaluation tool

Causes of the incident will not be included in the tool. Instead, the tool will focus on the processes taking place during an incident, providing organizations with a learning opportunity about what can be improved when dealing with an incident. Due to the importance of input (i.e.: the preparedness of an organization), some aspects referring to this will also be included.

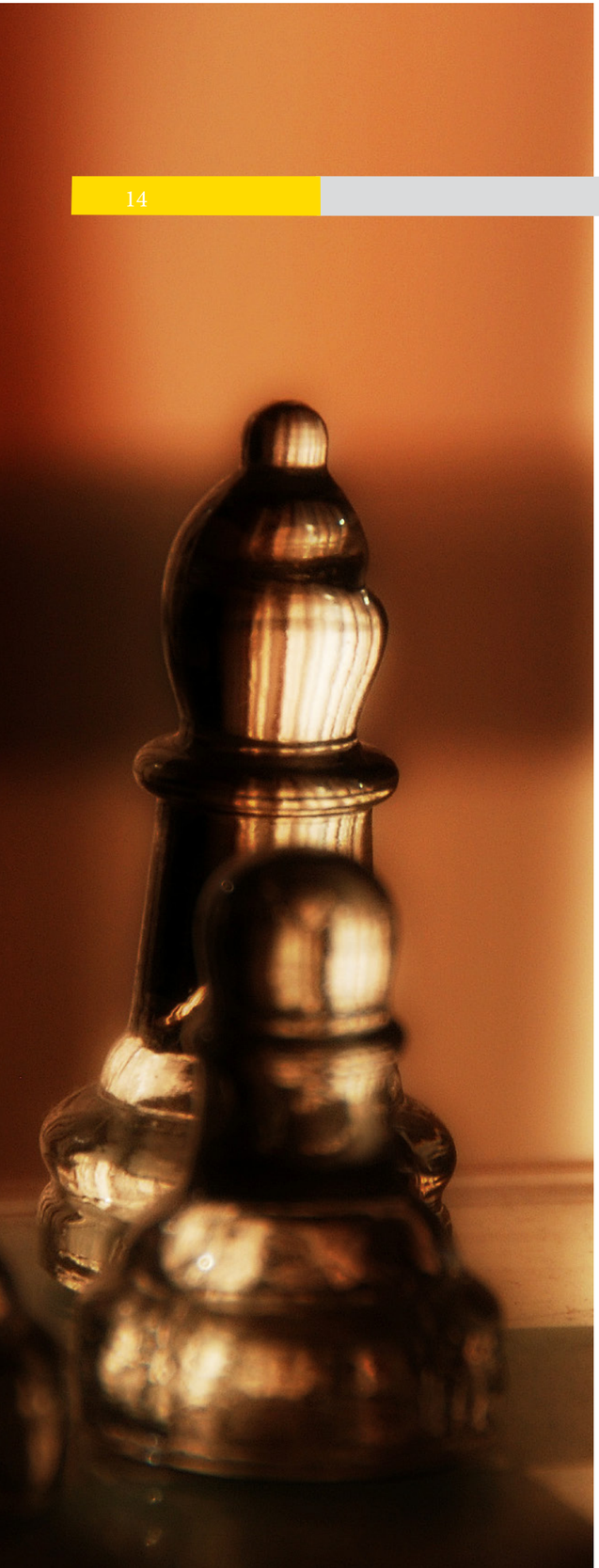
During the interviews, experts in the field indicated that they made a distinction between causes, processes, and outcomes of incidents. In one organization, for example, a clear division was made between evaluating the causes of an incident and evaluating the processes taking place during an incident. This division resulted from the argumentation that the cause of an incident and the processes of dealing with the incident are not always directly related. Additionally, the outcomes of incidents (interpreted as harm caused to persons involved, public health and the organization) can also not be seen as an exclusive consequence of the processes that the organization engaged in. Related to this, one interviewee stated: '*If something was done well, it does not always mean it went well. And if something went well, it does not always mean it was done well.*'

During incidents, the incident preparedness of a healthcare organization (i.e.: procedures and capabilities enhanced by OTO activities) serves as input that is processed by, for instance, decisions taken by officers on duty and behaviors of personnel (Goodwin, Burke, Wildman, Salas, 2008). This response to an incident can therefore be considered as a process that is taking place during the incident. The output of this can be seen as the level to which harm was minimized for involved persons, public health and the organization itself. This is based on the input-process-output model that describes how to effectively use input and manage processes in order to gain the best output possible (Goodwin et al., 2008).

The strength of this model is in its focus on interaction between input, process and output (Goodwin et al., 2008). This makes it an ideal base to observe the dynamic nature of incident intervention. Based on characteristics of this model (Bushnell, 1990), it can be applied to the situation where the processes are elements involved during the incident response by healthcare organizations, such as decisions made, teamwork dynamics and communication.

In order to evaluate an incident, an evaluator needs to recognize and differ between input to the incident and its contributions to the output, as well as how this input was processed. For

Figure 2 Input-Process-Output Model relating to Incidents [Figure of input-process-output model relating to incidents]
Source: Bushnell (1990)



the output, the level of success in response to an incident is considered. Bushnell (1990) furthermore differs between outputs and outcomes. Outputs are short-term effects of how the input was processed, while outcomes deal with long-term results, such as the effects on public safety and health. This is supported by Burnett (1998), who states that a solution to a crisis has both short-term and long-term effects.

This model can be used for any process that requires an input and transforms it into an output. In general, translating an incident, which is an occurrence that fulfills the above stated criteria, to this model helps understanding and facilitates evaluation (Bushnell, 1990). Furthermore, Bushnell (1990) states that input and process are both important for the output. Figure 2 shows the input-process-output model during the occurrence of an incident in a healthcare organization.

As has been mentioned before, one of the objectives of the incident evaluation tool is to focus on the processes, such as procedures, behaviors and decision-making, taking place during an incident itself. This implies that the incident evaluation tool should strongly focus on the process part of the model. However, since input is also considered to be an important determinant of the output, the tool should also include some aspects that refer to the level of preparedness of a healthcare organization. Examples of these aspects could be the existence of proper pre-plans and a strategy.

2.3 Learning from incidents

Key findings

When properly evaluated, failures provide a great learning opportunity to organizations. In the context of an incident, failures can be interpreted as mistakes made during the process of dealing with an incident. These mistakes can result from several factors, such as team factors or individual factors, and may or may not have harmful consequences. To learn from mistakes, organizations need to implement the evaluation of an incident into their procedures.

Key takeaways for the incident evaluation tool

The incident evaluation tool will focus on the potential mistakes occurring during an incident response. This will include several types of mistakes, even if these mistakes did not result in harmful consequences. This is in line with the focus of the tool on the processes. Furthermore, the evaluation should be part of a bigger whole (i.e.; organizational procedures for incident management).

Learning from failures

Madsen & Desai (2010) state that failure can be a great learning experience if handled properly. What they mean is that, although failure is an unfortunate event with possible harmful consequences, an organization can still learn from it by properly evaluating and formulating learning points about what needs to be improved to have a better outcome next time. Failures in the past will reduce the chance of failures in the future, especially for large failures (Madsen & Desai, 2010). Failures give organizations more insight in their systems and procedures. Additionally, lessons learnt from failures will not be forgotten fast.

Learning from failure can be transferred to an incident; it is an unwanted event with potentially harmful consequences. In the context of processes taking place during incidents, failure can be understood as mistakes that occurred within the handling of an incident. Mistakes can, for example, take place because involved individuals are likely to experience anxiety and stress during an incident (Drupsteen & Hasle, 2014), despite being instructed and trained. These fundamental possible mistakes can be made at each step during incident management and have a high potential of resulting into catastrophic consequences (Mitroff, Shrivastava, and Udwadia, 1987). However, by proper evaluation, an organization can learn from mistakes made and, consequently, be better prepared next time. It is therefore desirable and necessary to consider these mistakes and carefully evaluate whether any of them occurred, and if so, what learning points can be created.

Failures during an incident to be learned from

As mentioned above, a response to an incident can be accompanied by many mistakes made by involved personnel. The nature of those failures can differ; Mahajan (2010) describes a framework of factors that can cause a failure during an incident, as illustrated in Table 2.

Main Factors	Contributory Factors
Institutional	Economic pressures, regulations..
Organizational	Financial priorities, structure, local policies, standards, saferty culture
Work environment	Staffing, skill mix, workload, shift patterns, design, equipment
Team factors	COmmunication, supervision, team culture
Individual	Knowledge, skills, competence, health
Task factors	Task design, avalaibility and use of protocols
Patient factors	Complexity and seriousness, language, personality, social factors

Table 2: Factors possibly contributing to a Failure during an Incident. Source: Mahajan, 2010

Table 2 illustrates that failures during an incident response can result from numerous factors. When evaluating an incident, these possible factors need to be taken into account in order to reveal mistakes made during the incident response, and thus to be able to formulate learning points (Mahajan, 2010).

The evaluation of an incident should focus on the organization as a whole. However, to be able to do this, it is important to look at several components of the organization as well, such as individual and team factors.

Some of these mistakes might result in potentially fatal consequences. For example, miscommunication within a crisis team during the occurrence of an incident can eventually result in harm to patients. Other mistakes might not result in any detrimental consequences; miscommunication within a crisis team could also occur without resulting in harm to patients. Phimister, Oktem, Kleindorfer and Kunreuther (2003) state that over 90% of failures does not result into any harm. However, these failures still have a great learning potential; parties involved can learn about the mistake and prevent a similar mistake in future. Therefore, the incident evaluation tool should ensure that all mistakes during the process of dealing with an incident are evaluated, even when these mistakes did not have harmful consequences. This is in line with the previously discussed focus of the tool on the process during the incident, rather than the outcomes.

"There are some things you can only learn in a storm"

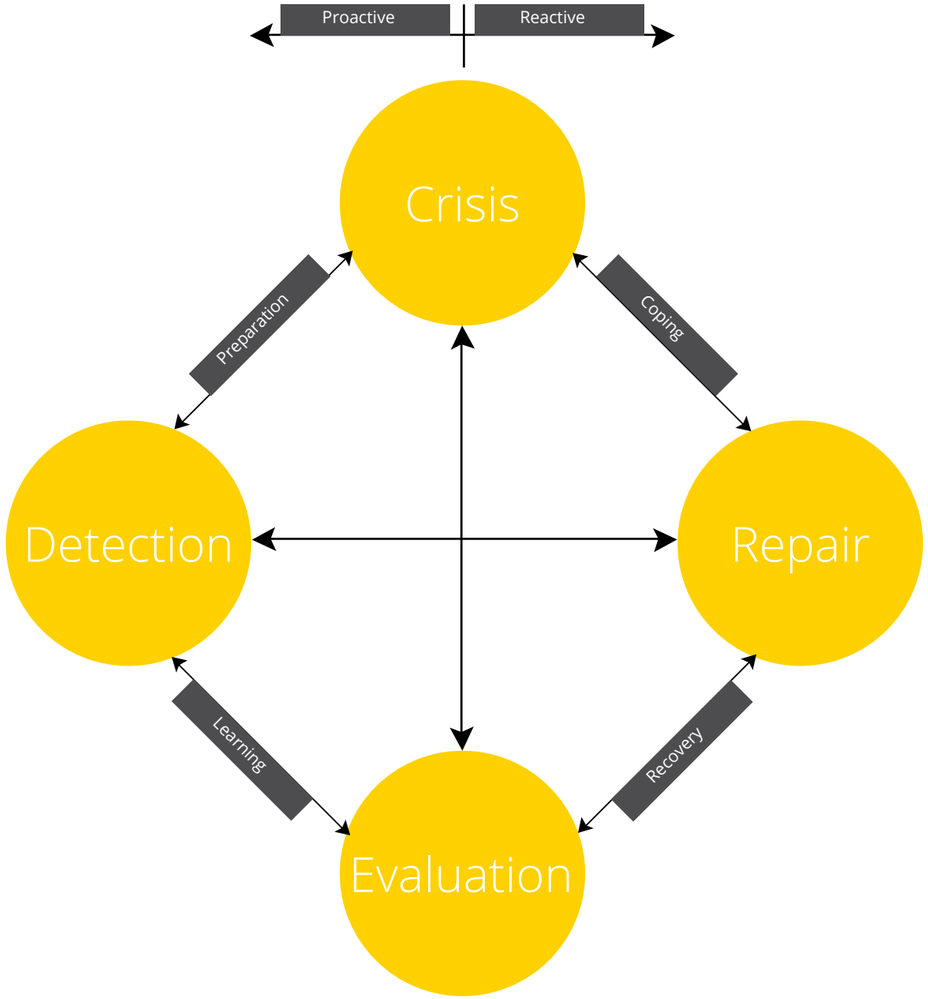


Figure 3: A model of crisis management Source: Mitroff et al., 1987

Incident evaluation as part of effective incident management

As has just been discussed, evaluating incidents provide great learning opportunities for healthcare organizations. Therefore, the evaluation should be implemented in the procedures of organizations. Mitroff et al. (1987) describe a model of crisis management consisting of four phases: *(1) detection, (2) crises, (3) repair, and (4) evaluation (see Figure 3).*

The model presents appropriate steps to be taken to prevent crisis, to recover effectively, and to learn from crisis. Phase 4, assessment, includes the evaluation of what has happened, together with formulation of learning points and necessary correction of input. Evaluation, and subsequently learning, further contributes to the improvement of procedures and training required. Consequently, this can result in more efficient detection, prevention and coping with crisis. This model implies that evaluation cannot be seen as an isolated practice. Instead, it should be seen as part of a bigger whole.

It is important to note that the escalation of an incident can be prevented between phase 1 and phase 2. As such, the incident takes place but does not result in a crisis. Despite the absence of a crisis, an organization can still learn from an incident that has been prevented from being amplified. It can be evaluated and learning points can be formulated. As was already pointed out in Chapter 2.1, the distinction between smaller incidents and a crisis resulting from an escalation will be taken into account by the incident evaluation tool. Some incidents do not need extensive evaluation because they are too minor. Nevertheless, smaller incidents should not be ignored because organizations can learn from these incidents as well (Drupsteen & Guldenmund, 2014). However, as retrieved from Homsma, van Dyck, Gilder, Koopman and Elfring (2009), we learn optimally from large incidents with big consequences. These large incidents thus need a more specific and thorough evaluation.

Structure

Effective learning does not occur without a structure (Drupsteen & Hasle, 2014). For an incident evaluation tool, a clear structured scheme thus needs to be made. For this structure, the theory of the 4-I framework can be implemented (Crossan & Berdrow, 2003). This framework consists of four processes and aims at ensuring learning within organizations. These steps are:

Intuiting: the recognition of the possibilities possible because of experience accumulation
Interpreting: explaining of an idea or insight in own words and thoughts.
Integrating: the process of developing shared understanding amongst individuals and the taking of coordinated action, in other words the communication.
Institutionalizing: embedding learning that is obtained through the processes into systems and structures.

Referring this theoretical framework to our project, to learn optimally from a failure it will be best to design the incident evaluation tool as an entire scheme, consisting of several steps that an organization can implement. In this manner, an optimal reflection and evaluation of the incident can be ensured. In Chapter 3., the four concrete processes will be linked to the incident evaluation tool.

2.4 Conditions for learning from incidents

Key findings

To learn from incidents using evaluation, several aspects in the organizational context need to be taken into account. If this is not done, involved persons experience barriers to report failures that took place during the incident response. Therefore, healthcare organizations should enable effective continuous learning. This can be done by establishing three essential building blocks for organizational learning: (1) a supportive learning, (2) specific learning processes, and (3) leadership that reinforces learning

Key takeaways for the incident evaluation tool

In order to effectively use the incident evaluation tool, healthcare organizations need to ensure certain conditions are met within their organizational context and within the process of evaluating. Before conducting an incident evaluation, organizations need to assess their readiness to perform this evaluation.

Although learning from incidents is possible and desirable, there are several conditions that need to be fulfilled in order to learn effectively from the incidents. A crucial prerequisite is the culture of the organization: a learning climate should exist in which employees feel safe to evaluate what has happened and what they can improve on. The importance of this culture can

Self-perceived barriers to report a failure/evaluate an incident
I never get any feedback on what action is taken
The incident form takes too long to fill out and I just don't have the time
The incident was too trivial
When the ward is busy I forget to make a report
I don't know whose responsibility it is to make a report
When a failure didn't have any consequences, I don't see the need to report it
Junior staff are often blamed unfairly for failures
Failure reporting is unlikely to lead to system change
I wonder about who else is privy to the information that I disclose
If I discuss the case with the person involved nothing else needs to be done
I don't feel confident the form is kept anonymous
I am worries about litigation
It's not my reposnibility to report somebody else's mistakes
My co-workers may be unsupportive
I don't want to get into trouble
Even if I don't give my details, I am sure they'll track me down
I am worried about disciplinary action
I dont want the case discussed in meetings

Table 3: Self-perceived barriers to report a failure/evaluate an incident. Source: Evans et al., 2006

be derived from scientific literature (e.g. Edmondson, 1999) as well as the conducted interviews.
Evans et al. (2006) conducted a study that revealed most common barriers for reporting of a failure, which disables learning from incidents, as demonstrated in Table 3.

Some of the barriers shown in Table 3 imply that employees do not feel the need to complete an evaluation of an incident. Therefore, those incidents that don't require to be evaluated extensively should indeed not be evaluated extensively to keep the learning spirit high among personnel. However, this decision cannot be taken based on outcomes of the incident; as described above, mistakes sometimes lack a harmful outcome, but do have great learning potential. That is why a short evaluation is needed to gather information on whether an incident should or should not be further evaluated. When evaluation is in progress, the presented barriers additionally show that employees involved can be reluctant to report failures as they are afraid it will be held against them. Because of this, it is important to keep the information gathering anonymous and confidential. More importantly, an organization needs establish a learning culture that enables learning and in which no blame is held against anyone. This will increase the willingness of personnel to report failures during an evaluation and decrease their fear of being punished for this (Evans et al., 2006).

In order to establish a learning culture, several aspects need to be taken into account. Garvin, Edmondson and Gino (2008) identify the three building blocks for effective continuous learning in organizations. These are:

> Supportive learning environment
> Specific learning processes
> Leadership that reinforces learning.

When these principles are incorporated into an organization, learning can be established. It will ensure that employees are willing to report failures and to engage in evaluation, which is critical for effective evaluation and formulation of learning points and corrective actions.

Supportive learning environment

An environment in which personnel feels supported is critical for organizational learning to take place. A supportive learning environment consists of four aspects: (1) psychological safety, (2) appreciation of differences, (3) openness to new ideas, and (4) time for reflection.

1 Psychological safety

To be able to evaluate incidents, communication is the key to learn. But to be able to communicate, individuals need to feel safe to share their ideas and opinion. This is called psychological safety (Argote & Miron-Spector, 2011). This implies that individuals trust each other and feel safe to take a risk and report a failure. Those individuals who report a failure that took place during an incident, should not be punished for their mistakes. A culture of mutual respect is needed. In addition, Edmondson (1999) claims that psychological safety is necessary for effective team learning. Since interviews and evaluation meetings will be important within the incident evaluation tool, psychological safety is important to create. To further discuss the effects of psychological safety, individuals will not only be able to share their ideas about errors and reporting but will also be more willing to learn (Edmondson, 1999).

Therefore, creating a psychologically safe environment in incident evaluations is important. In many organizations, the psychological safety can be built within the organizational culture. Additionally, the evaluating of incidents should also happen in a psychologically safe environment. First, the participants need to know that the evaluation will take place because it is a learning opportunity; they need to know it does not take place to put blame on involved persons. Second, the person responsible for evaluating the incidents has a key role in the psychologically safe environment and should act as a leader. This leader should act like he is one of the others, so that involved individuals feel more understood and safe to talk (Edmondson & Nembhard, 2009). In addition, the leader needs to show the value and importance of the contribution of personnel to the evaluation. In this way, individuals feel important and needed. The leader needs to act proactively, so that he can invite individuals to speak up and to make everyone's contribution to the evaluation even. Lastly, the involved individuals should feel engaged to the evaluation. In other words, they need to feel the importance of the evaluation (Edmondson & Nembhard, 2009).

2 Appreciation of differences

During an incident response, teams where individuals of different expertise meet are inevitable (Interviews). In such a team, different or opposing ideas are raised with increased frequency. During an incident evaluation this could mean that several people have different opinions about what went wrong and what can be done better. Nevertheless, diversity can enhance learning behavior, as there is more diverse input (Van Der Vegt & Bunderson, 2005). However, the condition to this is that members of the group are devoted to their membership and appreciate different ideas.

Menon & Blount (2003) add another condition which states that interpersonal relationships play a significant role. If a person contributing to the discussion with ideas or remarks is considered to be an enemy to someone, this person will most likely not accept this contribution. Therefore it is important to clarify during the discussion that interpersonal relationships might intervene with the learning purpose of the evaluation discussion. If possible, this obstacle should be removed. The facilitator of the discussion must therefore introduce basic rules and make individuals involved aware of not basing their judgment on interpersonal relationships.

3 Openness to new ideas

If, during the evaluation, someone suggests to change a procedure that is imbedded in the organization, this might

cause a level of resistance among its members. Major, Turner & Fletcher (2006) have shown that openness to new ideas is positively related to the motivation to learn. Another condition would therefore be that the evaluator needs to clarify that the evaluation is a learning experience and encourage the sharing of new ideas, enhancing openness to new ideas in other members.

4 Time for reflection

Evaluation of an incident takes time and, consequently, involves costs. That is why personnel involved might feel pressure to finish things as soon as possible. People who are stressed of time constraint then have limited ability to diagnose problems and learn from the experience (Garvin et al., 2008). Limitation of stress and strain is one of the building stones of a supportive environment. Evaluation of an incident is an important learning experience and as such, when the decision is taken to execute an evaluation, individuals should not be pressured to evaluate as fast as possible.

Concrete learning processes

In order for learning to be effective, concrete steps must be defined and taken for new knowledge to be embedded in practice. Effective learning processes can include the generation, collection, interpretation and dissemination of information (Garvin et al, 2008). Knowledge can be shared among individuals, team, or the whole organization (Garvin et al, 2008). This means that knowledge that is gained by reflection on the incident can be shared with other teams or with other organizations.

Aligned with statements in Chapter 2.3.3, it is important to have a clear scheme about how evaluation and further learning steps will take place. Additionally, as was stated in one of the barriers to reporting, employees need to know that their feedback is valuable. Therefore, the evaluation process must be transparent and conclusions about learning points and corrective actions to be taken must be accessible to all. Like this, employees will see the result of their work they put in the reflection, filling out questionnaires and, consequently, their motivation to learn from what has been concluded is enhanced. Furthermore, it can increase the engagement of employees for the evaluation and the overall organization.

Leadership that reinforces learning

For learning to take place, it is important to correctly execute the evaluation and to transfer the learning points to practice. However, for this to happen, supportive leadership is needed (Owens & Hekman, 2012). During the evaluation, the evaluator needs to facilitate sessions with individuals involved in a way that supports learning, as was previously mentioned. However, after the evaluation, employees need to transfer new knowledge to their work. That is where leaders of teams or units need to support the new knowledge for transfer to actually take place. Team and unit leaders should thus also support the evaluation of incidents, since they are a crucial link in translating what has been learned to the work floor.
To wrap up the key takeaways for the vision of the incident evaluation tool, the position and use of the tool within the organizational context have to be taken into account. The definition of an incident is complex, but we will consider an incident as a situation that forces the healthcare organizations to deviate from the daily situation, where potential threat to public safety or health was involved. Similar to failures, incidents provide a healthcare organization with a great learning opportunity when evaluated appropriately. The incident evaluation tool will give the possibility to reflect on processes, and to a limited extent the input (i.e.; incident preparedness), and to formulate learning points based on this. However, to ensure effective evaluation, the tool has to be used in an organizational culture that allows learning to take place.

Chapter 3

Development of the Incident Evaluation Tool

This chapter describes the method of the development of the Incident Evaluation Tool (IET), which is represented in the Scheme of Figure 1. Each component of the tool will be thoroughly elaborated during the following paragraphs, including the argumentation for why a certain component of the evaluation scheme is included and what it implies.

3.1 Vision and preconditions of the incident evaluation tool

Before explaining what the IET incorporates, it is important to explain our vision for the tool, while further giving the justification for the use of a whole evaluation scheme. The vision of IET in short is to 'Evaluate – Learn – Improve'. Due to the complex and high-responsible work environment, healthcare organizations are in constant need to learn how to improve their work and to adapt processes and procedures after events that occurred (Interviews). That is why the incident evaluation is of pivotal importance, as it represents an opportunity to learn from the process of the incident response, especially from failures and deviations of procedures. Moreover, an evaluation of an incident enables to further reflect on supervision, communication and team processes (Interviews). When an incident occurs the organization is forced to react immediately as human lives and public safety can be at stake. This kind of environment doesn't offer any possibility to experiment in the field, as any error can have fatal consequences. That is why there exists such a high necessity to thoroughly evaluate incidents; healthcare organizations need to constantly improve in dealing with these complex situations (Interviews).

An incident is a highly complex situation including different levels of extremity, different procedures required, different effect radii and different persons involved and affected. As was described in Chapter 2, a hazardous situation sometimes doesn't escalate to a crisis. However, this is still considered to be an incident as healthcare organizations need to react and deviate from their daily routine. In addition to that, a situation where no serious consequences were involved should be evaluated nevertheless, as it can contain learning potential. Therefore, evaluation of all kinds of incidents is needed.

On the other hand, the evaluation of an incident is time-consuming and, consequently, involves related costs. There exists a need to efficiently identify incidents that offer information that could further help to improve healthcare organizations' work and practices. The present tool has been developed with this regard and offers two combined elements that can help in distinguishing between incidents according to their learning potential (AAR Chapter 3.4.1, & Quick Scan Chapter 3.4.2). Therefore, further direction of an evaluation can be determined. Moreover, the distinct steps of the tool represent learning possibilities for individuals and teams at different points of time, while simultaneously taking into account the organizational capacities. When all the steps of the present IET are taken, organizations can be sure to address all the accompanying factors of an incident and that the most thorough form of evaluation has been executed.

Nevertheless, it is important to mention that certain preconditions exist for the successful use of the tool. As was explained in Chapter 2, in order for learning to take place, the organizational environment needs to be supportive in order for learning to occur. This is further described in the Incident Evaluation Tool Manual (IET Manual), which represent a guideline for organizations on how to use the IET, including more detailed information about the preconditions which should be fulfilled in order to assure the best possible outcomes of the evaluation procedure. To be more precise, for the successful use of the IET the following preconditions should be present in the specific organization (Veiligheidsregio- Hollands Midden, 2014):

Learning culture (including psychological safety, appreciation of differences, openness to new ideas and time for reflection; Chapter 2.4)
Confidentiality of given information (during interviews, questionnaires, etc.; Chapter 2.4)
Information Sharing with Employees (inform about the value and procedures of the tool; Chapter 2.4)

Taking into account these preconditions, organizations can proceed to evaluating an incident.

Figure 1: Incident Evaluation Tool

3.2 Incident

The IET starts after an occurrence of an incident. Based on the definition of an incident, organizations enter a state where they deviate from their daily routines. After the occurrence of an incident, a healthcare organization should take several steps in order to analyze and learn from it effectively, which is the objective of the developed evaluation tool.

3.3 Psychological Debriefing

Directly after an incident it can be appropriate to perform a short Psychological Debriefing (PD) (Bisson & Deahl, 1994; Interviews). This is "a structured intervention designed to promote the emotional processing of traumatic events through the ventilation and normalization of reactions and preparation for possible future experiences" (Bisson & Deahl, 1994, p. 717). The aim of this debriefing session is to reduce initial distress and to prevent the development of later psychological disorders (Rose, Bisson & Wessely, 2003). Whether a PD is needed or not depends on the impact of the incident on the involved personnel. Hence, the organization itself can decide if there exists a necessity for it or not. Besides the necessity for a PD, the length of a PD heavily depends on the nature of the incident. As Rose and colleagues (2003) showed, the length of a PD can differ substantially. Based on the interviews conducted, we estimate that in most occasions a 15 minute debriefing session is sufficient. However, a PD may take longer when the impact of an incident on patients or population safety was bigger (e.g. dealing with severely burned people, casualties). When a PD is required, all involved parties should be present (command and control team, on-scene personnel, potentially other disciplines) (Interviews). The chairman or duty manager of the crisis team should be the person to initiate and facilitate the PD.

3.4 After-Action Review and Quick Scan

After the Psychological Debriefing may have taken place, the After-Action Review (AAR) should be performed and accordingly the Quick Scan should be filled in. Shortly said, the Quick Scan is a written form of the AAR.

After-Action Review

The After Action Review (AAR) is "a verbal post-shift team discussion that incorporates and integrates both technical information and human factors" (Mission-Centered Solutions, AAR, 2008, p. 1). The need for an AAR was expressed at several points in this report. First, Chapter 2.2 illustrates that even when an incident does not escalate into a crisis, it is still of high value to reflect on the response to such an event. Furthermore, as argued in Chapter 3.4, an incident that did not involve serious consequences might still offer a valuable learning opportunity. Consequently, according to our incident definition (WHO, 2007; Chapter 2.1), it is necessary to perform an AAR in order to proceed to our developed evaluation instrument.

However, one needs to be able to classify an incident in a way to decide on whether further evaluation is appropriate or not. With a quick review of an incident conducted by the personnel involved, such a decision can be made. Lastly, interviewees stressed the necessity of using an AAR in the beginning of an evaluation, which was supported by other practical examples in the literature (Mission-Centered Solutions, AAR, 2008; Veiligheidsregio-Hollands Midden, 2014; Interviews). The AAR:

Incorporates the action's or day's events due to an incident into the learning cycle.

Provides a forum in which the team's performance successes and failures can be determined.

	ADVANTAGES	DISADVANTAGES
On the same day	Most situations or circumstances are still present. Accordingly, more information can be gathered. Every involved party can be present.	Biased opinions – still emotionally agitated
The day after	People able to think more objectively about the incident (less biased). Enables team members to retain many details from the previous day.	Information might not be fully retrieved. Risk of having not every involved party present at the meeting. Team members are generally not as interactive, involved or engaged as they would have been right after the event.

Table 4: Difference in performing After-Action Review on the same day or the day after

Assists in creating a common team perception of the day's events.

Provides a place in which group norms can be established, emphasized and reinforced.

Provides practice for team communication and for conflict resolution between members.

The aim of the AAR in our tool is to gain an insight in the actions taken during the incident, shortly evaluate preparation and deviations, as well as discuss functioning of teams during the incident. It should be a short structured way to analyze the approach which was used during the incident, together with a short discussion of the lessons learned (Veiligheidsregio-Hollands Midden, 2014). It is therefore important that the crisis management team attends the meeting. In case of other disciplines being involved in managing the incident (e.g. fire department, police, etc.), their representatives should also be present during the AAR. A guideline for an AAR is attached to the IET Manual. This format is developed by using practical literature (Mission-Centered Solutions, AAR, 2008; Veiligheidsregio-Hollands Midden, 2014; Reconstructieformulier VIM, 2014).

The chairman or duty manager of a crisis team makes sure that an AAR takes place after the incident. He/she is also responsible for facilitating the meeting and assigning a secretary or information manager (if not present). This secretary or information manager is accountable for taking notes of the AAR (Veiligheidsregio-Hollands Midden, 2014). The timing of the AAR depends on the nature of the incident, the disciplines involved, and how exhausted the involved parties are (Interviews/ Meetings). Table 4 mentions advantages and disadvantages of performing an AAR on the same day and doing it a day after (Interviews; Mission-Centered Solutions, AAR, 2008). An organization can consider this matrix when deciding for a suitable timeslot.

The AAR is often done on the day of or the day after the incident (Mission-Centered Solutions, AAR, 2008). When multiple disciplines are involved (e.g. fire brigade, police), it might be practical to perform an AAR on the same day (after the incident and potentially after the PD), since more involved parties can be present than compared to a meeting on the next day (e.g. representatives of the fire brigade don´t need to come back on the next day, as the AAR can be performed directly after the incident). On the other hand, if the parties

involved are very exhausted from dealing with an incident or if the incident caused a great emotional impact, it might be better to perform an AAR the day after. Accordingly, it is the task of the organization to assess which moment in time is most suitable for performing an AAR. An AAR will take approximately 15 minutes (Veiligheidsregio- Hollands Midden, 2014). However, every incident is unique so depending on the complexity level and the discussion during the AAR, the duration may vary. During the AAR it is also discussed whether further evaluation is requested or recommended.

This review offers a 1st learning possibility, as individuals involved already learn what could have been done better by discussing the incident process, including lessons learned due to failures, such as wrong decisions made during the incident (Drupsteen & Guldenmund, 2014). Moreover, as was introduced in Chapter 2.3.4, the 4-I framework (Crossan & Berdrow, 2003) can serve as a guideline to better understand the learning possibilities given in our IET. The discussion during the AAR represents the first two steps of the framework, namely (1) intuiting and (2) interpreting. These two steps take place, because difficulties, failures, procedures and other processes are discussed during the AAR, and people can express their insights and thoughts with own words.

Quick Scan

In our tool, the Quick Scan is used to summarize the opinions, outcomes and findings which were expressed during the AAR. It is basically a written form that describes the topics mentioned during the AAR (Veiligheidsregio- Hollands Midden, 2014). The information manager or secretary who took notes of the AAR is also responsible for filling in the Quick Scan format, which is enclosed to the IET Manual as well. The Quick Scan is filled in directly after the AAR. The aim of it is to offer support and backup the decision of the need for further evaluation (Veiligheidsregio- Hollands Midden, 2014). The Quick Scan therefore ends with the question whether further evaluation is needed or not. The chairman or duty manager (often in collaboration with the crisis team) will express the need for further evaluation or not and will also argument this choice (Veiligheidsregio- Hollands Midden, 2014). This is why the Quick Scan and AAR are very important to include in the IET, as it makes a distinction between incidents for which further evaluation is requested and for which there is no need for it.

After the Quick Scan is filled in, the format should be sent to the members of the crisis team and potentially others involved, to validate the content (Veiligheidsregio- Hollands Midden, 2014). Afterwards, the members should have some time to react on the Quick Scan format and the recommendation whether there is need for further evaluation or not. Whether other persons, such as crisis team members, next to the CEO or chairman or duty manager have the opportunity to argue on the decision made, and how long the members have time to react, is decided by the organization itself.

3.5 Decision on further evaluation

After the time span in which the members can react on the Quick Scan, the organization will decide whether further evaluation will be conducted (Veiligheidsregio- Hollands Midden, 2014). The person responsible for the decision on further evaluation depends on the hierarchy and structure of the organization (Interviews). However, the decision should be based on the results of the AAR and Quick Scan. Furthermore, an organization should consider its own ability to further evaluate an incident based on its capacities (Interviews). The evaluation of an incident might be required and beneficial, but the trade-off of time, money and benefits needs to be considered as well. The capacity of an organization can thus limit its evaluation efforts. Organizations should therefore be careful in deciding which incidents will be evaluated thoroughly. They might not have the appropriate resources to evaluate all incidents in depth, hence, a check if resources can be made available is a precondition before an evaluation can start (Interviews).

For the reasons stated above, organizations need to clarify which learning opportunities and benefits the evaluation of an incident can offer. Furthermore, to distinguish incidents that should be evaluated, organizations must take into account its impact. Further evaluation might be especially important when upscaling took place during an incident. Additionally, as was discussed in Chapter 2, organizations can especially learn from large incidents. Therefore healthcare organizations should be aware of the indicators for escalation of an incident as presented in the following (Bouwstenen Integraal Crisisplan voor de zorgsector, 2014):

- Functioning of the organization is disrupted or threatens to be disrupted.
- The continuity of care, the safety of people and/or the reputation of the organization are threatened.
- Multiple organizational parts are involved.
- Multiple external partners are involved.
- The government requests scaling up.
- Large-scale deployment is required.
- There is a big impact on the environment.
- There is a lot of media attention.

3.6 Incident Evaluation Instrument

If healthcare organizations decide that further evaluation is required, they can use the developed Incident Evaluation Instrument (IEI). We defined it as “a guideline that can be used by healthcare organizations to evaluate an incident thoroughly”. By using the IEI, healthcare organizations can assess the corresponding input and processes in depth that took place when dealing with the incident. Accordingly, it is possible to determine what went well and wrong in dealing with the incident. The information gathered during the evaluation process will be used as input for a final feedback meeting, which will serve as another learning possibility for participants.

The IEI consists of four general steps that are mainly based on insights from interviews, whereas the content of these steps is based on practical literature, scientific literature, and interviews. The four steps, of which step 2, 3 and 4 will be executed by an evaluator (see Chapter 3.6.2) and possible assisting persons, are as follows:

1) Select a trained and objective evaluator (This selection is made by organization or person responsible)

2) A phase of information gathering:

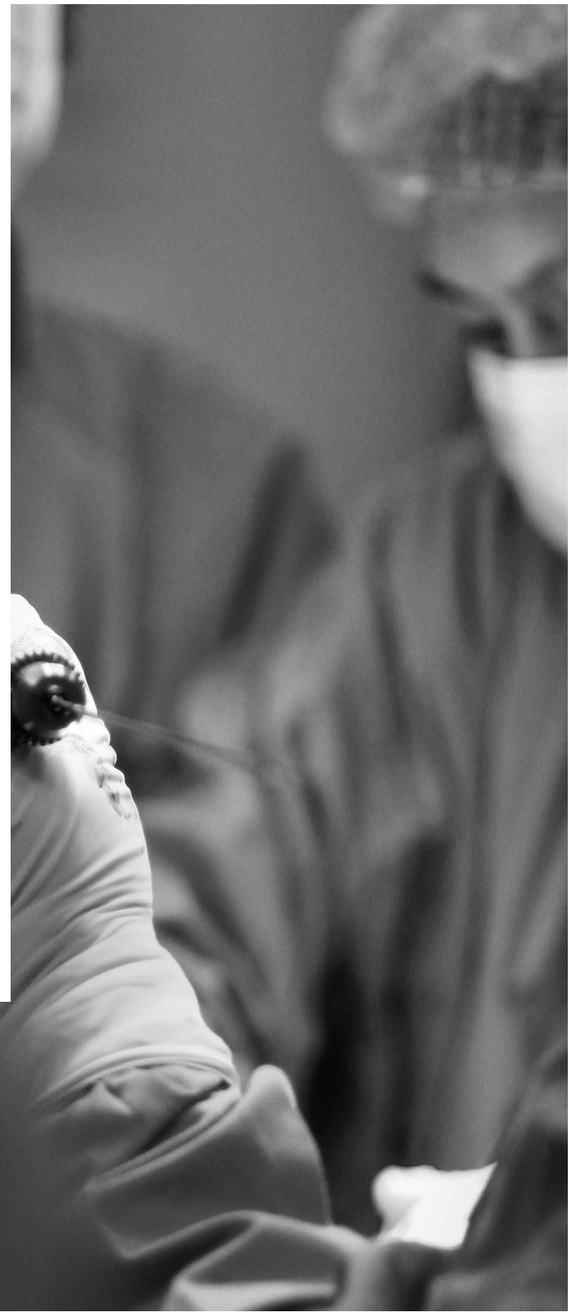
Collect incident reports, videos, recorded conversations, photos, news in the media, etc.
Distribute and assess questionnaires which will be sent out to command & control and on-scene personnel
Conduct interviews with persons who occupy different positions in various divisions

3) Information will be combined in a final questionnaire that is filled out by the evaluator

4) Analysis of the information and use this as input for the final feedback meeting

Sources of the Incident Evaluation Instrument

The IEI and its components were developed based on practical literature, interviews and scientific literature. The research in scientific relevant studies revealed the existence of critical success factors for dealing with incidents. This science-proved information serves as an important back-up of the developed IEI, especially concerning the two questionnaires, the final questionnaire for the evaluator, and the interview guideline, which will be all explained in detail in Chapter 3.6.3 and Chapter 3.6.4. These critical factors are areas where a positive result of activities is absolutely necessary for the success of the incident response (Rockart, 1979). Critical success factors should be identified by each organization itself, starting from the top direction down (Freud, 1988). However, there are already some identified factors for the area of emergency management. The most important ones for the purpose of our IEI are summarized in the following Table 5, representing the thematic boxes that were used in the development of the components of the instrument.



Thematic Box of the Questionnaire	Description	Sources of Information & Back-up Academic Literature Practical Literature Interviews
Alarm Response	After receiving the alarm, it is crucial that the correct personnel knows what to do next.	Knitter (2009)
Supervision & Assignment Procedures	A clear awareness of responsibilities is necessary, hence, everyone knows his or her tasks and acknowledges the command structure, thus, the supervisor.	Bouwstenen Integraal Crisisplan voor de zorgsector (2014) Interviews Knitter (2009) Mahajan (2010) Ministerie van Verkeer en Waterstaat (2006) NVBR (2005) Wilmink et al. (1998) Zhou et al. (2011) ZiROP (2009)
Supervision & Command Procedures	A clear awareness of responsibilities is necessary; hence, everyone knows his/her tasks. Command procedures are organized and orders effectively communicated.	Interviews Knitter (2009) Mahajan (2010) Williams Zhou et al. (2011)
Tactics & Strategy	Establishment of an overall strategy including prioritizing and decision-making.	Bouwstenen Integraal Crisisplan voor de zorgsector (2014) Interviews Matthew (2001) Ministerie van Verkeer en Waterstaat (2006) NVBR (2005) Wilmink et al. (1998) ZiROP (2009)
Safety & Resources	Mobilization of capacities and adequate resources, including an accurate estimation of needs in terms of equipment – as a lack of resources, materials or facilities may also cause problems in procedures and similar. Furthermore, the continuously controlling and monitoring of the effects of the incident.	Bouwstenen Integraal Crisisplan voor de zorgsector (2014) Harrald (2006) INCIDENT PERSONNEL PERFORMANCE RATING (ICS 225) Interviews Knitter (2009) Magrabi et al. (2015) Mahajan (2010) Ministerie van Verkeer en Waterstaat (2006) NVBR (2005) Williams Wilmink et al. (1998) Zhou et al. (2011) ZiROP (2009)
Procedures & Pre-Plans	Preparedness and prevention, in terms of accurate procedures and plans account for a great part of success of an incident response. Important that operational system of emergency management, embedded in procedures and plans, is constantly improved and maintained up-to-date.	Bouwstenen Integraal Crisisplan voor de zorgsector (2014) Harrald (2006) INCIDENT PERSONNEL PERFORMANCE RATING (ICS 225) Interviews Knitter (2009) Mahajan (2010) Ministerie van Verkeer en Waterstaat (2006)) NVBR (2005) Wilmink et al. (1998) Zhou et al. (2011) ZiROP (2009)
Internal/External Communication & Collaboration	The efficiency of communication with supervisors, within teams, between departments and with external divisions (e.g. fire brigade). Thus, including the collaboration with other disciplines. Furthermore, the information sharing with the media and stakeholders of the healthcare organization.	Bouwstenen Integraal Crisisplan voor de zorgsector (2014) Comfort (2007) D´Amour et al. (2005) INCIDENT PERSONNEL PERFORMANCE RATING (ICS 225) Interviews Knitter (2009) Mahajan (2010) Ministerie van Verkeer en Waterstaat (2006) NVBR (2005) Reader et al. (2007) Wilmink et al. (1998) Zhou et al. (2011) ZiROP (2009)
Teams & Cooperation	The team effectiveness, including team leadership, flexibility and adaptability, mutual support and trust (back-up behavior) and a coordinated way of dealing with the incident. Moreover, the efficient cooperation with other teams and disciplines.	Baker et al. (2006) Comfort (2007) D´Amour et al. (2005) INCIDENT PERSONNEL PERFORMANCE RATING (ICS 225) Interviews Mahajan (2010) Rempt (2014) Stachowski et al. (2009)
Staffing	An accurate estimation of needs in terms of human resources, implying a selection of the right amount of personnel with suitable expertise. Furthermore, an efficient organization of staff replacement during the incident.	Crisisplan voor de zorgsector (2014) Harrald (2006) Mahajan (2010) Ministerie van Verkeer en Waterstaat (2006) NVBR (2005) Williams Wilmink et al. (1998) Zhou et al. (2011) ZiROP (2009)

Table 5 Sources for the selection of topics for the IEI

The conducted interviews gave even further insights about critical factors that need to be taken into account when dealing with incidents. The subsequent factors were mentioned: (1) people who are properly trained to deal with incidents are needed, (2) a deviation from daily procedures at the right moments is often needed, (3) people who are team players and who put the organizational interest before individual interest are needed, (4) a proper command and control needs to be established, as the hierarchy becomes stricter during an incident, and consequently there is less room for discussion, (5) a good transfer of information and good communication are needed in order to work efficiently.

The steps and components of the IEI, which are based on the identified critical success factors, will be explained in detail in the following paragraphs.

Select a trained and objective evaluator

First of all, the healthcare organization needs to select a trained and objective evaluator to facilitate and steer the evaluation procedure (Interviews; Zhang, Ma & Lu, 2009). The evaluator should be a person who is independent, hence was not involved in the incident. Being objective and independent during an evaluation is highly important according to several interviewees (Interviews) and scientific literature (Zhang, Ma & Lu, 2009). It is inappropriate that a person who was involved, because this fact makes the person more subjective and therefore biased when evaluating an incident. The latter is represented in a Dutch expression, which states that 'Je laat een slager toch zijn eigen vlees niet keuren' (´You don't let a butcher assess its own meat ´) (Interviews). Possible independent and objective evaluators are: (1) an external party or (2) an independent person or committee within the organization (Interviews).

Besides having an independent and objective person to evaluate an incident, it is also important that these evaluators are educated in using evaluation procedures (Interviews). Deciding on who should do the evaluation thus also depends on the competencies of the persons who are present in the organization. If, for instance, no person is available or present who fulfills the conditions to perform a correct evaluation, an external party might be more appropriate (Interviews). If multiple persons are involved in the evaluation of the incident, it is important that one of them functions as a chairman or leader, who is responsible for the whole evaluation process (Interviews), hence, fulfills the conditions explained above. In the rest of the report we will refer to only one evaluator, however, keep in mind that the use of multiple evaluators might also be appropriate (especially in large, information rich incidents).

Information Gathering

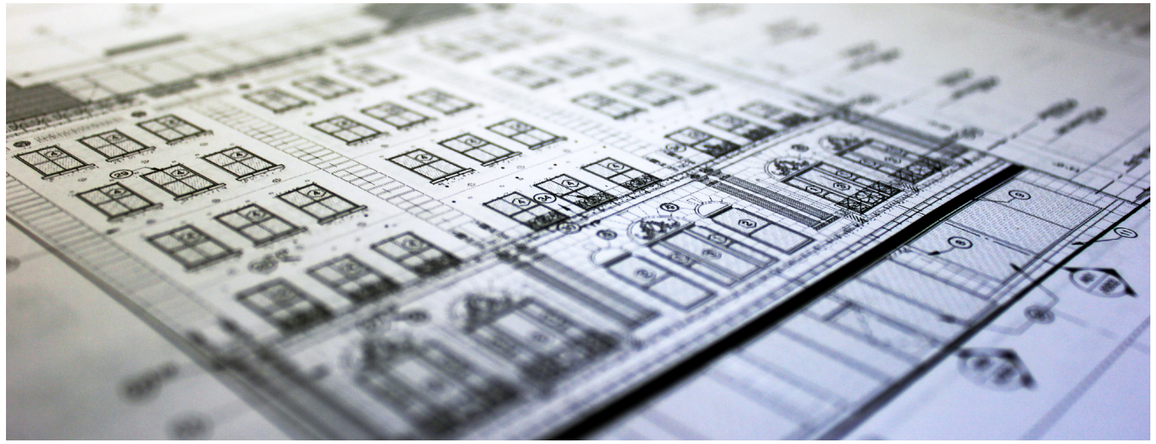
After the evaluator is selected, he or she needs to gather information in order to retrieve a full image of what happened during the incident (Crisislab en Veiligheidsregio Drenthe, 2013; Interviews). The following information sources can be identified: (1) incident reports, videos, recorded conversations, social media etc., (2) questionnaires and (3) interviews (Crisislab en Veiligheidsregio Drenthe, 2013; Interviews). The evaluator can basically use every source of information to create a proper image of the incident. Incident reports, videos, recorded conversations, social media, e-mails, and photos can all be valuable sources for information retrieval (Interviews). Besides that, the evaluator sends two types of questionnaires to the involved parties. Based on recommendations from interviews we made a distinction between command & control and on-scene personnel. The on-scene personnel is responsible for the execution of orders and the direct help. Hence, they are the employees who work on the scene or in the field of the incident (e.g. nurses and physicians in hospitals). The command & control personnel refers to tactical and strategic decision-makers. These employees manage the coordination of the incident response and take decisions that direct the work of on-scene personnel (e.g. crisis coordinators, officers, policy team) (Interviews).

Based on this distinction, two questionnaires were constructed:

"When you listen, it's amazing what you can learn. When you act on what you have learned, it's amazing what you can change."- Audrey McLaughin

one for the command & control and one for the on-scene personnel. The questionnaires offer quantitative questions where answers are indicated on a 5-point Likert scale, from 1 (NO) till 5 (YES), while also giving the opportunity for qualitative answers in the form of comments. Both of these question types were developed with respect to the identified critical success factors in Chapter 3.6.1. The factors with corresponding questions mentioned in one or/both of the questionnaires are again: (i) general facts of the incident, (ii) personal information, (1) alarm response, (2) supervision & assignment procedures, (3) supervision & command procedures, (4) tactics & strategies, (5) safety & resources, (6) procedures & pre-plans, (7) internal/external communication & collaboration, (8) teams & cooperation, and (9) staffing. The constructed questionnaires are attached to the IET Manual.

The evaluator can thus gather information by distributing the questionnaires to the employees who were involved during the incident. Accordingly, information can be retrieved from both the command & control and on-scene personnel. The questionnaires should be distributed digitally. Afterwards, the respondents have some time to react and to send the questionnaire back to the evaluator. The specific response time should be determined by the organization. After this time



period, the evaluator can assess the results by using statistical programs and qualitative coding.

There exists the possibility for the organization to only assess one of the departmental working levels, for instance, if they only want to evaluate the functioning of the on-scene personnel during an incident. In that case, only the questionnaire aimed at the specific target group should be used. But if an organization chooses to do so, it has to be aware of the fact that important information may be missing, which diminishes the effect of the IET. Further elaboration on this possibility is given in the recommendations section.

The last method to gather information is conducting interviews with persons who occupy different positions in various divisions to get an overview of perspectives in corresponding departments (Crisislab en Veiligheidsregio Drenthe, 2013; Interviews). The evaluator can conduct interviews with key persons involved in the incident. The IET Manual provides the guideline for this interview (as well as the references used for developing this guideline). The outline can however be changed by the evaluator. The information he/she gathered from the reports, videos, recorded conversations, questionnaires etc. should be used as an input to develop additional questions for the interview guideline (Interviews), as the evaluator can address findings of the questionnaires in certain questions. The latter is more thoroughly explained in the IET Manual.

Summary of information – Final Questionnaire

After the evaluator has gathered all relevant information, he or she has to combine the information and fill out a final questionnaire, which is attached to the IET Manual as well. This questionnaire addresses the following components:

The conflation of the on-scene personnel questionnaire and the command & control questionnaire

A qualitative part with open-ended questions which includes the interview questions

As has been said, the evaluator needs to assess the results of the individual questionnaires by using statistical programs and qualitative interview coding. By using a statistical program to evaluate the quantitative part, it is possible to calculate the average, minimum value, maximum value, and standard deviation of the answers provided to the questions. Especially the standard deviation of questions is of high value for the analysis, as it represents the amount of varying answers for one specific question. A standard deviation that is close to 0 adverts that nearly all persons who filled out the questionnaire scored almost the same on the particular question. When the standard deviation is high, it represents a higher variation in the scoring of an item (Bland & Altman, 1996).

It is important to note that some questions asked are exactly the same for both the on-scene personnel and the command & control personnel. The evaluator has to be aware that the two groups can interpret these questions differently. For instance, the topic "Procedures and pre-plans" includes questions such as "Was a pre-incident plan used/referenced in the incident?" and "Did the pre-incident plan provide accurate and useful information during the incident?" When thinking about pre-incident plans that were used, it is likely that the on-scene personnel thinks about other specific plans they needed to follow during the incident compared to the command & control personnel. Both respondent groups function on different organizational levels and accordingly diverse pre-plans might be involved (Interviews). The evaluator has to be aware that such differences in perceptions and perspectives exist, otherwise he or she might compare groups that cannot be considered as equals. The final questionnaire also acknowledges this difference by making a distinction between the on-scene and command & control personnel.

3.7 Final Feedback Meeting

The Final Questionnaire, which is filled in by the evaluator, will be used as informational input for the final Feedback Meeting. During the assessment of the questionnaires, interviews and other gathered information, the evaluator is able to detect failures and its roots, the value of procedures and possible deviations, failures in information sharing, communication breakdowns, lack of training and other findings which can serve as topics for discussion. Therefore, the results of the evaluation are presented by the evaluator in the final feedback meeting. We define the final feedback meeting as "an interactive and informative meeting for people involved in dealing with the incident, in which they can discuss and accordingly learn from what happened during the incident". The aim of this meeting is to provide involved personnel with an opportunity to learn from what had happened during the incident and that action and/or learning points are determined. Having an interactive meeting to formulate learning points and corrective actions after the evaluation of an incident was seen as a crucial point by several interviewees (Interviews; Crisislab en Veiligheidsregio Drenthe, 2013).

The evaluator is responsible for the scheduling and facilitation of the meeting. Findings from the precedent evaluation are used to guide the meeting and to trigger informative discussions. Therefore, it is an important task for the facilitator to always give food for thought based on the results of the IEI.

During this final feedback meeting it is of course important that the personnel needed is present. Who exactly should present depends on the organization and the amount of people involved (Interviews). It might not be possible to include everyone who was involved during the incident, because this might lead to understaffing on the work floor. In these cases, it is important that the appropriate people are selected to be present at the final feedback meeting as indicated by evaluator based on his findings. It is necessary to involve individuals of different levels and positions for a constructive discussion, as Chapter 2.4 has indicated. These persons should have been highly involved during the incident and should also be given the opportunity and responsibility to share the lessons learned derived from the meeting with peers who were not able to join. The duration of the Feedback Meeting depends on the type of incident as well as on decision of the organization.

This Final Feedback Meeting is of pivotal importance and represents the 2nd learning possibility. As mentioned earlier, the 4-I framework helps to ensure learning within organizations (Crossan & Berdrow, 2003), whereby the third step of integrating is represented in the Final Feedback Meeting. The idea is to develop a shared understanding amongst the participating individuals concerning the evaluation results, which are presented by the evaluator. A fruitful discussion should help to clarify suspicious findings, misunderstandings and needed improvements.

	Definition	Aim	Responsible person	Attendance	Point in time	Time span
Incident	A hazardous situation that may or may not have resulted in a crisis, forcing healthcare organizations to deviate from their daily situation and apply procedures accordingly.	N.A.	N.A.	N.A.	N.A.	N.A.
Psychological debriefing	A structured intervention designed to promote the emotional processing of traumatic events through the ventilation and normalization of reactions and preparation for possible future experiences.	To reduce initial distress and to prevent the development of later psychological disorders.	Chairman/duty manager	Crisis management team, on-scene personnel, and potentially other disciplines.	Directly after an incident	Depends on the nature of the incident
After-Action Review	A verbal post-shift team discussion that incorporates and integrates both technical i nformation and human factors.	To gain an insight in the own functioning of the team during the incident.	Chairman/duty manager	The crisis management team and potentially representatives from other disciplines.	Decision of the organization	Approximately 15 minutes
Quick Scan	A written form that describes the topics mentioned during the AAR.	Offering support and backup in deciding if further evaluation is needed.	Information manager/ secretary	N.A.	Directly after the AAR	Depends on the content – approximately 15 minutes
Incident Evaluation Instrument	A guideline that can be used by healthcare organizations to evaluate an incident thoroughly.	Unravelling the processes that took place while dealing with the incident.	Evaluator	Decision of the evaluator.	When decision for further evaluation is made.	Differs for each evaluation
Final Feedback Meeting	An interactive and informative meeting for people involved in dealing with the incident, in which they can discuss and accordingly learn from what happened during the incident.	The involved people learn from what happened during the incident (using evaluation points), and that action and/or learning areas are determined	Evaluator	Decision of the organization – include different departments, positions etc.	Closely after the final questionnaire is developed by the evaluator.	Decision of the organization. Further, depends on the type of incident and amount of evaluation points.
Final Feedback Meeting	An interactive and informative meeting for people involved in dealing with the incident, in which they can discuss and a ccordingly learn from what happened during the incident.	The involved people learn from what happened during the incident (using evaluation points), and that action and/or learning areas are determined	Evaluator	Decision of the organization – include different departments, positions etc.	Closely after the final questionnaire is developed by the evaluator.	Decision of the organization. Further, depends on the type of incident and amount of evaluation points.
Final Report	A written document that i ncorporates the crucial findings of the evaluation tool.	Providing: general information (facts) about the incident and how it proceeded, points that went well, points that went wrong (need improvement), action- and learning points, and further recommendations	Evaluator	N.A.	After the final feedback meeting	The organization decides on the deadline for handing in the report.

Table 6: Overview of the elements of the tool and terms used

3.8 Final Report – Recommendations for learning and action points

After the Final Feedback Meeting, it is essential that the evaluator creates a report about the results of the Incident Evaluation Instrument and the discussed points in the Feedback Meeting (Crisislab en Veiligheidsregio Drenthe, 2013). The organization decides on a deadline for handing in this report. We defined the report as "a written document that incorporates the crucial findings of the evaluation tool". The aim of this report is provide the following (Crisislab en Veiligheidsregio Drenthe, 2013; Veiligheidsregio- Hollands Midden, 2014):

General information (facts) about the incident, the response to an incident and how it progressed - points that went well, as well as failures

Corrective actions and learning points

Further recommendations, as for example the indication of training needs

For instance, it is possible that certain training needs were identified or that bottlenecks in communication were determined. This should be stated in the report and accordingly learning points and corrective actions should be developed. From our perspective, learning points are interesting findings or useful experiences that one can use or share to be able to, for example, behave differently in the future, without further concrete action being taken. It is more or less a learning experience that people can put in their 'backpack' (Veiligheidsregio- Hollands Midden, 2014). In contrast, corrective actions are findings which clearly state the adjustments to be made concerning procedures, plans, provision of resources, changes in staffing and furthermore (Veiligheidsregio- Hollands Midden, 2014).

The Final Report sums up all the important information gathered during the evaluation process and thus represents the 3rd learning possibility. Employees who were not able to attend the Final Feedback Meeting have the chance to use the Final Report as input for their personal development, hence, learning from identified mistakes and consequently acknowledging points for improvement. The Final Report can be seen as the first step of institutionalizing in the 4-I framework (Crossan &

Chapter 4:
Recommendations

With regards to the future, we recommend to take some additional advises into account. These recommendations deal with: (1) the developed Incident Evaluation Tool (IET) and (2) directions for future research. Afterwards, a short wrap-up of the present report is provided.

4.1 Recommendations with regard to the developed Incident Evaluation Tool

If a healthcare organization chooses to evaluate an incident thoroughly after the After-Action Review (AAR) and Quick Scan, it uses the Incident Evaluation Instrument (IEI). This instrument makes use of two questionnaires (one for the command and control and one for the on-scene personnel). Accordingly, actions from both involved levels can be evaluated and a complete organizational picture can be gathered from what had happened during the incident. However, it might also be possible to evaluate only one of these levels. If a healthcare organization wants to assess how, for instance, the on-scene personnel functioned during an incident, it can use the questionnaire aimed at this specific group of staff. If an organization chooses to do so, it has to be aware of the potential consequences. We believe that using only one of the developed questionnaires can lead to incomplete information (since valuable information from the other level is missing) and a diminished effect of the instrument. By using only one questionnaire, less people are involved in the evaluation process which can lead to a lower engagement and motivation of the employees concerning the learning objectives. Therefore, this approach can have negative consequences for the learning process within the whole healthcare organization. Hence, we recommend to evaluate both the work floor level (on-scene personnel) as well as higher command levels (command and control personnel).

The second recommendation is concerned with the selection of an evaluator. Healthcare organizations need to select a trained and objective evaluator to facilitate and steer the evaluation procedure to ensure the IEI is used successfully. It represents a crucial aspect of the IEI as the evaluator is responsible for the correct execution of the incident evaluation instrument, the final feedback meeting, and the report of the incident evaluation. Selecting who is going to be the evaluator is therefore not a task that should be rushed. Accordingly, we recommend that a healthcare organization should spend an appropriate amount of time on selecting a trained and objective evaluator, as it is beneficial and crucial for the whole evaluation process.

The last recommendation represents a connection between the two OTO projects performed this year. In addition to our project, the other project group developed a tool for evaluating OTO-activities. It would be of high value, if the same responsible person evaluates incidents and OTO-activities, as the results of the evaluations may have an influence on each other and thus need to be compared.

4.2 Directions for future research

During the project, several opportunities for future research were detected.

First of all, the project team did not take any financial data into account. There is for instance no cost- and benefits analysis performed. The latter is of high importance for healthcare organizations to analyze if enough capacities are given to perform the IET and if the benefits of it are of pivotal value for them. Accordingly, it can be investigated how such a cost- and benefits analysis can be performed for these organizations.

Secondly, future research should include the possibility of the creation of an incident evaluation database. This database may offer healthcare organizations to share their findings after using the IET and other evaluation methods. Consequently, the organizations can learn from each other's mistakes and might even adjust certain ways of working.

The last and most important recommendation for future research refers to the validation of our tool and the questionnaires we developed. It is important to note that our project is the first step in many to follow. We developed the tool as well as the questionnaires based on academic articles, practical articles, and interviews. However, they are not validated yet. This is beyond our project scope but it represents a task which needs to be done in order to properly use the IET. The validation of the IET is the appropriate next step to take with respect to these facets. We don't prescribe how the validation process should exactly look like, since we leave it up to other parties to find a scientifically grounded way for doing it. Nevertheless, we will mention two validation issues with respect to the developed questionnaires that need to be taken into consideration. Further validation issues need to be identified in order to conduct a science-based validation,

To improve, for instance, the communicative validity of the scale used in the questionnaires (Sandberg, 2000), the relevance of the items should be discussed with field practitioners. Although the items used are partly based on interviews with experts in the field, we still think that a relevance check is of additional value. The construct validity (the degree to which a scale measures what it claims to be measuring) of a scale is also important to consider. Cronbach and Meehl (1955) identify three necessary steps for investigating the construct validity of a measure: (1)

articulating a set of theoretical concepts and their interrelations, (2) developing ways to measure the hypothetical constructs proposed by the theory, and (3) empirically testing the hypothesized relations among constructs and their observable manifestations. It should be mentioned that construct validity cannot be derived from a single set of observations, therefore a series of investigations is required (Clark & Watson, 1995). In other words, to assess the construct validity of a scale a well-sized research population is needed.

4.3 Wrap up

Our task was to develop a generic science-based incident evaluation, which can provide healthcare organizations and its employees with learning opportunities, based on how they proceeded in the occurrence of an incident. For the development of our IET insights were used from academic and practical areas. Taking the recommendations into consideration, we believe that the IET and its components, such as the developed IEI, can be used in practice to enhance the learning after an incident, and perhaps even the incident preparedness of healthcare organizations.

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Appendices

Appendix 1: Organizational Context OTO Limburg

The two most important stakeholders for the current project are OTO Limburg and healthcare organizations in Limburg. However, to understand the organizational context that OTO Limburg operates in, the following organizations and institutions can be taken into account: VWS, NAZL and ROAZ (Jonkman & Damen-Koolen, 2012).

OTO Limburg (the client)

OTO Limburg stands for Opleiden, Trainen, Oefenen ('Educate, Train, Exercise') Limburg. It is an organization that allocates governmental investments to various healthcare organizations and monitors OTO activities in the region of Limburg. Its aim is to increase and improve incident preparedness in healthcare organizations. It does so by monitoring OTO activities and providing support for these.

Every year, OTO allocates a subsidy from the Dutch Ministry of Health, Wellness and Sport to healthcare organizations. When these organizations apply for such a grant, they can invest this money in OTO activities.

With the incident evaluation tool, OTO will be able to help healthcare organizations evaluate incidents in order to learn from these. Like this, OTO can assist them in improving their preparedness for incidents. One of the outcomes of the incident evaluation tool might lead to an adjustment of OTO activities within a specific organization.

Healthcare organizations in Limburg

These organizations will use the incident evaluation tool to assess their incidents. Healthcare organizations include the following: hospitals, ambulance services, GGD (Gemeentelijke Gezondheidsdienst; 'Municipal Health Service'), nursing homes, and general practitioners.

The incident evaluation tool offers healthcare organizations the opportunity to learn from incidents that have happened, which could improve their preparedness for incidents.

The current project aims to develop an incident evaluation tool for OTO Limburg and healthcare organizations in Limburg. However, if the incident evaluation instrument is implemented successfully, other OTO regions can decide to adopt the instrument. Consequently, all healthcare organizations in the Netherlands would be able to use this instrument in order to evaluate and improve processes, such as procedures, behaviors and decision-making processes, regarding their incident management.

VWS

This is the Ministry of Health, Welfare and Sport. The VWS is responsible for financing/subsidizing OTO, which accordingly tries to enhance the level of preparedness of healthcare organizations during exceptional circumstances (e.g. by providing trainings).

NAZL

NAZL stands for Netwerk Acute Zorg Limburg ('Network Acute Care Limburg'). This organization supports, stimulates and facilitates healthcare organizations in the coordination of emergency care. Its goal is to help a patient as fast as possible on the right location with the best possible care. NAZL is one of the eleven regions of LNAZ (Landelijk Network Acute Zorg; 'National Network Acute Care'). Additionally, NAZL manages the annual subsidy from the VWS.

ROAZ

ROAZ stands for Regionaal Overleg Acute Zorg ('Regional Consultation Acute Care'). It is a network organization that by means of a concrete agenda and close cooperation, warrants the accessibility, availability, efficiency, continuity, and quality of emergency care in the region. The network of ROAZ exists among others out of healthcare organizations which are discussed below. The main purpose of ROAZ during exceptional circumstances is to initiate upscaling, special procedures, command structures, and multidisciplinary cooperation between healthcare providers. OTO is accountable towards ROAZ for the investments they make out of the subsidy. ROAZ will check whether the money is well spent.

Appendix 2: Combined Summaries of Interviews

We conducted interviews with a number of experts in the field of incident management. During the interviews, the following main topics were discussed: (1) the definition of an incident, (2) dealing with incidents, (3) evaluating incidents, and (4) learning from an incident evaluation.

An overview of the functions and types of organization of the interviewees can be found in Table 1, Chapter 1.

The following summaries are presented in the chronological order in which the interviews were conducted.

Definition of an incident

Interview A

Hard to give a definition. Considers incidents to be unexpected and undesirable events. At the moment itself it is decided whether an incident escalates to such an extent that the crisis team is needed. Incidents at [organization] happen on average once every day; however the upscaling does not often occur (over the past couple of years ten times).

Interview B (focus group)

N/A

Interview C

It is hard to give an exact definition of an incident, but an incident can be seen as an unforeseen situation that deviates from the regular, daily situation.

Interview D

The definition of an incident within an organization is hard to define, because it is often organization-dependent. It is therefore important to explain well what you talk about when referring to an incident. An incident can be seen as a disruption of the daily affairs (a change in the normal pattern).

Interview E

An incident can be seen as a small thing. A crisis is bigger; it is so big that you need to make other decisions than usual. When an incident involves the entire organization, crisis management is needed. Crises happen a couple of times a year (depends on the year how often, usually around 3 to 4 times). Most are internal incidents at [name hospital] (e.g. ICT system crashes).

Procedures and critical factors when dealing with an incident

Interview A

When an incident happens and when it escalates the 'Officier van Dienst' (OVD; Officer in Duty) is the one to decide whether the crisis team is needed; this is the case when more people are involved with the incident, when it is outside his span of control. The crisis team consists of 120 people; they do this next to their regular jobs and receive training twice a year.
The protocols and procedures to be followed within the crisis room during an incident can be sent to us.

Interview B (focus group)

N/A

Interview C

At a monodisciplinary level people are prepared in the case of an incident. The OVD-G (Officer in Duty) is present as the coordinator. Additionally there are national protocols that can also serve as a guideline for upscaling. At the multidisciplinary level make use of GRIP procedures. For every organization the basis (= decent procedures) of dealing with incidents should be the same.

Interview D

Critical factors for dealing with an incident:
o Are people sufficiently trained? Training can ensure that people can improvise, change, and adapt (the ability to improvise is an important factor)
o Is it organized in a facilitating way?
o To what extent are you prepared to work together with other disciplines?
o To what extent did you think of alternatives when things don't work out? Is proper planning put into place?
o To what extent does a deviation from daily protocols take place and to what extent did you prepare for this?
o Transfer of information/information management
o Communication. Important to specify what exactly you are talking about. For example: not knowing how to reach each other, don't speak the same 'language', technical deficits that disable communication, etc.
o Formulating and addressing tasks (for example: a task is not being formulated clearly, resulting in problems during execution)

Interview E

The duty manager is the first on the scene; needs to know what to do, who to call, etc. During a crisis the duty manager is the one in command. Critical factors in dealing with an incident:

o You need people who are team players. No room for heroism, who understand that their primary interest should be the interest of the entire organization: organization comes first, personal interests come last.
o You need people who are trained, got trained in simulations, have a quite heavy training system (training: deal with a fire once a year, evacuate patients once a year, real-life exercises) = get experience with exercises, only then you are ready to tackle such an incident; well-equipped in knowledge
o Have control and command, push away the ´yeah… but´ factor. Listen to input and then decide and stick with it. In general: have a strict hierarchy. Duty manager is first in command. Handle with a crisis you need to perform in a specific way – need to obey to orders. It gets stricter and it´s different compared to a daily situation.
o Sometimes you need luck
o You need fast adjustment, but rely on the procedures; make a lot of decisions which are not logical in a daily work situation, but during a crisis it may be the right choice – make the right decisions while deviating due to specific situations

Procedures and critical factors for evaluation of an incident

Interview A

The difference between evaluating an exercise and a real incident is that incidents involve a lot more people, there are more emotions, and there is more pressure. Small, daily incidents are reported/evaluated by the involved department. Interviewee is not involved in this; solely about the incidents which needed upscaling. First, there is an incident investigation, which focuses on the cause of the incident. Second, there is an investigation/evaluation about the functioning of people; why something broke does not have to do with how people functioned. Additionally looked at how the organization functioned. So there is a focus on the processes that went wrong during the incident. People that were involved are present during the evaluation, together with interviewee. There is a checklist that is being followed and there are recurrent themes that are discussed during the evaluation.

They look at the performance of the entire team and everything surrounding this. Things that are discussed are e.g.:

o The leader is being evaluated, then look at how cooperation went
o Communication
o Way of alarming and reaching involved people
o Functioning of systems (e.g. computer systems)
o Do people behave according to protocols
The (old) checklist used during evaluations can be sent to us (the interviewee is currently busy with writing a new checklist).

Interview B (focus group)

One of the interviewees mentioned that their organization uses the Ishikawa Fishbone research method for evaluating incidents (from equipment to processes). This method emphasizes on 5 main topics: people, maintenance, materials, method, and measurements. Another interviewee mentioned that the functioning of the involved crisis teams is important to take into account. Adding to this it was stated that it is also important to look at the performance of the policy- and operational team. Other critical components that should be considered are:

o Communication
o Processes, procedures and protocols
o Including deviation from existing processes, procedures and protocols and why this deviation happened.
o Job tenure (if everybody performs the tasks that he/she is also supposed to do)
o Powers/ competencies
o Mandates
o Division between the tactical, strategic, and operational field.

All interviewees agreed that independent persons (internal or external) should be involved in the evaluation. If the interviewees functioned in the crisis teams themselves they don't want to evaluate it, because they are too subjective then. One interviewee mentioned that quality officials (a group of approximately 15 persons) evaluate incidents. Using interviews and questionnaires (that are filled in by associated parties), they assess all key functions to determine what was done exactly and how was acted during the incident. Besides having an independent person to evaluate an incident, it is also important that evaluators are educated so they know exactly how they have to evaluate appropriate. Evaluators thus also need certain capacities. They should have the ability to shut down own judgement (need to be objective). Another component that influences evaluation is political/media pressure. When incidents happen that have a big impact, hospitals are normally 'obligated' to start an independent investigation.

Interview C

Evaluations are done to learn from incidents. After all: if something went well this does not mean things were done well, and if things were done well, this does not always mean it went well ('Goed gegaan is niet altijd goed gedaan, en goed gedaan is niet altijd goed gegaan'). An after-action review serves as a thermometer to check how involved employees are doing after an incident. This is being initiated by the OVD-G. If it appears that things should have been done differently, a further evaluation will be done later (not immediately because of the emotional burden). Whether an incident will be evaluated

is decided by interviewee, sometimes together with the VIM (Veilig Incidenten Melden; 'Safely Report Incidents') Committee. The evaluation by the VIM Committee is done later after an incident. The VIM Committee is more objective and has a more neutral perspective. During the evaluation, the Prisma Light method is used. Both causes and processes during the incident are evaluated. Reconstruction forms are used by sending them to involved employees together with interviews with involved employees. For these interviews no format exists. Interviewee wants to increasingly make use of interviews, because this is easier and employees cannot hide behind an interview. What is important when doing this is ensuring that the employee does not feel 'interrogated'? It should be a dialogue.
The results and learning points are presented to the management team by the VIM Committee. Management has to make the tradeoff between desirability and feasibility.

Interview D

Currently the willingness to learn from evaluation exists (a 'trend'). So more evaluations take place with the goal to learn. However, the actual ensuring of learning is still a weakness, while this is especially important. Critical factors include:

o You need to know the goal of the evaluation (evaluating as a goal is useless)
o Ideally incidents and trainings should be evaluated by the same functionaries
o You should not be afraid to put your finger on the problem with the goal to change something
o The level of the evaluator in the organization (a nurse cannot evaluate the CEO of a hospital)
o The right people should evaluate (else you cannot learn from it). 'Equals' can evaluate each other. An external party can evaluate (no direct employer-employee relation). A committee within the organization can evaluate. This committee should be given a certain position within the organization. The advantage of such a committee is that you can also give them the responsibility of assuring learning points.
o The results of an evaluation should be recognizable, else people will not be willing to change based on the results
o Don't forget that evaluation always includes some subjectivity. It is almost impossible to find objective criteria for incident evaluation, because no incident is the same.

Interview E

Quite good in dealing with crisis, but in evaluation need further improvement. Right now a report is made with experiences from the persons who were involved in the crisis, including questions such as:

o What can we learn from the infrastructure?
o Did we make the right decisions?
o Was there room for improvement?
o Did all members of the crisis management team have the feeling that persons listened to them?
o Did command and control function?
o How did communication go (in the organization, other disciplines, media, family of patients – emotional value you need to put in the information etc.)? – Communication is really important in an evaluation, internal and external; information sharing can be a problem

The aim is to evaluate within two weeks after an incident, but most times they need two months to get all agendas right. There is room for improvement here. This happens because, once a crisis is over, there is mainly relief and the sense of urgency is gone. They don't want to think about the evaluation yet. The evaluation consists of one meeting with the crisis management team. There are very thin guidelines (medical orders, environmental issues, psychological help if needed, team-play, etc.)/ Having an independent chairman would be helpful (not the duty manager).

Within an organization, evaluations happen at different levels. People on the work floor have a different evaluation than the crisis management team. For people on the work floor it is necessary to do an evaluation within 24 hours after the incident. For the crisis management team it is different; they are not confronted with the patients etc., but need to make sure that the operational procedures function. Important aspects to assess in an incident evaluation tool:

o Need a more structured and objective way of evaluation
o Needs to show the key points: when did we come to the key decisions? Could we have handled it faster and better? Really difficult to find an answer to this question!
o Should show why something was successful (e.g., it should show that certain decisions were the right or wrong ones)
o Questions can be too vague, a list of questions is too broad. The tool must go deeper than that
o What can we learn from this? What are the learning points?
o Need to be concise, otherwise people don´t use it

Learning from an incident evaluation

Interview A

To learn from incidents, important to have an independent evaluator ('opdrachtgever'). He/she has to make sure an organization learns from the incident and that something is being done with it. The hierarchy within an organization has to make sure that people are given the right responsibilities and rights to ensure this. This independent person needs to be trained in evaluating reports, deliver data and evaluate the process. The creation of support for implementing measures is also important.

Interview B (focus group)

Healthcare organizations can learn from incidents by arranging a meeting/gathering after the incident to reflect on what exactly happened. This is also a part of the aftercare, people have the need to 'close' the incident appropriate with each other. They are also obligated to show to the IGZ that they evaluated the incident. For this, it is necessary that all parties come together and discuss with each other what was happened one more time. Preferably, such a meeting is led by a neutral chairman.

Interview C

If it turns out during an evaluation that things went wrong somewhere, they can zoom in to this in order to formulate learning points. The recommendations are presented to the management team.

Interview D

Critical factors to ensure learning from incident evaluation:
o Results of the incident evaluation need to be reported back to the organization.
o The creation of a 'learning culture' or 'evaluation culture'. The culture within an organization is very important. It is necessary to create an open and safe environment, in which people are not punished for what they say. Ideally it should be normal to evaluate, it should be part of the daily practices.
o The interest of the organization is most important, not the individual interest. Need to look at the bigger picture.
o A learning point needs to be addressed well: for whom is it? Who is responsible? What needs to be done with it? Management should supervise this. They can also give feedback about the state of affairs and put pressure on the organization to actually execute the learning points (then you really create learning opportunities).

Interview E

You want an evaluation to show the key decisions that led to the success of dealing with an incident.

Other remarks

Interview A

It might be that healthcare organizations feel less urgency to evaluate (and train for) incidents, because there is 'less at stake'. If an incident happens at [organization] and if it turns out they did not deal well with the incident, the company could cease to exist. For healthcare organizations, this is not the case, because they will keep existing anyway.

Interview B (focus group)

N/A

Interview C

Development within his organization concerning evaluations:
o More towards interviews
o New registration system for incidents, in order to have the same system for both registering and analyzing incidents (in the past different systems were used for this)

Interview D

N/A

Interview E

The difference between exercises and real life is that a real life incident involves more emotions and are more complex. There needs to be better care for staff after an incident compared to exercises.

Appendix 3: Overview Definitions WHO

Crisis
Is an event or series of events representing a critical threat to the health, safety, security or wellbeing of a community, usually over a wide area. Armed conflicts, epidemics, famine, natural disasters, environmental emergencies and other major harmful events may involve or lead to a humanitarian crisis.
Disaster
A serious disruption of the functioning of a community or a society causing widespread human, material, economic or environmental losses that exceed the ability of the affected community or society to cope using its own resources. A disaster is a function of the risk process. It results from the combination of hazards, conditions of vulnerability and insufficient capacity or measures to reduce the potential negative consequences of risk (1). Any occurrence that causes damage, ecological disruption, loss of human life or deterioration of health and health services on a scale sufficient to warrant an extraordinary response from outside the affected community or area.
Emergency
A sudden occurrence demanding immediate action that may be due to epidemics, to natural, to technological catastrophes, to strife or to other man-made causes.
Hazard
Any phenomenon that has the potential to cause disruption or damage to people and their environment.
Risk
The probability of harmful consequences, or expected losses (deaths, injuries, property, livelihood, economic activity disrupted or environment damaged) resulting from interactions between natural or human-induced hazards and vulnerabilities.
Vulnerability
The conditions determined by physical, social, economic and environmental factors or processes, which increase the susceptibility of a community to the impact of hazards. The degree to which a population or an individual is unable to anticipate, cope with, resist and recover from the impact of a disaster.
Risk Reduction
Involves measures designed either to prevent hazards from creating risks or to lessen the distribution, intensity or severity of hazards. These measures include flood mitigation works and appropriate land-use planning. They also include vulnerability reduction measures such as awareness raising, improving community health security, and relocation or protection of vulnerable populations or structures.
Emergency Preparedness
Program of long-term activities whose goals are to strengthen the overall capacity and capability of a country or a community to manage efficiently all types of emergencies and bring about an orderly transition from relief through recovery, and back to sustained development. It requires that emergency plans be developed, personnel at all levels and in all sectors be trained, and communities at risk be educated, and that these measures be monitored and evaluated regularly.

Source: WHO, 2007