THE PROBLEM-SOLVING BEHAVIOUR OF NURSES: A CASE STUDY

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Student number: 01508011

Supervisor: Prof. Dr. Paul Gemmel

A dissertation submitted to Ghent University in partial fulfilment of the requirements for the degree of Master of Science in Complementary Studies in Business Economics

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Nederlandstalige Samenvatting

In deze masterproef wordt het probleemoplossend gedrag van verpleegkundigen geanalyseerd. Daarbij wordt onderzocht wat de bepalende factoren zijn die het probleemoplossend gedrag bepalen. Er wordt een onderscheid gemaakt tussen first- en second-order problem-solving behaviour. Bij first-order problem-solving wordt het probleem typisch opgelost om de continuïteit van het werk zo snel mogelijk te kunnen garanderen. Dit heeft veelal tot gevolg dat de kern van het probleem niet wordt aangepakt, omdat dit verdere analyse vergt, waardoor het probleem terug kan voorkomen in de toekomst. Men spreekt dan over *firefighting*. Anderzijds is het bij second-order problem-solving de bedoeling om het probleem te vermijden in de toekomst. Hierdoor wordt de effectieve oorzaak van het probleem opgespoord en aangepakt. In de literatuur is een model opgesteld door Tucker en Edmondson, daterend uit 2002, dewelke factoren omschrijft die second-order problem-solving behaviour bevorderen. Gezien geen recentere versies van dit model zijn ontwikkeld, werd getracht dit model deels up te daten. Aan de hand van dit model, en een brainstormsessie met een aantal ervaren personen uit de gezondheidssector, werd een propositie opgesteld. Hierin wordt geponeerd dat probleemoplossend gedrag van verpleegkundigen beïnvloed wordt door een aantal factoren, waaronder de leiderschapsstijl van de hoofdverpleegkundige en de tijdsdruk voor de patiëntenzorg de belangrijkste zijn.

In het empirisch gedeelte van dit onderzoek werd een vergelijkende case study uitgewerkt tussen twee ziekenhuizen. In beide ziekenhuizen werden semigestructureerde interviews afgenomen met verpleegkundigen om op die manier de noodzakelijke informatie te verkrijgen over het gestelde probleemoplossend gedrag. Daarnaast werd ook de hoofdverpleegkundige van de dienst ondervraagd, om enerzijds de meest prominente leiderschapsstijl te bepalen en anderzijds te polsen naar eventuele kenmerken van Lean leiderschap. De resultaten gaven aan dat de propositie gedeeltelijk klopt. De leiderschapsstijl van de hoofdverpleegkundige heeft een prominente invloed en stimuleert second-order problem-solving behaviour aan de hand van hoofdzakelijk Coachende leiderschapskenmerken. Tijd heeft hierin een minder prominente invloed dan gedacht. Hoewel een beperkte tijd first-order problem-solving behaviour in de hand kan werken, heeft dit niet per se tot gevolg dat geen second-order problem-solving behaviour wordt verkregen. Naast de leiderschapsstijl is de teamcultuur van groot belang. Een cultuur waarin psychologische veiligheid gegarandeerd wordt en waarin verpleegkundigen openstaan voor het geven en ontvangen van constructieve feedback is zeer gunstig voor het second-order problem-solving behaviour. Persoonlijkheidskenmerken van verpleegkundigen werden geacht geen impact te hebben op de resultaten. Door een beperkt aantal respondenten kon hier geen indicatie over gegeven worden.

Acknowledgements

Table of Contents

Abbreviations

BAS	Bloed, Ademhaling en Spijsvertering
BZIO	Bundeling Zorginitiatieven Oostende
CIP	Continuous Improvement Process
CSR	Corporate Social Responsibility
FONA	Faults and Near Accidents
FOPS	First-Order Problem-Solving
HN	Head Nurse
JIT	Just In Time
IML	Incidenten Meld- en Leersysteem
LPS	Lean Production System
N	Nurse
PDCA	Plan-Do-Check-Act
SMART	Specific-Measurable-Acceptable-Realistic-Timely
SOPS	Second-Order Problem-Solving
STARR	Situation-Task-Action-Result-Reflection
TIMWOODS	Transportation, Inventory, Motion, Waiting, Overprocessing, Overproduction, Defects, Skills underutilised
TPS	Toyota Production System
TRAF	Toss-Refer-Act-File
UHG	University Hospital Ghent
VUCA	Volatile, Uncertain, Complex and Ambiguous

List of figures

List of tables

List of charts

1. Introduction

Healthcare is characterized by numerous operational failures, hindering employees and potentially even decreasing both productivity and quality of care. At the same time, it is expected by governments, experts and patients, that hospitals will learn more and more from the mistakes of the past and prevent them from reoccurring in the future. Those operational failures can be described as disruptions or errors in the supply of necessary materials or information to employees (Tucker, 2004). Nurses play a prominent role in solving those problems, as they are most often confronted with them. As stated by Tucker (2004), 9% of nurses' time is wasted on failure resolution activities on average, which is 44 minutes in an 8 hour shift.

As these operational failures are part of nursing tasks, it is important to investigate how nurses deal with them. There are two ways of solving problems, first- and second-order problem-solving. First-order problem-solving tries to quickly solve the problem, without tackling the root and therefore without preventing reoccurrence in the future. For a problem to be completely solved, it shouldn't be possible for it to be repeated in the future. Therefore, second-order problem-solving is necessary, mostly accompanied by a root cause analysis. In this thesis, the problem-solving behaviour of nurses is examined, and more specifically the nurses' motivational factors to behave in a specific way.

Different possibilities arise when reflecting upon factors influencing problem-solving behaviour of nurses, such as the stimulus of leadership, continuity of care and the presence or absence of a blame culture among nurses. In order to better understand the problem-solving behaviour of nurses, and thus to be able to effectively resolve the operational failures by means of second-order problem-solving, it is important to identify the motivating factors that drive the problem-solving behaviour of nurses. Therefore, this master's thesis examines the following hypothesis:

In healthcare organisations, problem-solving behaviour of nurses, whether first- or second-order, is driven by a variety of motivational factors, of which the head nurses' leadership style and patient care time are the most prominent.

A comparative case study has been drawn up in two different Flemish hospitals: UH Ghent and BZIO in Ostend. A comparison is important, as a difference in organisational structure and corporate culture can have an impact on problem-solving behaviour. A qualitative case study is used to conduct the research. Semi-structured interviews with nurses and the head nurse of the department are held in order to obtain the information needed. The interviews with the nurses were analysed in order to identify their problem-solving behaviour. Based on the interviews with the head nurse, their leadership style was determined, which can influence the behaviour of nurses. To determine the leadership style, the literature of Quinn was used, based on Audenaert's analysis.

2. Literature Review

2.1 Problem-Solving

2.1.1 Operational Failures

When discussing the problem-solving behaviour of nurses, it is important to state that the corresponding problems are defined as operational failures. A distinction has to be made between operational failures and medical errors. There is no clear definition of a medical error. A definition by Schubert et al. (2012) will be used and corrected below: "An error occurs when organisational, human, technical, or environmental factors lead to an unintentional failure of an intended practical action or cognitive process, which results in recognizable physical, spiritual, mental, or social harm to a patient" (Schubert, Winslow, Montgomery, & AhlamJadalla, 2012). In this definition, Schubert states that an error leads to a failure. However, he focusses mostly on human errors. It should be noted that not all errors lead to failure.

Operational failures on the other hand can include errors in materials, information and equipment that stem from a variety of causes including inadequate equipment maintenance, inspection and repair as well as coordination problems among and between staff, management and customers (Adler-Milstein, Singer, & Toffel, 2009). Operational failures are broader than only human failures, focussed on in the definition of Schubert on medical errors. They are defined as the inability of the work system to reliably provide information, services, and supplies when, where, and to whom needed (Tucker A. L., 2004). The results of operational failure can widely vary between minor incidents and major catastrophes.

As reflected in the definition above, operational failures include, in addition to only human failures, also material and information failures. These failures can, in turn, also lead to errors. Given the complexity of the definitions and causalities, an example is used for illustrative purposes:

There appears to be a problem with the machine for putting patients to sleep in the OR. The machine applies the wrong amount of sleep aid. The anaesthetist notices this and corrects it, causing the operational failure not to lead to a medical error. However, if the anaesthetist does not notice the problem, there is a chance that the patient will die. If this is the case, the operational failure will, in fact, lead to a medical error.

Tucker and Edmondson (2003) provide a definition of the expression "problem":

"A problem is defined as a disruption in a worker's ability to execute a prescribed task because either: something the worker needs is unavailable in the time, location, condition, or quantity desired and, hence, the task cannot be executed as planned; or something is present that should not be, interfering with the designated task." (Tucker & Edmondson, 2003)

When discussing problems in healthcare, both organisational and medical problems can arise. The focus of this study is on organisational problems, which are listed in Table 1. This table provides five broad types of organisational problems as derived by Tucker and Emondson (2003). A significant difference between both types of problems is noticed by Tucker and Edmondson (2003). Medical problem-solving is heavily positively influenced by experience and age, while organisational problem-solving is not (Tucker & Edmondson, 2003).

Table 1: Broad Types of Organisational Problems

Missing or incorrect information
Missing or broken equipment
Waiting for resources
Missing or incorrect supplies
Simultaneous demands on the workers time

Source: Adapted from Van Beveren (2015), Tucker and Edmondson (2003)

The difference between an error and a problem needs to be clarified as this can be rather vague. An example is provided to clear up the difference. The delivery of the wrong medication to the wrong patient is an example of an error causing a problem. It should be noted that the two types of failures are intertwined. The distributor of the medication made an error, causing the nurse to face the problem, categorised under the fourth type of organisational problems shown in Table 1. The responsibility of conducting and preventing those process failures is a critical divergence between problems and errors. When discussing problems, workers can act due to the awareness of the problem. When discussing errors however, the work systems must be redesigned by the specific area of management so that the errors are less likely to occur. As a result, employees can help to prevent problems more than errors. The difference can be made more tangible by comparing it to an iceberg. The problems are part of the iceberg that is above water, while the errors are under water. Consequently, it is difficult to address the errors than the problems. It is key to tackle the errors, which

is at the heart of problem-solving behaviour. The importance of management however should not be neglected in aiding the problem-solving effort (Spear, 2005; Tucker & Edmondson, 2003).

The chain of events can therefore be described as: error -> failure -> problem-solving cognition -> problem-solving behaviour -> problem-solving. The causality link between error and failure is not unambiguous and can be reversed, given the situation. In the example of the anaesthetist, an operational failure eventually led to a medical error. However, the failure of the machine can also be seen as a technical error. In any case, after the occurrence of an error or failure, the cognition of the problem is necessary in order to encourage behaviour, eventually leading to solving the problem.

Considerable research has been conducted on operational failures for several reasons. Individual and organizational performance can be hindered as it burdens and discourages employees. On the other hand, it can potentially create organizational learning and increased productivity as it spotlights improvement opportunities. Research suggests however that most organisations find it difficult to learn from failures. Also, as service delivery consists of high levels of human interaction, researchers claim that problems and human errors eventually leading to operational failures are inevitable (Tucker A. L., 2004). Hospital nursing units specifically are a breeding ground for such failures as they are characterized by task interdependence and uncertainty. Task interdependence means that nurses are most of the time dependent on other professionals such as doctors, pharmacists, laboratories and many more, to complete their task accurately. Uncertainty causes opportunities for failures as each patient with a unique set of health conditions requires unique treatment. This makes it almost impossible to predict the corresponding services and materials needed for nursing care (Tucker A. L., 2004).

Additionally, Tucker and Spear (2006) describe the complexity of nursing work using a similar approach. Continuously changing conditions of patients is one source of complexity. This implies that a step-by-step process of care cannot be guaranteed. Nurses need to apply a back-and-forth strategy between assessment, planning, implementation and evaluation rather than sequentially progressing through the steps. The coordination role assigned to nurses forms a second cause of complexity. This includes ensuring that patients receive ordered services from other health care workers as planned, resulting in less time spent providing patient care. Furthermore, nurses must at all times be aware of what other health care workers are doing, eventually increasing their working load (Tucker A. L., 2004).

2.1.2 Types of problem-solving

When examining problem-solving behaviour, a difference must be made between two types of responses to organisational problems. Therefore, organizational learning should be scrutinized in

order to capture the contrast. Gond and Herrbach (2006) state that organisational learning can be split in two approaches, behaviourist learning and cognitive learning. The former view stands for first-order problem-solving. In this case, specific target levels must be reached using a goal-driven, adaptive system. Organisational learning is therefore viewed as an adaptive competence resulting from the environment. The latter however tries to expose the root cause of problems by focussing on a thorough questioning of the current theories and practices. This can be noted as second-order problem-solving (Gond & Herrbach, 2006). Only by using second-order problem-solving techniques, sustainable solutions and improvements can be obtained (Tucker & Edmondson, 2003). This is described as second-order problem-solving behaviour.

When using first-order problem-solving techniques, the underlying causes are not fixed. It is effective in the sense that the immediate problem is solved, yet it is not a sustainable way to solve problems as it only patches problems (Tucker & Edmondson, 2003). No attention is paid to the possible reoccurrence of the problem, as long as the initial nuisance is gone. In the same context, the word "workaround" is commonplace (Debono, 2010). A workaround can be defined as follows:

"Workarounds are work patterns an individual or group of individuals create to accomplish a crucial work goal within a system of dysfunctional work processes that prohibits the accomplishment of that goal or makes it difficult." (Debono, 2010)

As opposed to workarounds, second-order problem-solving digs deeper to find the root cause of the problem so it cannot reoccur in the future. This can only happen by changing the current system and is also called preventive control, learning action and double-loop learning. When executing second-order problem-solving techniques, three major actions should be undertaken: communication about exceptions, effort to find and remove underlying causes of problems and experimentation (Tucker & Edmondson, 2002). An important remark to make is the simultaneous use of both problem-solving approaches in the same organisational context. Especially in healthcare, it is typical that a first-order problem-solving precedes second-order problem-solving. A fast workaround is desired as in many cases patients will not be able to wait for the care needed. Although second-order problem-solving should still occur after the workaround (Tucker & Edmondson, 2002, 2003).

As mentioned before, workarounds are sometimes necessary and seem to be successful, however they can be very counterproductive in terms of communication about the problems. Because employees do not inform the people responsible for the problem, no learning moments can occur (Tucker & Edmondson, 2003). In addition to that, due to the lack of communication the workaround can lead to new problems, creating a cascading effect (Young, Corsun, & Shinnar, 2004), also called a snow-ball

effect (Mazur & Chen, 2009). In Lean management, this is waste since things aren't done right the first time (Tucker & Edmondson, 2003). Tucker and Edmondson (2003) found two rules-of-thumb in line with their previous findings (2002). Firstly, when communicating about the problem, it is likely to address peers rather than people in the right place to solve the problem. Secondly, when examining service organisations, the focus lies on customer's problems as customers always come first, making organisational problems subordinate. This approach causes the first-order problem-solver to be perceived as a heroic fire-fighter (Young, Corsun, & Shinnar, 2004). As a result, organisational improvement is countered, and independence is facilitated.

A coherent distinction has to be made between problem-solving and problem-solving behaviour. In this study, the behavioural aspect will be highlighted, as it is the focus of this dissertation. Problem-solving behaviour is a part of problem-solving, focussing on actions, being the behavioural aspect, undertaken by the person trying to solve the problem. When those behavioural aspects are observed, problem-solving may take place. Also, it is important to note the difference between first- and second-order problem-solving behaviour. Second-order problem-solving behaviour, as summarized in Table 2, should result in second-order problem-solving, as those actions are aimed at investigating the root cause of the problem. When observing first-order problem-solving behaviour however, the problem is tackled in an ad-hoc fashion, resulting in first-order problem-solving and consequently, without paying attention to the reoccurrence of the problem.

As counter-intuitive as it may sound, research finds that empowering workers has a negative effect on second-order problem-solving, and more specifically on second-order problem-solving behaviour. This can be perceived as illogical as front-line workers are authorised to handle root causes when empowered and are at the best position to locate them. When empowering workers, there is no managerial support to address problems so that workers are completely on their own to resolve them. Tucker and Edmondson (2003) found that managers are at a better position because of their power and status to undertake problems that cross organisational borders. Without a top-down support, chances of finding and removing root causes are minimized. Accordingly, it is of utmost importance when applying an empowerment strategy, that managerial support is prominently present (Tucker & Edmondson, 2003).

Next to the sector-specific findings, the national culture of the country is of importance as well. Hayes (1981) identified the difference between US and Japanese managers in problem-solving behaviour. American managers enjoy problems as they are a part of what makes work fun. Japanese managers on the other hand experience them as failures and try to operate as much crisis-free as possible. This can

have a considerable impact on the beliefs and behaviour of workers as it is part of the job of managers to translate organisational culture into a practical conversion (Emiliani, 2003).

Five main actions have been identified of second-order problem-solving behaviour and are summarised at Table 2. These behavioural aspects in turn can result in second-order problem-solving.

Table 2: Actions of Second-order Problem-solving (Tucker & Edmondson, 2003)

Communicating to the person or department responsible for the problem
Bringing the problem to the attention of the manager or head nurse
Sharing ideas about the cause of the situation and how to prevent recurrence with someone in a position to implement changes
Implement changes
Verify that changes have the desired effect

2.1.3 Second-Order Problem Solving Behaviour in Nursing
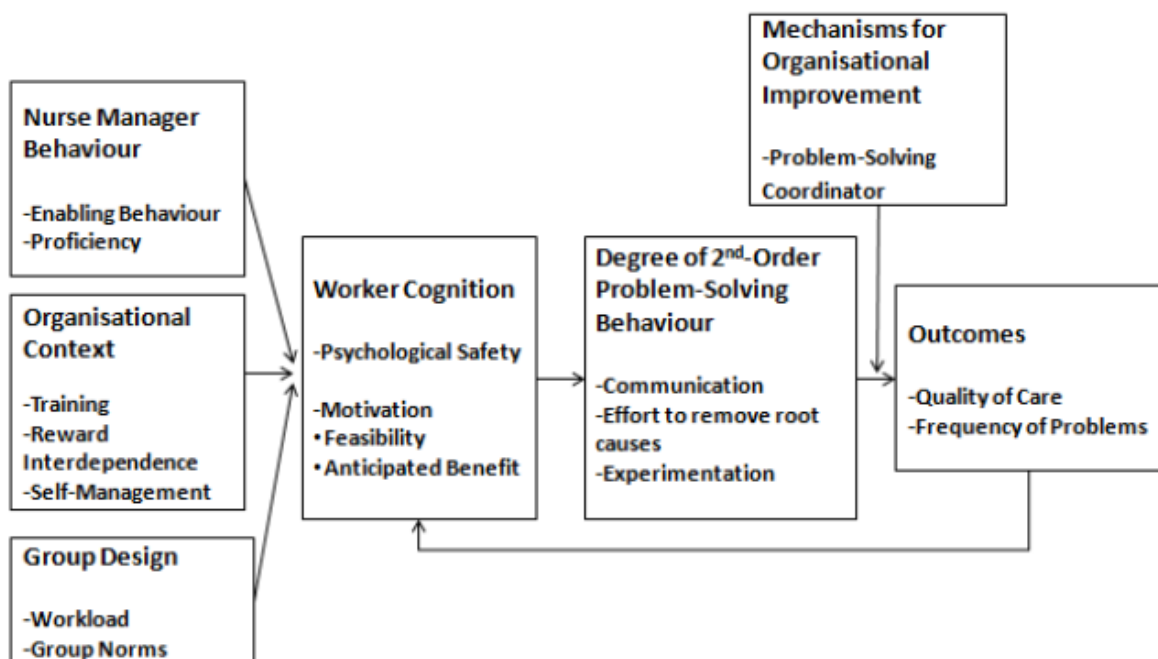
Figure 1: Model of Nurse Second-Order Problem-Solving Behaviour (adapted from Tucker and Edmondson (2002, p.90)

In order to thoroughly understand problem-solving behaviour, the underlying drivers of their actions need to be explored. Several papers have provided insight into those variables, however one study stands out. Tucker and Edmonson put together a model of nurse second-order problem-solving in 2002 and 2003 which remains useful until today. All citations were checked, confirming that no more recent extensions exist that would be useful with regards to the topic of this dissertation. According to Google

Scholar, the model of 2002 was cited 99 times and the paper of 2003 has 972 citations after the third quarter of 2020. A brief look at the various citations convinced the researcher of the current applicability in the light of this study. In order to wholly understand the different drivers of second-order problem-solving, the variables of this model need to be carefully defined. The model itself is depicted in Figure 1.

As mentioned before, the task interdependence and uncertainty make problem-solving an unavoidable part of nursing. Tucker and Edmondson (2002) noted an average of one problem per hour among the nurses they shadowed. They found a tendency of nurses to stick to routines in case of difficulties, even though it is evident that change is preferable. Therefore, organisational routines, rather than occasional individual efforts, are at the basis of the development of capabilities in second-order problem-solving. Research into the different nursing environments and how well those environments supported improvement activities was conducted, leading to supportive conditions for second-order problem-solving behaviour in the model. Three different **Managerial Levers**, all also subdivided, are defined: nurse manager behaviour, organisational context and group design (Tucker & Edmondson, 2002).

MANAGERIAL LEVERS

Nurse Manager Behaviour and the importance of top-down support is widely seen as a crucial enabler (Mazur & Chen, 2009; Spear, 2005; Tucker & Edmondson, 2002, 2003). According to Young, Corsun and Shinnar (2004), problem-solving has to be monitored meticulously by management. Inspiring leadership is an important factor in encouraging employees to exceed first-order and short-term problem-solving (Mazur & Chen, 2009; Spear, 2005; Tucker & Edmondson, 2002, 2003). Tucker and Edmondson (2002) found that second-order problem-solving behaviour was enabled by two factors. Firstly, hospitals where nurse managers had a strong presence on the work floor and had the time to resolve problems, more second-order problem-solving behaviour was encountered. This is called '*proficiency*' in the model. Secondly, second-order problem-solving behaviour was more frequently measured in hospitals using a designated individual to provide direction and support to nurses, evidentially resulting in greater assistance and coaching to nurses when resolving problems and is called '*enabling behaviour*' (Tucker & Edmondson, 2002).

A second managerial lever being a supportive condition is *Organisational Context*, consisting of '*training*', '*reward interdependence*' and '*self-management*'. Research found that those variables are connected with efficient improvement efforts and therefore form the basis of *Organisational Context*. Firstly, training on problem-solving techniques, next to an increase in competencies, also creates a

culture valuing continuous improvement activities. Secondly, reward interdependence and reward systems aiming at more substantial parties can stimulate second-order problem-solving behaviour more heavily than rewarding individuals. As mentioned before, the outcomes and performances of nurses are highly dependent on others, making the healthcare sector complex and prone to operational failures. Accordingly, task teams with representation over functional departments and other supportive cooperative behaviour is specifically important in a healthcare environment. Self-management forms the last variable of organisational context-construct. It has received a great deal of attention because of the perceived effects being both positive and negative. A higher form of empowerment can have negative consequences, as already explained, although it can also boost the motivation by their ability to make decisions on their own behalf. Self-management implies "the group level analogy of autonomy" (Tucker & Edmondson, 2002), and autonomy being "the amount of job-related independence, initiative, and freedom either permitted or required in daily work activities" (Tucker & Edmondson, 2002).

Group Design is the last managerial lever, being split in '*Workload*' and '*Group Norms*'. Workload is and will always be an up-to-date subject, especially in hospitals where little spare time is available for improvement activities. In order to accomplish second-order problem-solving actions, time has to be made available without compromising the increasing efficiency concerns. Also, the behavioural norms form an important factor in improvement efforts and can vary between nurses, nursing groups and even different hospital units. Empirical research has found that it is much easier for nurses to communicate to peers than to members of other groups. Planning meetings on a regular basis can be a solution with regard to this divergence in group norms as communication is augmented, causing second-order problem-solving behaviour to be enhanced (Tucker & Edmondson, 2002, 2003).

WORKERS COGNITION

The mentioned managerial levers can influence the degree of second-order problem-solving behaviour. **Workers Cognition** however is necessary to achieve this intended result, consisting of two core sections, *'Psychological Safety'* and '*Motivation*'. The former refers to the perception of work conditions, while the latter investigates the nurses motivation to indulge in second-order problem-solving behaviour (Tucker & Edmondson, 2002).

Psychological safety is of utmost importance when discussing problem-solving behaviour, as mentioned in the work of Mazur & Chen (2009) and Edmondson (1999), as well as Nembhard and Edmondson (2006). Problem-solving in healthcare often brings human errors and shortcomings to light, which can have negative consequences on the person raising the issue, often called 'whistle

blower'. Also, as organisational skills are often relatively low with nurses, errors are discovered by employees higher up in the organisational hierarchy, resulting in avoidance of second-order problem-solving behaviour when the psychological environment is perceived as unsafe. Lastly, in psychological safe conditions, the reputation of the employee who notices the problem remains untouched, in turn enhancing second-order problem-solving behaviour (Tucker & Edmondson, 2002). According to Tucker & Edmondson (2002), ideal behaviour can only occur when the conditions of psychological safety are completely fulfilled, as displayed in Table 3.

Table 3: Optimal Behaviour Resulting in Second-Order Problem-Solving (adapted from Simon Van Beveren, 2015)

Protesting to managers and others about the situation.
Complaining about mistakes of colleagues instead of quietly correcting other's errors.
Being aware of own mistakes and self-aware as an individual.
Questioning rather than taking current practices for granted.

Tucker and Edmondson (2002) assign a specific definition to '*Motivation*': "*the determination to pursue activities intended to lead root cause removal over alternative responses*" (Tucker & Edmondson, 2002, p. 100). Motivation on itself is also subdivided into '*Anticipated Benefit*' and '*Feasibility*'. The anticipated benefit is important as nurses have to be persuaded that the benefits will outperform the initial costs of engaging in root cause removal. The benefits include reduced frustration, less time wasted and even a reduction in negative patient effects. Feasibility consists of the worker's knowledge of resources and processes needed to tackle certain problems, including excess time, communication platforms across unit and hierarchical boundaries, and an easy approach to a specific support person who is able to solve and implement efforts more easily (Tucker & Edmondson, 2002).

The **degree of second-order problem-solving behaviour**, resulting from the managerial levers and workers cognition, consist of '*communication*', '*effort to remove root causes*', and '*experimentation*'. These actions were already more elaborately explained and displayed in Table 2, through the use of examples.

OUTCOMES

The use of second-order problem-solving behaviour leads to two different outcomes. Firstly, a *reduce in frequency of problems* is to be expected. First-order problem-solving has no impact on the reoccurrence of problems in the future, as no real action is undertaken to tackle the root cause. Second-order problem-solving however has proven to be suppressive towards reoccurrence. As a

result, the frequency of problems is decreased (Tucker & Edmondson, 2002). Secondly, as root causes are removed and reoccurrence has been reduced, delays in patient care and numbers of aggravated patients will be decreased. It should be noted that a positive outcome in turn affects the workers cognition, resulting in a higher degree of second-order problem-solving behaviour, stimulating an iterative improvement process (Tucker & Edmondson, 2002).

MECHANISMS FOR ORGANISATIONAL IMPROVEMENT

Next to the effort and willingness needed to engage in second-order problem-solving, Tucker and Edmondson (2002) suggest that a *'Problem-Solving Coordinator'* is necessary to assure root cause removal. For a problem-solving coordinator to work effectively, ample power and credibility must be given. They provide a definition, reflected in following statement:

"A problem-solving coordinator is a person in a formal role at the work group level who is given the slack time and responsibility for communicating about problems across organisational boundaries, investigating for root causes, and implementing countermeasures." (Tucker & Edmondson, 2002, p. 104)

2.1.4 Balancing Loop of Problem-Solving Behaviour

Tucker and Edmondson (2003) created a balancing loop, translating their 2002 model in managerial terms. This is necessary in order to completely understand the dynamics and causal relations between first- and second-order problem-solving (Tucker & Edmondson, 2003). The loop is depicted in Figure 2. Interpretation of the loop starts at the left side, as Latent Failures increase (+) Barriers to Task Completion. First-order problem-solving is in turn increased (+) by those barriers, along with the biggest motivations for fire-fighting. As those efforts turn out to be effective initially, barriers to task completion are removed (-), and nurses tend to feel gratified. In that way, there is no need to participate in second-order problem-solving (-). However, the amount of latent failures isn't reduced and can even increase over time, resulting in increasing frustration, exhaustion and even burnouts. The time lag is indicated by two slash marks between first-order problem-solving and burnout. The following parts of the cycle are obvious, keeping the model in mind. The *Organisation Responsiveness* yet has to be explained, being described as the degree to which the organisation is responsive to efforts for root cause removal. Managers' responses to initiatives by persuasion and stimulation is very important in order to guarantee second-order problem-solving behaviour (Tucker & Edmondson, 2003). This role can be fulfilled by the Problem-Solving Coordinator, as is described in the 2002 model (Tucker & Edmondson, 2002).

Norms of Individual Vigilance
Efficiency Concerns
Empowerment

Barriers to Task Completion

First-Order Problem-Solving Effort

+ + +

+ −

+

+

Effectiveness of First-Order Problem-Solving

+

Burnout

Latent Failures

−

+

Effectiveness of Second-Order Problem-Solving

+

Gratification

−

Organisation Responsiveness

+

Second-Order Problem-Solving Effort

−

+

Management Support

+

Psychological safety

Figure 2: Balancing Loop of Problem-Solving Behaviour (Tucker and Edmondson, 2003)

2.2 Leadership

In order to properly conduct and process the interviews with the head nurses, a good understanding of leadership and the different leadership styles is necessary. Different kinds of models and frameworks were used over the years. The most popular and widely used is the Situational Leadership Model, developed by Hersey and Blanchard (1969). The model implies that leaders should analyse the situation and act in the most appropriate manner, according to that situation. It consists of four different styles: Directing, Coaching, Supporting and Delegating (Prachi, 2015). As the model grew more popular however, it was criticised for several reasons. The different versions of the model, initially released to remove the ambiguities, caused confusion and lack of clarity. Furthermore, the major problem recurring in every version, is the absence of a theoretical foundation proving the hypothesized relationships between the different variables in the model (Graeff, 1997). The framework used in this thesis, is Quinn's Competing Values Framework. It was built on four important management models, developed since the start of the 20th century, leading to five different leadership styles. The book 'Leiders Doen Groeien' by Mieke Audenaert is used as a guideline for the further course of this literature study. The questionnaires in the book will also be used in the interviews and in determining the leadership style.

2.2.1 Transactional Leadership

The first leadership style touched upon is the Transactional Leadership. At the basis of this style is the internal process model, focussing on stability and continuity. As a leader, it is important to be technically skilled and an expert in setting up, coordinating and controlling work processes. Such bureaucratic leaders aren't popular in today's society, as it does not take into account the needs of contemporary complex work. Transactional leaders tend to motivate employees by clearly communicating about what is expected, combined with appropriate rewards and penalties. The behaviour of transactional leaders is characterized by managing distractions, expectation management, job analysis, staff selection and STARR Interviews. Distractions are managed as sufficient breaks are given to employees, making sure that enough focus on the job remains. Different techniques can be used such that cognitive breaks are possible. One technique is TRAF, which stands for Toss, Refer, Act and File. According to this technique, one must be aware of the tasks and documents that can be tossed away, given to someone else, have to be dealt with and can be filed afterwards. Job analysis is important as it provides a systematic way to collect information about which objectives the job has and how different jobs are linked to each other. Staff is selected on the basis of a realistic job description, resulting from systematic selection procedures. It is characteristic of a transactional leader that expectations are clearly communicated and attention is paid to the working relationship, meaning that it is clear what is given and expected in return. Finally, STARR Interviews are held. This is a technique used in selecting personnel where the interviewee describes a specific situation, followed by the task and action expected of him/her. The result of the situation is then described and the process is reflected upon (Audenaert, 2019).

2.2.2 Transformational Leadership

A transformational leader often asks how to inspire employees and boost their productivity. This is not an obvious question as stress and burnouts are omnipresent. The management model that reflects this is the Rational Goal Model. Ford and Taylor, the spiritual fathers of this model, assumed that clear goals and instructions made employees more productive because their noses point in the same direction. Transformational leaders search employees' engagement by idealised influence, inspiring motivation, intellectual stimulation and individual consideration. Therefore, it is important that a strong and clear vision is created and effectively communicated to all employees, reflecting the group interests and values. A significant share of charisma is desirable for such leaders. Also, goal-setting and monitoring, using SMART goals, positive feedback-seeking behaviour and performance reviews are characteristics of a transformational leader (Audenaert, 2019).

2.2.3 Servant Leadership

Support and follow-up, ensuring the involvement and health of employees is at the core of a servant leader. Servant leadership has become more popular since the emergence of the welfare debate and the people-centred approach in the workplace. It is built on the human relations model, supporting the idea that the leader is at the service of his employees, rather than the other way around. Informal relations are important as social capital becomes equally meaningful as material capital. The figurehead of servant leadership is Nelson Mandela, whose leadership qualities were characterised by selflessness and altruism. Social exchange is inherent in a servant leadership style and is defined as a long-term process of investing on the basis of give-and-take, from an open and undefined exchange based on trust. Employees feel involved in the organisation as leaders show commitment with regard to their individual needs and wishes. It goes without saying that in this type of leadership, trust is an important cornerstone. Modesty, emotional intelligence, effective communication, mindfulness and feedforward conversations are other characteristics of a servant leader (Audenaert, 2019).

2.2.4 Coaching Leadership

The fourth leadership style discussed by Audenaert (2019) is coaching leadership, being characterised by innovation, a sustainable career and intrinsic motivation. The style, just like the previous one, has seen a notable boost in popularity in recent years. This is due to the increasingly difficult context that organisations have to take into account. Globalisation, more and diverse stakeholders and economic, political and social instability create what is known as a VUCA-context; Volatile, Uncertain, Complex and Ambiguous. In this context, skills as complex problem-solving, thinking critically and creativity are necessary. In today's society, work is gradually taking on a different meaning. Where the emphasis used to be on lifetime employment, this has now shifted to lifetime employability. Work means continuous learning and is inherently linked to life. It is therefore important to design work in such a way that it gives meaning to life. It is more relevant to focus on the career rather than the job itself. Coaching leadership is based on the open system model, which dates back to the 1960s. The model is more dynamic than the previous ones and takes into account a VUCA context. The leader is seen as a innovator and a mediator and motivates by sharing his power with his employees. A coaching leader needs to have some political skills and must dare to empower his employees. Conflict management is also linked to the tasks of a coaching leader. Conflicts are often seen as dangerous, bad and inevitable. When they are managed properly however, conflicts can turn out to be useful and should be stimulated in an open learning climate (Audenaert, 2019).

2.2.5 Authentic Leadership

Authentic leadership is the fifth and final leadership style and focusses on a balance and sustainability. As all previous leadership styles have specific characteristics, authentic leadership tries to integrate them into a sustainable whole. The CSR model (Corporate Social Responsibility) tries to focus on leadership with an orientation towards the society, taking into account the norms and values of the employees. Authentic leadership is defined by four dimensions. The first dimension is the ability to balance the processing of information and therefore taking several sources of information into consideration before making a decision. Secondly, authentic leaders tend to have an internalised moral perspective, meaning that their choices and behaviour were determined by their own values and preferences. Relational transparency is the third dimension, as leaders will open up honestly when sharing feelings and thoughts. The fourth and final dimension characterising authentic leaders is self-confidence and the ability to acknowledge strengths, limitations, motives and reputation.

Each leadership style has positive characteristics, but can also turn out to be negative, which is also called the 'too much of a good thing'-effect. Therefore it is important as a leader to avoid extremes. Transactional leaders can for example come across as rigid bureaucrats, whereas transformational leaders can seem tyrannical egoists. Servant leaders on the other hand can be seen as indulgent victims and coaching leaders as unpractical dreamers. However, if extremes are avoided and balance is pursued, leaders won't drown in a specific model or style, but rather will combine the positive characteristics of all the different styles (Audenaert, 2019).

2.3 Lean

A basic notion of Lean should be explained in order to further develop this thesis. The different hospitals were chosen on the basis of Lean maturity. A distinction was made between, on the one hand, a hospital unfamiliar with Lean and, on the other hand, a hospital with experience in Lean management. In addition, the head nurses will be polled on their degree of application in Lean leadership. Firstly the basic principles of Lean will be discussed shortly. Next, the characteristics and attributes of Lean leadership will be explained. Finally, the components of Lean in healthcare are touched upon.

2.3.1 Basic Principles of Lean

Lean thinking is defined by Womack and Jones (1996, p.15) as follows:

"…lean thinking is lean, because it provides a way to do more and more with less and less – less human effort, less equipment, less time and less space – while coming closer and closer to providing customers with exactly what they want." (Womack & Jonas, 1996, p.15)

Imre, Jenei and Losonci provide a definition of Lean in the 2011 EurOMA Conference, stating that "Lean is an integrated socio-technical system whose main objective is to efficiently satisfy customer needs by continuously striving for customer value, continuous flow and waste elimination in processes" (Imre & Jenei, 2011). This description of Lean can be divided into several components. Firstly, there is a clear focus on satisfying customer needs and adding value by rearranging work processes. Secondly, Lean emphasises on an integrated approach, meaning that an overarching system is preferred rather than implementing a single tool. Moreover, Lean is a social system, denoting that people are at the very core. In order to change the way of thinking, and consequently working, the organisational culture and the principles of the organisation must be adapted (Imre & Jenei, 2011).

The system is, next to social, also described as technical, implying that an extensive set of tools are used. These tools on their own however do not create a sustainable Lean environment. Sustainable developments can only arise when the organisational culture is changed, and Lean principles are accepted. Nevertheless, the tools and methods are of utmost importance, but cannot achieve any result itself. Therefore, the biggest test is the change in mindset and behaviour of leaders and employees (Dombrowski & Mielke, 2013).

Womack and Jones (1996) created main guiding principles capturing the lean way of thinking. They emphasised five fundamental strategic principles. In order to gain maximum benefit, those principles must be followed step-by-step:

1. Define Value: Value is in essence what a customer is willing to pay for. Multiple tools can be used to create a better understanding of the customer's value (e.g. interviews). By defining value, the price point can be set and other important requirements or expectations that must be met, can be determined (Crawford, 2016).

2. Map Value Stream: The value stream is defined as all the steps and processes involved in taking a specific product from raw materials and delivering the final product to the customer. Or in other words it is the identification of all the actions that a certain product or service needs to go through. By drawing this process on a map, it is much easier to identify the steps that do not create value and find ways to eliminate those steps (Crawford, 2016).

3. Create Continuous Flow: In this step, it should be made sure that the remaining steps flow smoothly without interruptions, delays or bottlenecks. This may entail becoming cross-functional across all departments, which can be perceived as e very demanding thing to do (Crawford, 2016).

4. Establish Pull: A pull-type system refers to customers pulling products or services from providers as needed. This is made possible by significantly lowering the production time because of the improved flow. Therefore, a just in time (JIT) delivery can be used. This results in no more material stockpiling and expensive inventories, saving money for both producer and customer (Crawford, 2016).

5. Seek Perfection: This broad yet very important last step emphasises on making Lean thinking and process improvement part of the corporate culture. By doing so, the company should remember that Lean is not a static system, requiring constant effort to perfect. Full immersion of each employee is therefore necessary (Crawford, 2016).

An important part of the Lean philosophy is the reduction and elimination of waste. Waste can be defined as an action or step in a process which consumes resources but does not add any value. Initially, seven types of waste were determined by Taiichi Ohno (1988), Chief Engineer at Toyota, as part of the TPS. An eighth type was added when the Toyota Production System was adopted in the Western world. Those types of waste are commonly referred to as 'TIMWOODS', using the first letter of each type to form the acronym (Skhmot, 2017). Figure 3 summarises the eight types of waste.

DEFECTS
Waste from a product or service failure to meet customer expectations

OVERPRODUCTION
Waste from making more product than customers demand

WAITING
Waste from time spent waiting for the next process step to occur

UNUSED TALENT
Wastes due to underutilization of people's talents, skills, and knowledge

TRANSPORTATION
Wasted time, resources, and costs when unnecessarily moving products and materials

INVENTORY
Wastes resulting from excess products and materials that aren't processed

MOTION
Wasted time and effort related to unnecessary movements by people

EXTRA-PROCESSING
Wastes related to more work or higher quality than is required

Figure 3: The eight types of muda (Skhmot, 2017)

The focus of this study is the impact of the Lean philosophy on problem-solving behaviour. Therefore, a last designation of the scope of the production system is applicable. Four characteristics of Lean are

identified by Liker's 4P model: philosophy, process, people and partners as well as problem-solving. It can be noted that most companies have focused on the process and have eliminated waste but have neglected the other P's in the model. This can be defined as toolbox Lean, because of the lack of integration and the use of some single tools as an implementation of the Lean production system (LPS). The aim is to achieve a continuous improvement process (CIP) by improving every process every day. As employees are often strictly bound to their workplace and do not have much time for improvements, they cannot shoulder this alone. Therefore, they must be supported by the organisational structure, inspiring leaders and training, resulting in enough time to engage in problem-solving efforts (Dombrowski & Mielke, 2013). This is depicted in Figure 4.
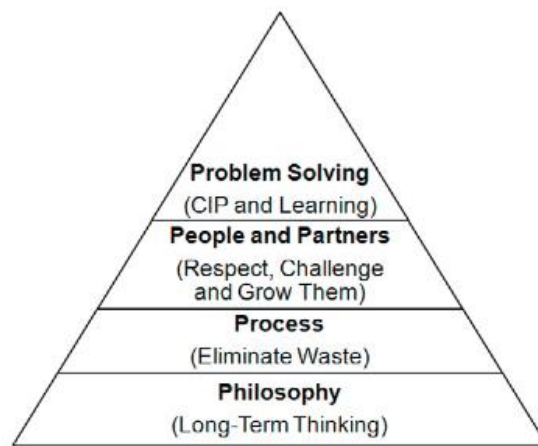
Figure 4: 4P Model of Lean Production System (Dombrowski & Mielke, 2013)

Lean should not be solely described as a cost reduction system but rather as an improvement system. Also, it is not a set-it-and-forget-it proposition requiring a constant resistance against the regressive pull of old habits. If the Lean design is accompanied by management support however, the improvements will be ways to even further improvements. Therefore, the fifth Lean principle according to Womack and Jones (1996) emphasises on 'striving', a continuous search without ever ceasing to work on improvement (Mann, 2009).

2.3.2 Lean Leadership

Several studies show the importance of Lean leadership in the Lean production system. Implementation of the tools that are used to create efficiencies and standardize processes are at most 20 percent of the effort in Lean transformations. The remaining 80 percent is to be allocated to changing leaders' practices and behaviours, and conclusively their mindset. By setting an example as upper management, a durable Lean success and an increasingly Lean leadership mindset follow (Mann, 2009).

Five basic principles have been derived to describe Lean leadership comprehensively as shown in Figure 5: Five Principles of Lean Leadership (Dombrowski & Mielke, 2013).
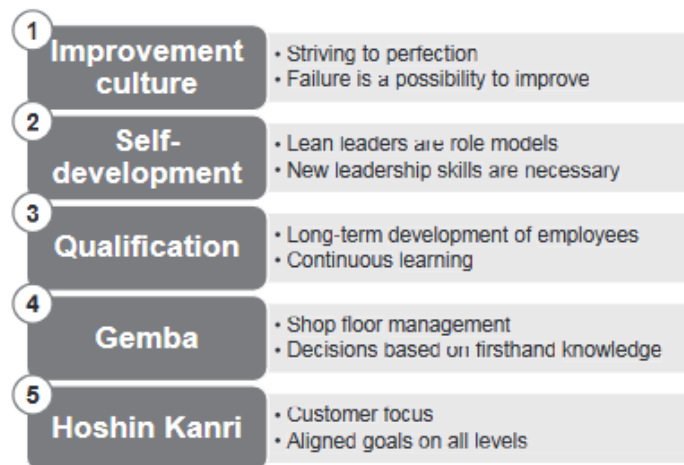
Figure 5: Five Principles of Lean Leadership (Dombrowski & Mielke, 2013)

The first principle as shown above is *improvement culture*, implying all attitudes and behaviours that result in a constant striving to perfection. Long-term thinking is of sheer importance when describing this principle (Liker, 2004). Next to long-term thinking, an essential part of the improvement culture is a different understanding of failure. When implementing Lean leadership, the root cause of the failure needs to be found, making sure that it will not occur again. A common misconception regarding the improvement culture is the worker's role in CIP. Floor workers cannot fix the weaknesses and failures in their processes alone, but nevertheless might have the best knowledge of their existence. Formal rules and management support are needed in order to maintain improvement activities at all levels and all processes. The role of Lean leaders consists of picking up the employee's ideas and helping their application in practice (Dombrowski & Mielke, 2013).

Some attributes of leadership are inherent to a leader's personality, but others have to be developed. Therefore, *self-development* is an important step in Lean leadership. In order to completely grasp those new techniques, short learning cycles are used based on the PDCA (Plan-Do-Check-Act) approach (Liker, 2012).

Next to self-development, leaders have to educate others as the *qualification* of employees is vital in Lean leadership, enabling workers to engage in the continuous improvement (Liker, 2012). This process develops on a daily basis, taking place at the work floor as well as using conventional education in classes and training. Using a coaching method, the employee is continuously tested and learns by doing (Rother, 2009).

The *gemba* principle originated in Japan and literally means real place, referring to the place of value-adding (Imai, 1997). By going to the workplaces frequently, leaders can understand the processes in order to make the right decisions. The leaders must observe the process and fully understand it, including failures and improvement possibilities. By doing so, the root cause of a failure can be

identified based on facts and observations (Liker, 2004). Next to creating a better understanding of processes and its shortfalls, gemba also illustrates the leader's acknowledgement of the operations in the corporation (Liker, 2012). According to Imai (1997), the five golden gemba rules should be followed in order to integrate these aspects:

1. Go to gemba first: When a problem occurs, leaders should immediately go to that specific place.

2. Check: All factors that might be part of the problem should be carefully analysed.

3. Take temporary countermeasures: To satisfy the customer instantly, some countermeasures should be taken. Even if they are more expensive than the regular process.

4. Find the root cause: Identifying the root cause is of utmost importance so as to achieve a sustainable solution. The five why method can be used to obtain the root cause.

5. Standardize: Once step 4 is fulfilled, permanent countermeasures should be taken (Imai, 1997).

The last principle of Lean leadership is called *hoshin kanri*, also known as target management or policy deployment, making sure that the different single activities are aligned and do not have opposite directions (Liker, 2012). Figure 6 show the principles of Lean leadership, also indicating the central role of the team (Dombrowski & Mielke, 2013).
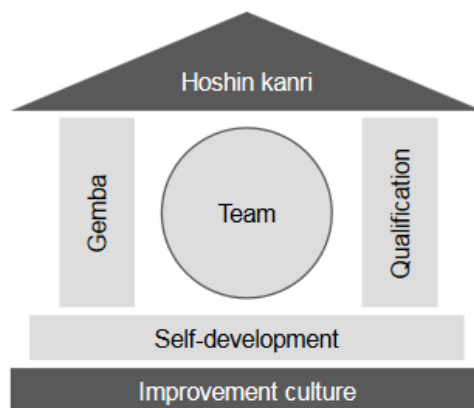
Figure 6: The Lean leadership model (Dombrowski & Mielke, 2013)

Bijl et al. (2019) found that a strong positive relationship exists between Lean maturity and second-order problem-solving of nurses. This relationship is strengthened by Lean leadership, which will also be examined in this study. The Lean leadership practices that emerged from the study of Bijl et al. (2019), were used in the methodology of this dissertation (Appendix 1). Also, a strong link was viewed between those practices and the characteristics of a transformational leader. When examining the leadership style of each head nurse, this will be taken into account (Bijl et al., 2019).

2.3.3 Lean Healthcare

As Lean became more popular in the 40's, other manufacturing sectors than the automotive industry started to adopt specific tools and the philosophy in their processes. Following on from that, Lean developed from purely factory and process orientation to a complete business organisation. This made it possible to implement Lean anywhere, as every business had to deal with quality issues, customer satisfaction and cash flow. In the early 90's, Lean Thinking was introduced as a Lean interpretation to service management and not long after, it was implemented in the health sector (Graban, 2012). This evolution is systematically shown in Figure 7.
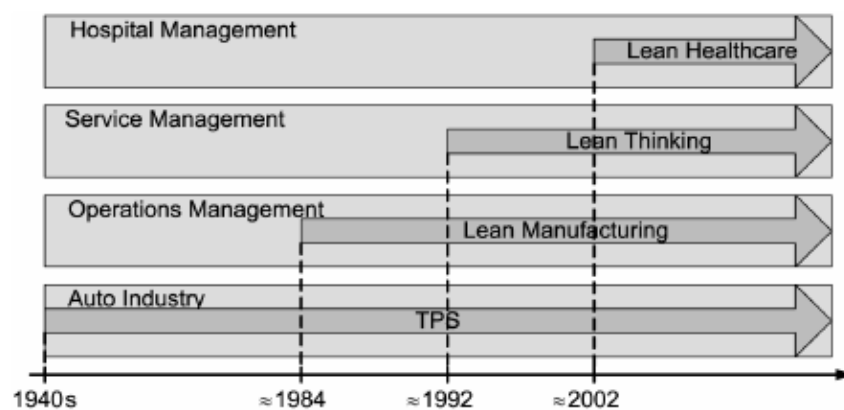
Figure 7: Evolution of Lean in different businesses, adapted from Laursen (2003)

A number of reasons paved the way for Lean in healthcare. Some of these are increasing costs and waiting times, complicated regulations, ineffective allocation of resources and growing error rates (Graban, 2012; Jimmerson, Weber, & Sobek, 2004). Poksinska (2010) suggests that Lean in healthcare uses the existing framework of processes for achieving improvements and therefore gives an alternative methodology instead of completely reorganising, which requires extensive investments. By doing so, continuity of care is guaranteed and there are no radical changes. The latter has a remarkable impact on employee satisfaction as employees are often change-sensitive (Graban, 2012; Pokskinska, 2010).

In order to overcome the actual resistance to change, three points have been uncovered by Poksinska (2010). Firstly, a Lean mindset of the workers is necessary. Their commitment and participation are crucial to avoid obstacles. Secondly, Poksinska found that training and empowerment of employees is vital in their development. Finally, management support is of utmost importance for the Lean implementation to work. Without a top-down support, chances of successfully applying Lean drop remarkably (Graban, 2012).

After committing to the three enablers such that the Lean implementation effort has a worthy chance to succeed, types of waste in healthcare can be investigated. As already mentioned before, the

removal of the different types of waste is an important step in the process of Lean making. When approaching the types of waste in the hospital setting, it becomes clear that the same Lean principles from TPS and Lean Manufacturing can be used, also explaining the logical evolution to Lean Healthcare. The types of waste, including a brief description, are shown in Table 4.

Table 4: Types of waste in Hospitals

Type of Waste	Brief Description
Transportation	Movement of patients and equipment
Inventory	Unneeded stocks and supplies
Motion	Movement of staff and information
Waiting	Delays in diagnosis and treatment
Overproduction	Unnecessary tests
Overprocessing	Doing more than required, resulting in stressed, overworked staff
Defects	Medication errors, infections
Human Potential (Skill)	Silo-mentality, not using knowledge of teams

Source: Adapted from Van Beveren (2015), Graban (2012)

Whether or not Lean is applicable in healthcare is among others investigated by Spear (2005). He found that few industries are better equipped than the healthcare sector to achieve the skills and knowledge needed to enhance processes that cross the boundaries of their disciplines. Hospital management and employees are well educated and have proven copious times to be flexible in learning new ways of thinking (Spear, 2005). Manos, Sattler and Alukal (2006) found that the methodology is fitting in a hospital because the managerial processes, comparable to all businesses, are at the hearth of what works and what does not (Manos, Sattler, & Alukal, 2006). The outcome of Lean healthcare is examined by Poksinska (2010) and is found to be very positive. Some examples are reduction of overall time patients spent on care, drop in number of errors and increased patient satisfaction (Pokskinska, 2010).

A few complications make the implementation of Lean in healthcare challenging. As mentioned before, full implementation can only be accomplished when the culture of the organisation is ingrained with the Lean way of thinking. Therefore, it is not easy to implement it in every company since the knowledge it is based on cannot be written down (Jimmerson, Weber, & Sobek, 2004). Some practitioners argue that the adoption of Lean is not possible since hospitals are no Japanese car manufacturers and the organisational settings show striking differences. When examining the types of

waste however, similarities arise, making the application of Lean potentially beneficial (Pokskinska, 2010).

Another challenge is the complexity of the sector, being the cause of many problems and creating many opportunities for ambiguities. Those ambiguities can hide in the descriptions of how a job should be performed or how the work of a group should be integrated successfully into the whole (Spear, 2005).

Linked with the aforementioned complexity, is the way healthcare is organised within hospitals. A silo-mentality can arise as the patient is the only person to see the complete journey through the hospital. As a result, the patient can spend hours in the hospital waiting for care or value-adding activities. In order to solve this problem, Poksinska (2010) proposes a holistic approach to break down the departmental silos and achieve the best cross-functional Lean results (Pokskinska, 2010).

The last complication that hinders Lean is the organisational structure. The highly educated physicians are typically used to act independently and are not educated to work efficiently in group. This however is unlike the basic principles of Lean, emphasising on group effort and effective communication (Pokskinska, 2010).

The problem-solving behaviour of nurses in a Lean environment has already been extensively studied by Gemmel et al. (2018). Initially, it was expected that by implementing Lean in the hospital, second-order problem-solving behaviour was stimulated. It was investigated to what extent the degree of implementation, and thus the Lean maturity, had an influence on the display of SOPS behaviour. Gemmel et al. found that more second-order problem-solving behaviour was encountered in hospitals with a more extensive Lean implementation. This implicated that a more favourable environment for changing the problem-solving behaviour of nurses was found in hospitals where Lean has large management support, organization-wide (Gemmel et al., 2018).

3. Proposition Generation

Hospitals, and healthcare organisations in general, are confronted with incidents in the working field on a daily basis. Examples of such organisational problems are missing or broken equipment or supplies, simultaneous demands on the workers time, missing or incorrect information and waiting for resources. These problems can cause a loss in quality and can compromise the continuity of patient care. It is therefore necessary that such problems are solved swiftly and properly. Since nurses ensure the care of patients, solving these problems is seen as part of their duties. However, there are several ways to tackle these problems. As described in the literature review, problem-solving is divided into first- and second-order. First-order problem-solving can be described as a workaround, as the underlying cause is not fixed nor tackled, but the problem itself is solved immediately. No attention is paid to the possible reoccurrence of the problem, making this type of problem-solving rather unsustainable. When using second-order problem-solving techniques however, the root cause is addressed, making sure occurrence in the future of the same problem is less likely. Problem-solving, whether first- or second-order, arises from problem-solving behaviour. Those behavioural aspects are actions undertaken by nurses to resolve the problem. Although it has frequently been researched what the determining factors are for the use of first- or second-order problem-solving techniques, it largely remains unclear which motivating elements are more prominent than others for nurses to adopt specific problem-solving behaviours. Possible factors that can influence these behaviours can be leadership, organisational context, group design and worker cognition. Those elements are described in detail by Tucker and Edmondson (2002) in their model of nurse second-order problem-solving behaviour. Leadership, and more specifically the type of leadership of the head nurse, is expected to be of great impact in this. Since Lean plays an important role in the degree of second-order problem-solving behaviour of nurses (Van Beveren, 2015), it is also assumed that this will have an impact on motivation. This leads to the following proposition for investigation in the empirical part of this study:

In healthcare organizations, problem-solving behaviour of nurses, whether first- or second-order, is driven by a variety of motivational factors, of which the head nurses' leadership style and patient care time are the most prominent.

This will be studied by comparing two different hospitals with a distinction in knowledge and implementation of Lean. The study is partially based on the model of Tucker and Edmondson (2002), however the outcomes of that model, i.e. "quality of care" and "frequency of problems", were not investigated. Hence, the empirical part of the study solely focuses on the diverse motivational factors that lead to a certain problem-solving behaviour.

4. Empirical Research

4.1 Goal and Mission

The goal of this dissertation is to investigate and determine the underlying driving elements that cause nurses to behave to organisational problems in a specific way. It is expected that several motivational factors determining the behaviour will be found, depending on the hospital. Some will be more prominent than others. A qualitative case study performed in two Flemish healthcare organizations was held in order to investigate the above proposition. It was decided to choose two hospitals with different knowledge and experience in Lean management, so that this could also be compared in the case study and possibly contribute to the motivational factors, more specifically in the form of Lean leadership. Initially, problem-solving behaviour of the nurses is examined in order to arrive at the underlying motivating factors causing that behaviour. From this research, these different factors can then be listed and it can be determined which factors have a greater impact than others on problem-solving behaviour. Qualitative research was used, as this thesis deals with characteristics and behaviour. In addition, it was opted to use a case study design as research method. These aspects will be discussed in more detail later on.

The mission of this master's thesis is to provide new information to the hospitals that participated in this study. With knowledge of the different motivating factors, a productive problem-solving policy can be developed in a more efficient and correct manner. Furthermore, we believe that this dissertation can also be useful for other researchers and academics and can be considered as a starting point for further research into problem-solving behaviour in the healthcare sector. Finally, this case study could serve as a basis for further, more extensive work in which the findings of this study could be verified.

4.2 Methodology

4.2.1 Research Stages

When dissecting this dissertation, three overlapping research stages can be identified at different points in time. Firstly, since the build-up of enough theory was important in order to completely understand the different concepts of this study, a literature review was created. Secondly, the empirical research was conducted in the form of a case study in which sufficient data was obtained from interviews to be thoroughly analysed in the last stage. Next to the analysis, the writing and creation of a reliable report was also part of the last stage, which was very time-consuming. As the complete research was conducted over a short time span of 4 months, the different stages overlapped. A schematic overview of the milestones of this masters' thesis is depicted in Figure 8.

Start Literature Review	Initiation contact with Hospitals	Start of Empirical Research	Termination Empirical Research	Finish Final Report
•September 2020	•October 2020	•December 7th, 2020	•December 24th, 2020	•January 2021

Figure 8: Timeline Research (own input)

A separate timeline relating to the ethics committees is added below, in Figure 9. The approvals of both UH Ghent and BZIO Ostend are added in respectively Appendix 4 and 5.

1st Request UH Ghent	2nd Request UH Ghent	1st Request BZIO Ostend	Approval UH Ghent	Approval BZIO Ostend
•October 10th, 2020	•November 13th, 2020	•November 13th, 2020	•December 3rd, 2020	•December 18th, 2020

Figure 9: Timeline Ethics Committees (own input)

4.2.2 Qualitative Research

Since the collected data consists of personal characteristics and behaviour, the study is based on qualitative data. Using qualitative data, complex relationships between variables can be investigated more thoroughly within their natural environment. Using traditional questionnaires and thus using quantitative data, it is more difficult to fully grasp the complex interactions between people and the multiple variables (Worley & Doolen, 2006). It is therefore obvious that, since this research mainly is focused on people's behaviour, the choice is made for a qualitative research strategy that is more open, flexible and more systematic than a quantitative approach (Duits, 2011).

Prejudices may influence the data to be collected. Examples include prejudice on the part of the researcher or simply relying on one particular source. It is very important that these effects are eliminated through a documented and systematic approach to data collection. In this way, other researchers can identify possible biases (Worley & Doolen, 2006). Further explanations on this issue will follow.

4.2.3 Case Study Research

Case Study Research: Definition

In the field of case study research, a lot of work has been done by Robert K. Yin. That is why his work is being used as a guideline for the construction of this case study. Case study research becomes more popular within the healthcare sector. This is due to the internal complexity of healthcare, which is made up of many interconnected components. In addition, the sector is subject to continuous and rapid change and it is not easy to understand the intentions and motivations of top management (Yin, 1999). Yin argues that these are the reasons why researchers now more than ever prefer the case study approach to other general research methods. In order to completely understand case study research however, a comprehensive definition is necessary, being subdivided by Yin in two factors.

Firstly, the scope of a case study is clarified:

> "A case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident." (Yin, 2014)

As it is not always clear what the difference between the researched phenomenon and the real-life context is, it is needed to specify an additional set of technical characteristics, such as data collection and data analysis strategies. The second part of the definition aims to clarify this:

> "The case study inquiry copes with the technically distinctive situation in which there will be many more variables of interest than data points, and as one result relies on multiple sources of evidence, with data needing to converge in a triangulating fashion, and as another result benefits from the prior development of theoretical propositions to guide data collection and analysis." (Yin, 2014)

An important part of this definition, is the convergence into a triangulating fashion, mandatory to ensure the validity and reliability of the study. This will be defined later on.

Research Design

A multiple-case design was used to carry out this research, as two different health care organisations were chosen to be examined. On the one hand it concerns the University Hospital (UH) in Ghent and on the other hand the rehabilitation and residential care centre in Ostend (BZIO). One specific department was chosen within the hospitals to conduct the research. Within these departments, the nurses as well as the head nurse of that department were interviewed. These hospitals were chosen on the one hand for their willingness to participate in the research, but on the other hand also on the basis of their experience with Lean. It is rather obvious that the UH Ghent is partaking in this research, as it is linked to the university through which this research is caried out. The department in question is the BAS day hospital, where patients with cancer of the blood, the lungs or the gastrointestinal tract are located. The BZIO was noticed by Principal Investigator Professor Paul Gemmel, as the BZIO's Director of Care is known for his research on Lean in hospitals. The internal rehabilitation hospital of BZIO was selected as part of the research. A graphical representation of the case study design is shown in Figure 10[1].
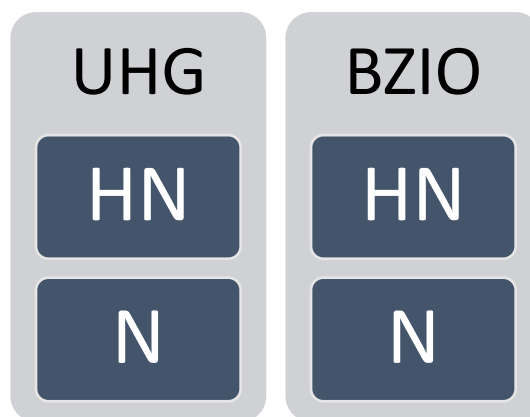
Figure 10: Case Study Design (own input)

Case Study Preparation

Initially, communication with the hospitals in question was entirely via e-mail. Later, a number of face to face interviews and video calls were held to indicate the further course of the study. During the communication by e-mail, the purpose and structure of the master's thesis was described, after which the question was asked whether the party in question wanted to participate in the research. Both hospitals immediately agreed to act as case studies. Before the study could start however, it had to be approved by the internal ethics committees of both institutions. To this end, a protocol had

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[1] See: List of Abbreviations

to be gone through, in which the entire approach, including the purpose and working method of the research, had to be clarified. In order to complete this, the protocols for conducting interviews and questionnaires were also drawn up. Those protocols can be found in Appendix 1.

A distinction is made in interviews between the nurses and the head nurse. During the semi-structured interviews with the nurses, the underlying motivation explaining the problem-solving behaviour is examined. In the interviews with the head nurse, an attempt is made to determine their most prominent leadership style and the degree of Lean leadership. This also includes completing a questionnaire. Before the interviews start, the interviewee must fill in an Informed Consent Form in which a brief description of the research is described, as well as a consent to the processing of the data. A number of questions have been prepared in advance to guide the interview, but the most important questions will be determined during the interview by the participants' input and therefore depend on interview to interview. Situational questions such as these are the most important as they concern information that should come directly and honestly from the nurses without being spoken for by the interviewer. In this way, the reliability of the investigation is maintained. However, the same interview protocol and a number of identical questions were used for all participants to ensure triangulation and thus the validity and reliability of the data collected (Nordin, Deros, Wahab, & Rahman, 2012).

As mentioned before, the study started with a literature review during which as many evidence as possible was bundled regarding the problem-solving behaviour of nurses, leadership and Lean. This process is called theoretical triangulation. It is defined as "the use of more than one approach to the investigation of a research question in order to enhance confidence in the ensuing findings" (Bryman, 2004). In this case, theoretical triangulation is in the creation of a new framework of motivational factors, based on the synthesis of the second-order problem-solving model of Tucker and Quinn's leadership styles.

Limitations

Some limitations are to be discussed in this dissertation. Firstly, nurses were interviewed at two hospitals that are geographically close to each other. Restrictions resulting from this can have an effect on the external validity, or in other words the possibility to generalise the empirical findings. Nevertheless, it should be noted that the external validity is limited in any case, as only two hospitals are involved in the study. Therefore, Grant and Wall (2009) state that it is key "to strike a delicate balance between attending to context-specific phenomena and testing generalisable hypotheses" (Grant & Wall, 2009).

As already mentioned before, it is possible that a specific problem-solving culture is inherent to the geographic area. This study only focussed on two hospitals in Flanders, which possible can result in the disregard of this factor. A difference in research findings can for instance be found when the same study is carried out in The Netherlands or even the French speaking part of Belgium.

Next to the external validity, research has to be aware of the internal validity. The researcher can never fully control the manipulation of the independent variable. The design of the experiments is therefore very important (Grant & Wall, 2009). Nevertheless, to suppress all external variables that could affect causality is almost impossible. In order to minimize the effects, researchers should use multiple control groups and pre-test/post-test time-series measurements designs (De Pelsmacker & P., 2010). However, due to the fragility and nature of the information, no control groups were used. On top of this, no pre-tests were performed in order to limit the workload on the researcher. Also, no statistical tests to investigate the significance of the occurrence of specific motivational factors were conducted. The motivational factors were compared to the other hospital. Therefore, this dissertation only gives insight into the difference of motivational factors causing problem-solving behaviour of nurses.

Another limitation can be the deviation between actual and detected behaviour. The answers of the respondents can be guided by normative behaviour and therefore be somewhat divergent from reality. Such restrictions are most frequently encountered in direct observations, but can also influence the behaviour of respondents towards higher levels of positive perceived behaviour. In literature, this factor is referred to as the Hawthorne-effect (Mazur, Chen, & Prescott, 2008). To counterbalance this effect, nurses were told no good or bad answers to the asked questions existed. Also, the nurses were not informed to the core about the effective purpose of the research. The nurses were notified that the study examined the problem-solving behaviour of nurses, but it did not address the search for the motivational factors that drive the problem-solving behaviour.

Finally, there are two limitations with regard to the triangulation of this research. As only one type of data gathering was used, i.e. semi-structured interview, the methodological triangulation is not met. This refers to the use of more than one method for gathering data. Also, only one researcher was appointed to gather all the data, implying the unsatisfaction of the investor triangulation (Bryman, 2004).

Collection of Data

By analysing the case studies, it was made possible to gain a picture of the nurses' problem-solving behaviour and, more specifically, their motivation for that behaviour. Given the nature of the

information, semi-structured interviews were opted for, as these can be conducted in an informal and open manner. In case of the head nurse, a questionnaire was also conducted, albeit to a limited extent, with regard to the applied leadership style. Appendix 2 gives an overview of the number of people interviewed across the hospitals, including the different days on which the interviews were conducted. Also, additional information is provided on who participated in the interview and how much time it took.

4.2.4 Data Analysis

Analysis of qualitative data has been researched for a long time. Hsieh & Shannen's definition (2005) will be used here, without, however, claiming that the other definitions are less correct:

> "Qualitative content analysis is a research method for the subjective interpretation of the content of text data through the systematic classification process of coding and identifying themes or pattern." (Hsieh & Shannon, 2005)

There is no such thing as a unique method of qualitative data analysis. However, there is a general consensus that the analysis is always an ongoing, iterative process, starting at the beginning of the research when data is collected. Some specific methods of analysis focus on qualitative data for health care research. These concrete methods can be used to define taxonomies, themes and theories (Bradley, Curry, & Devers, 2007). Taxonomy is defined as a formal system of classifying complex phenomena according to common domains and dimensions (Patton, 2002). This allows clarification in defining and comparing diverse and complex interventions that are common in healthcare policy and management (Sofaer, 1999). Furthermore, themes can be identified, which are described as recurrent, coherent concepts or propositions related to the research topic (Boyatzis, 1998). Such themes provide more general insights into the specific experiences of individual participants (Ryan & Bernard, 2003). Finally, a theory is a collection of general, correctable proposals that help to explain, predict and interpret events and phenomena (Patton, 2002). For empirical research, the establishment of a theoretical framework is of great importance (Bradley, Curry, & Devers, 2007). In order to compare the qualitative data with a taxonomy, theme or theory, it is important to order and code the data.

Coding of Content

Encoding data offers a way of organising and classifying qualitative data on the one hand and exposes links on the other. Such codes are considered to be tags or labels assigned to documents or parts of documents (paragraphs, sentences, words, etc.). These codes allow core concepts to be

catalogued more easily while safeguarding the context in which they occur. The process consists of the development, termination and application of the structure. The development is an iterative and cumbersome process that already starts during data collection (Bradley, Curry, & Devers, 2007). In general, a distinction is made between two different methods of code structure development: an inductive and a deductive approach.

The inductive approach uses one step at a time analysis of the data. From the moment a concept can be identified, a code is assigned to it. The data is analysed further, with the pieces being divided into parts and assigned to new or already existing concepts (Bradley, Curry, & Devers, 2007). This model is also called the *constant comparison model* by Glaser & Strauss (1967), in which the researcher constantly refines the dimensions of the created code and identifies new codes.

Where the inductive method starts with the analysis of the data, the deductive method starts with the creation of a framework for codes, also known as a coding tree, before analysing the data. In this way, concepts that have already been described in the literature can be integrated from the outset. This method makes it possible to build on existing insights regarding he research concept. A point of attention however is to avoid forcing data into a particular category. Although both methods are often applied separately, an integrated approach is possible whereby codes are developed using an inductive as well as a deductive approach (Bradley, Curry, & Devers, 2007).

Analysis

First of all, the interviews conducted were transcribed according to a transcription protocol which can be found in Appendix 3. After all the data was imported and the interviews were transcribed, the encoding of the data was started. A coding tree was set up in which at the first level a division was made between the two hospitals. A second layer comprises the theoretical framework. As a coding tree is used before the analysis started, the coding was approached in a deductive way. Before the start of the empirical research, a brainstorm session was held to obtain the first motivational factors. In the second layer, however, extra space was provided for possibly other, unforeseen motivational factors. In other words, coding was also partly inductive and thus an integrated approach is used. In this way, the taxonomy of the problem-solving behaviour of nurses was used from the literature as a theoretical framework and as a coding framework to test the practice.

4.3 Results and Discussion

The results of the empirical research will be discussed in detail in this section. Firstly, the used methods will be explained to analyse the results. Both hospitals will be analysed separately, distinguishing between the behaviour analysis, the factors driving the behaviour, leadership analysis and Lean analysis, leading to a conclusion per hospital. Also, a short introduction with regard to the hospital and the concerning department(s) will be provided. After both hospitals have been examined separately, a cross-hospital analysis will be conducted, comparing the two hospitals.

4.3.1   Processing of the results

In this study, the problem-solving behaviour of a department in a specific hospital is analysed, focussing on the SOPS behaviour. The amount of SOPS behaviour is compared to the drivers of behaviour explained in the model of Tucker (Figure 1), as well as drivers resulting from brainstorming sessions . The variations across the hospitals are investigated afterwards. However to investigate the variations of problem-solving behaviour across the different hospitals, the difference in numbers of respondents have to be corrected. In order to resolve this, relative numbers will be used, i.e. the absolute numbers divided by the number of participants per hospital. This factor will be multiplied by 100, for comprehensibility purposes. If, after the corrections, a number of X occurrences was found, this would mean that out of 100 nurses, X nurses would show that kind of problem-solving behaviour. However, it is important to understand that one problem can cause different problem-solving behaviours, and the same response can be used multiple times for addressing only one problem. This would result in inconclusive conclusions. As this dissertation focusses on the drivers of problem-solving behaviour, the meaning of this ambiguity is rather small, which means it will not be taken into account. The number of behaviours can never exceed the total number of interviewees, as multiple encounters of the same behaviour are counted only once. For example, if a nurse has shown the same problem-solving behaviour in different scenarios during the interview, this specific behaviour will only be counted once, therefore assuming that the nurse has mastered this behaviour.

After the problem-solving behaviour is analysed, the different motivational factors driving the behaviour are considered. It is expected that departments with a high level of second-order problem-solving behaviour will show a noteworthy leadership support, among other things, whereas, in case of first-order problem-solving behaviour, the patient care time will be a priority. For this analysis, the occurrences of SOPS behaviour, as well as the number of motivational drivers, will be evaluated in a descriptive way. Therefore, no statistical tests can be applied to express the significance of differences in SOPS behaviour.

In order to make the coding process translucent and highlight significant behaviours, quotes of the interviews will be used throughout the analysis. As explained in Appendix 3, the participants will be labelled. The first letter of each label, will be the location of the interview, varying between the letter G in Ghent and the letter O in Ostend. The following letters identify the participant, as the letter N stands for Nurse and the letters HN for Head Nurse. This code will be completed with the number of the interview.

4.3.2   The University Hospital of Ghent

With more than 3000 patients a day, the University Hospital of Ghent is one of the largest and most specialised hospitals in Flanders. Next to patient care, the hospital also invests in scientific research and education in cooperation with the University of Ghent. This research was conducted in the day hospital BAS, specialised in haematology, gastrointestinal, intestinal and liver diseases and pulmonary diseases. In recent years, the day hospital has extended and now spreads over two floors (UZ Gent, 2020).

Over a period of ten days, seven nurses and the head nurse were interviewed. Prior to the interviews, a briefing was held on the spot by the researcher during which the nurses were informed about the study. The nurses were given a few days before making a decision to participate. There was no pressure on the decision to participate, so participation was entirely voluntary. The interviews were held during working hours. The experience of the nurses interviewed at UHG is displayed at Chart 1. It should be noted however that 6 out 7 respondents worked at another department or a complete different sector. In other words, the figures only refer to the experience within the day hospital.

Chart 1: Experience Nurses at UHG
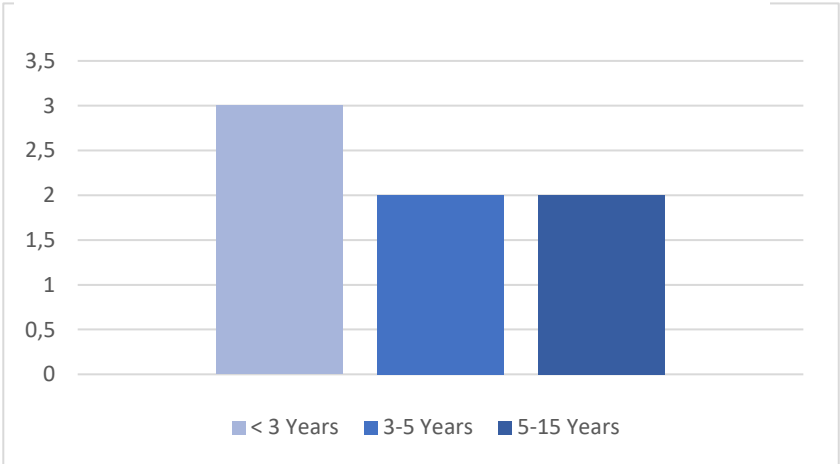
It is important to mention that UH Ghent uses a safety platform, which is used by personnel to report incidents and near misses. The platform is called Incident Reporting and Learning System, or in Dutch *"Incidenten Meld- en Leersysteem"*, further abbreviated to IML.

Apart from the introduction of a few Lean tools, no Lean culture had been carried across the various departments. Specifically in the BAS day hospital, some Lean tools were applied in the past, but Lean management is not applied strategically.

BEHAVIOUR ANALYSIS

Table 5 lists the second-order problem-solving behaviour, as reflected in the interviews. As listed in the table below, all the nurses interviewed show the first two types of second-order problem-solving behaviour. Each nurse mentions communication to the head nurse as well as communication to the person responsible in case of an operational failure. Also, 3 out of 7 nurses share ideas on the possible cause of the problem. Only one nurse mentions implementing the changes and only two verify that those changes have the desired effect.

Table 5: Absolute numbers of Second-Order Problem-Solving Behaviour at BAS

Second-Order Problem-Solving Behaviour	Absolute Number
Communication to Head Nurse	7
Communication to the Person Responsible	7
Implement Changes	1
Sharing Ideas about the Cause of the Problem	3
Verify that Changes have the Desired Effect	2

According to those numbers, Chart 2 is drafted, with the total number of nurses interviewed equalling 100%. This means that in day hospital BAS, all nurses would communicate to the head nurse or the person responsible in case of an operational failure. This statement is questionable, however, as a sample size of 7 nurses is too small. Furthermore, no distinction is made between types of operational failures. As soon as a nurse establishes such behaviour in the event of an arbitrary operational failure, this is assumed to be true for all operational failures. Given the focus of this study on the motivational factors leading to such behaviour, this is assumed to be true. Also, it should be mentioned that reporting an incident at IML is not enregistered as one of the types of SOPS behaviour.
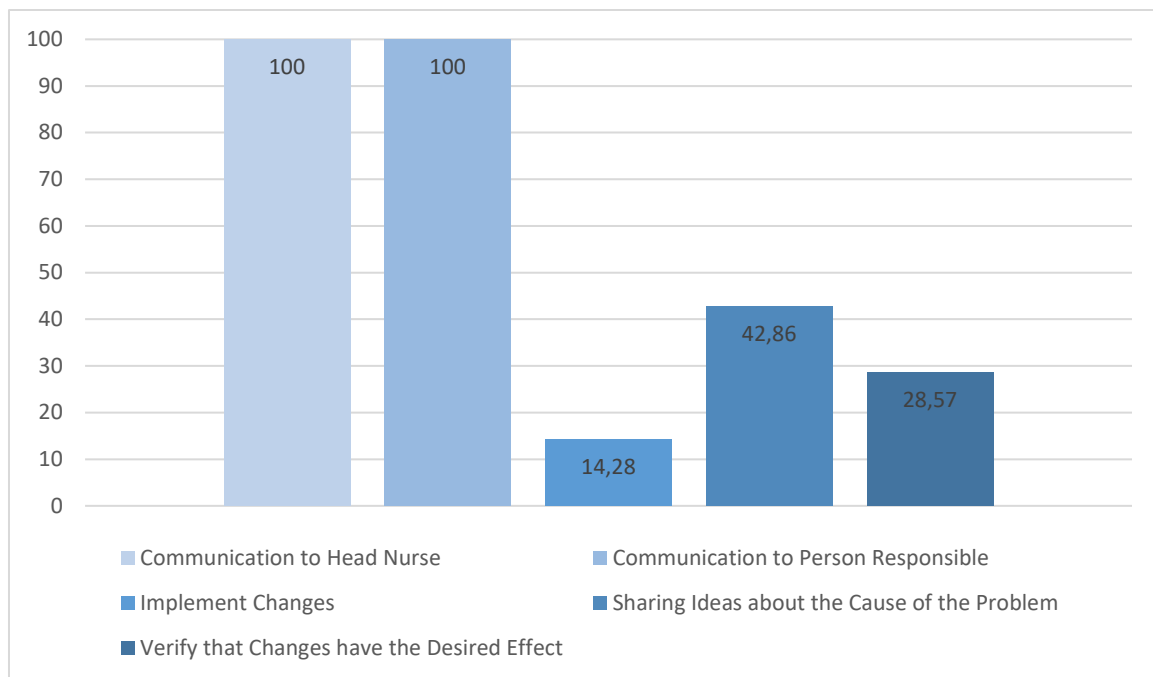
To make the coding process more transparent and to give supplementary information about how the department solves problems, a few notable quotes of the interviews are included.

GN1 provides a good example of SOPS behaviour, when talking about a problem with regard to the patient schedule:

"I go to the head nurse for those things, because I think it is their job to deal with those specific issues. As an equal, I try to approach the person responsible as directly as possible. If this fails, I go to the head nurse for a solution so that the next colleague does not have to go through that again."

This answer includes communication both to the head nurse and to the person responsible. The reason why the nurse does this, is so that this does not happen again in the future, which is precisely the purpose of SOPS. In addition, GN3 states that "*we report almost everything to the head nurse. There is practically nothing they do not know".* This confirms the fact that all nurses communicate problems with the head nurse.

GN6 indicates the following when talking about a doctor who forgot to edit a patient's file, stating that communication to the person responsible is a part of the problem-solving behaviour:

"I had to ask the doctor to adapt the change of therapy in the patient's file. You must always inform them if they make a mistake."

When GN2 was asked about a problem with regard to the pharmacy and a shortage of specific medicines, it was mentioned that the problem had been dealt with by the nurse in question, so it could not happen again in the future. Therefore, the nurse implemented the changes:

"I spent a couple of days checking everything, throwing away thing that were overdue and asking for other things extra. This week, at last, we did not have to ask for extra medicines and the problem did not reoccur."

When addressing the shortage of medicines in the cupboard, GN7 actively searched for the cause of the problem and mentioned a possible solution to the head nurse. The medicine cabinet is proposed to be replaced by a cupboard with an automatic refill system, also used in other departments of the UH Ghent. Also, GN1 mentioned the following:

"I check with a number of colleagues what the possible causes and solutions are to that problem. After that, we try to brainstorm on how to tackle it."

GN1 also addresses the importance of follow-up in order for problems to not reoccur in the future:

"I will continue to follow it up. I cannot let go of that. I want it to be prevented. It is only such a simple thing, but we must remain vigilant."

An important remark to make is the frequency of the problems. If a problem occurs only once, it is not perceived as an operational failure, and will consequently will not be treated that way. As soon as a certain problem occurs more than once, the actions described above are taken. This is for example also noticed by GN5: "*I do not think if something happens only once, I would really report it or take any further action.*" The original problem will always be solved in order to guarantee the care of the patient, but no further questions will be asked. GN5 reports the following: *"I think it is our duty to guarantee the care and continuity of care."* This will also be further explained in the following section.

DRIVERS ANALYSIS

The motivational aspects driving the problem-solving behaviour of the nurses will be discussed in this segment. Several drivers are already pinpointed by Tucker and Edmondson (2002) in their model of nurse second-order problem-solving behaviour. Next to that, other possible drivers were found during brainstorming sessions. When analysing the interviews, the drivers cited by the nurses were highlighted. As such, the 2002 model was updated and applied for the UH Ghent. In Table 6, the

drivers are displayed. The number in the right-hand column, is the amount of nurses mentioning such drivers during the interview.

Table 6: Absolute numbers of SOPS Drivers at BAS

Drivers Second-Order Problem-Solving Behaviour	Absolute Number
Leadership	7
Platform	7
Time	5
Team Composition	2
Culture	7
Part of the Job	2
Personal Motivation	4
Gratification	1

The different drivers will be explained elaborately below. However, to get a better grasp of the relative importance of those drivers, Chart 3 is drafted, showing which driver is perceived by the nurses as most important for enhancing second-order problem-solving behaviour.

Chart 3: Most Important Drivers at BAS

■ Leadership   ■ Culture
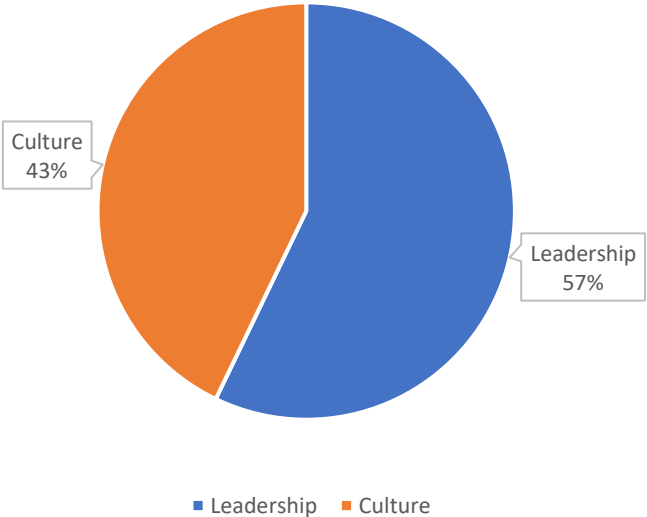
Only Leadership and Culture are mentioned as most important motivational factor stimulating second-order problem-solving behaviour by nurses. Leadership is mentioned by 57% and Culture by 43%. The other items in Table 6 were also seen as influential, but were never recognised as most important. Several nurses noted that such factors are not isolated, but are part of a chain of factors

that together cause specific problem-solving behaviour. Therefore, the above diagram should be placed in context.

The drivers listed in Table 6 are sorted according to their position in the model of Tucker (2002). Firstly, Leadership is explained, being part of the Nurse Manager Behaviour. After that, the Platform possibilities, as part of the Organisational Context, are highlighted. To conclude the Managerial Levers, Time and Team Composition are seen as drivers contributing to the Group Design. Finally, Culture, Part of the Job, Personal Motivation and Gratification are described as a component of the Worker Cognition.

<u>Leadership</u>

Leadership is, according to Chart 3, seen as the most important factor influencing problem-solving behaviour by nurses in BAS. It is also mentioned by all nurses interviewed. The model of Tucker and Edmondson (2002) states that a strong presence on the work floor and a leader acting as a coach has a positive influence on second-order problem-solving behaviour.

GHN1 states the following, confirming that presence on the work floor is positive for problem-solving behaviour:

"I tend to go around the department from time to time, so that things can be captured and I can feel the atmosphere. … Sometimes several fires can be extinguished even before they become a problem."

With regard to the coaching role of the head nurse, GN1 states the following:

"I think that a person in charge is very important, not to say how it should be done, but above all to give autonomy to the people. The intention is to get out of it together. That is why it is important to sit down together."

This idea is supported by GN3 in following quote:

"GHN1 is going to reason with us and also listen to our solutions. He is open to reasoning and will not immediately break down our opinion."

Next to the factors mentioned in the model, GN2 notices that it is of utmost importance for a leader to effectively tackle the problems mentioned by the nurses. If this would not be the case, communication to the head nurse would eventually stop:

"The head nurse may even be grumpy, but If he actually gets to grips with the problems, you'll keep reporting them."

It is also mentioned by several nurses that the open mindset and open door of GHN1, both literally and figuratively, have a massive impact on the communication to the head nurse and therefore the second-order problem-solving behaviour.

Platform

Al nurses mentioned the importance of several platforms for problem-solving, albeit not always in a positive sense. As already explained, the UH Ghent created a system called IML to report incidents and near misses. The system itself is created to facilitate the process of analysing the reported incident, searching for the root cause, solving the root cause and eventually providing feedback to the nurse that initiated the IML. It can be noted that the system's approach creates second-order problem-solving behaviour. This system is used by all nurses interviewed, however some remarks should be made. The system itself is in some cases too complex or not accessible enough, as can be seen from the quote below by GN3:

"In my opinion, it is far too cumbersome. … Sometimes I would not know where to start."

Next to the accessibility of the software, the feedback is mentioned by GN1 and GN7, both stating that the feedback takes too long. Apart from the shortcomings noted, it is striking that IMLs are always submitted, although there is room for improvement.

GN1: *"The feedback has taken far too lang and it was not that useful. But this would not stop me from making reports in the future. Especially to maintain the learning moment so that is does not reoccur."*

GN7: *"If the feedback were to come as early as the following week, I think even more incidents or near misses would be reported."*

Another platform that was mentioned by different nurses, is the working meeting. During this meeting, among other things, problems are mentioned and group discussions are held on how to solve them. As the day clinic has fixed hours and closes at 6 p.m., these meetings have to take place after working hours, which can be a stumbling block for some. In general, however, it can be argued that it is beneficial for problem-solving behaviour. Proposals such as team buildings and the use of a booklet for noting problems are also suggested by some individuals.

Due to the fact that a day clinic has fixed hours and patients cannot stay overnight, time is an important factor in solving problems. This was also included as one of the most important factors in the proposition generation. In view of Chart 3, this does not appear to be the case. Nevertheless, the time factor appears to be important. Several aspects have to be taken into account when linking time to problem-solving behaviour. Firstly, in a day hospital, it is important to progress, as patients cannot stay overnight and the patient care has to take place in one day. The consequences on problem-solving behaviour are twofold. On the one hand, it encourages quick fixes and workarounds if they take little time. This is an example of first-order problem-solving behaviour. On the other hand, the pressure can cause the problem to be forgotten afterwards, thus preventing the problem from being tackled at the root, as is quoted by GN2:

"If there is no time to deal with it, it can be forgotten. I will solve it through a workaround, but it can be forgotten to analyse it and really solve it."

In recent years, the day hospital has increased the number of nurses, as well as the number of beds. This has led to a reduction in the workload. As a result, time in this department does not pose a prominent treat when dealing with problems, which is beneficial for the second-order problem-solving behaviour.

<u>Team Composition</u>

A factor indicated by some nurses, is the team composition. This is not included in Tucker's model, but can be added to the Group Design. Of course, it is not easy to steer the composition of the team to such an extent that it is advantageous for problem-solving behaviour. Especially because nurses are regarded as a bottleneck profession. Nevertheless, the nurses' thoughts on this subject are set out below.

Several new nurses have been recruited in recent years, as mentioned above. The department consists of nurses from different backgrounds and experiences. This benefits problem-solving behaviour as it results in a broader view and a critical attitude, as quoted by GN1:

"Because they come from other hospitals and departments and bring different, rather positive, experiences."

In addition, the composition in terms of age has been mentioned to influence the problem-solving behaviour. A weighty distribution would be advantageous, as well as a larger number of young

nurses. Vice versa would be unfavourable for SOPS behaviour. This must, however, be said with caution, as it is only mentioned by one individual.

<u>Culture</u>

Next to Leadership, Culture is regarded as the main driver of problem-solving behaviour in this department. This is in line with the psychological safety in Tucker's model. It is striking that the reputation of the nurse who discovers the problem remains untouched. This, in turn, ensures partially the behaviour as listed in Table 3. As a lot of the Managerial Levers are present in this department, it is to be expected that positive Workers Cognition in turn will be present.

Culture includes how nurses deal with each other when experiencing a problem, also called the atmosphere. It is necessary for them to be able to get together, even if one of them has made a mistake. Several quotes support that this is the case in BAS:

GN1: *"The atmosphere is very important so that it is possible to discuss such matters with fellow colleagues."*

GN3: *"I think that the atmosphere is very important, because a good atmosphere ensures good communication and behaviour."*

GN5: *"There really is an open atmosphere here, it is not every man for himself, which in itself means that everyone is standing with their noses in the same direction. There is no blame culture here."*

In addition to the open attitude of the nurses, the atmosphere is also experienced as very critical. As a result, a lot is expected of colleagues. To the question of whether the group is regarded as critical, GN6 answers the following:

"Yes, I think so. It creates a flame that is passed on, that is how the new colleagues are trained."

In this regard, GN7 states:

"GHN1 has often said that we are a very critical and demanding group. … It wouldn't go well if there was a nonchalant person in the group. … GHN1 sometimes says that we should perhaps give the new people a little more time to adapt."

Transparency is important when discussing problems between colleagues. When certain things are discussed during coffee break and not everyone who is involved is present, this can be experienced as gossip.

<u>Part of the Job</u>

A driver that can have a negative effect on SOPS behaviour, is the feeling that solving problems is a part of the job. This involves solving the problems using workarounds and not returning to them later. As stated by Tucker (2004), 9% of nurses' time is wasted on failure resolution activities on average, which is 44 minutes in an 8 hour shift. Taking on such activities can therefore be seen as part of the job. Quotes of GN3 and GN5 are given below to illustrate this. The quote by GN5 explains a problem with regard to information given to the patient.

GN3: *"I think that, as nurses, we need to be flexible, create solutions and just go with the flow. It has to be done, and if we do not do it, no one will do it."*

GN5: *"I just think it is easiest to explain it to the patient myself. After all, that is also part of the work."*

<u>Personal Motivation</u>

Motivation is included in Tucker's model and is defines as: "the determination to pursue activities intended to lead root cause removal over alternative responses" (Tucker & Edmondson, 2002, p. 100). This essentially is referred to by Personal Motivation. Several nurses attributed the critical insight to personal traits with quotes as "*I think I just am like that"* and *"I am a perfectionist by nature"*. This will contribute to second-order problem-solving behaviour. Yet it should be noted that this is not alone in creating such behaviour, but rather acts as a catalyst in conjunction with the aforementioned drivers.

<u>Gratification</u>

Gratification is regarded as negative for exhibiting SOPS behaviour. In this context, it is seen as solving problems in order to be complimented. This prevents the problem from begin solved fundamentally, as it encourages first-order problem-solving behaviour. As this was mentioned only once and briefly during the interviews, it will not be discussed further.

An important distinction made by nurses is the frequency of the problems and their gravity. This plays a role in the display of problem-solving behaviour. In general, it can be said that operational failures that occur the first time are not yet really experienced as such and are mostly solved by quick workarounds. As soon as the frequency increases, the SOPS behaviour as displayed above is shown. The gravity of the consequence of the operational failure is important. The safety of the patient is, of course, central. Even when occurring the first time, behaviour as shown in Table 5 will be present.

LEADERSHIP ANALYSIS

The questionnaire as well as the interview included in Appendix 1 are used to determine the leadership style of the head nurse. Often, a mixture of several styles will be used. The questionnaire was divided into five parts. These parts correspond to the five leadership styles as determined by Quinn. The average scores of these tests are plotted in Table 7.

Table 7: Questionnaire Responses GHN1

Leadership Style	Average Score (/5)
Transactional Leadership	3.75
Transformational Leadership	3.83
Servant Leadership	3.57
Coaching Leadership	4
Authentic Leadership	3.67

According to this questionnaire, the most prominent leadership style being used by GHN1, is Coaching Leadership, yet all types are within .5 points range. In analysing the interview however, both Coaching and Servant Leadership characteristics are observed, as well as one Transformational characteristic. The noticed components are summarised below.

The leadership characteristics of GHN1 are feedback-seeking, empathic, conflict management and moderating. The first trait in this list, is a part of Transformational Leadership. In doing so, both the leader and the employees try to seek feedback, both positive and negative, in order to be able to pursue new challenges once again. Also, the leader appears to be very empathic and tries to take into account the condition of the employees, both professionally and at home. This is regarded as an important component of emotional intelligence. On top of that, the head nurse's door is always open, both literally and figuratively, which significantly reduces the distance between the employees and the leader. In addition, the quote below from GHN1 also describes these characteristics:

"I always try to be a listener for my staff, with regard to things happening in the day hospital and far beyond."

The most prominent leadership style, in both questionnaire and interview, is **Coaching Leadership**. GHN1 acts as a moderator when managing conflicts, is critical and capable of solving complex problems. In addition, a certain amount of autonomy and empowerment is given to the group, which

is a clear characteristic of Coaching Leadership. The head nurse will always listen to the solutions and possibilities coming from the group and keep them in mind when making decisions.

LEAN ANALYSIS

According to the studies of Gemmel et al. (2018) and Bijl et al. (2019), Lean has a strong influence on the amount of second-order problem-solving behaviour. In this light, it is important to have an understanding to what extent Lean is used in the hospital, and more specifically in the department. As already mentioned, there is no general Lean policy in the UHG, but some Lean tools have been used in the past. An example of this, is the improvement board, where points for improvement were listed. After some time, these points were evaluated with the aim of continuously improving, which is at the core of Lean. After some time, however, the board was removed. When asked whether the nurses were aware of Lean, the answer always was no, although one nurse had heard about it earlier during college.

Bijl et al. (2019) noticed seven Lean leadership practices in a nursing ward setting. They found that Lean leadership has a positive effect on second-order problem-solving. These practices were also questioned during the interview with the head nurse.

1. Convincing and setting an example: not applicable, as no Lean program is initiated.
2. Unlocking individual and team potential: this is partly applied, as the head nurse uses reference persons for matters such as safety and pharmacy. It is also expected that certain projects will be handed over to nurses in the future. GHN1 states: *"By doing so, they can contribute to the group and any possible ambitions can be triggered."*
3. Solving problems systematically: IMLs are expected to be drawn up in the case of incidents or near misses. During work meetings, there is time to discuss problems, although this is not compulsory.
4. Enthusing, actively participating and visualising: not applicable.
5. Developing self-managing teams: this is already mentioned in the previous section, as empowerment is a part of the leadership style of GHN1. Therefore, GHN1 tries to enthuse the team in taking decisions and solving problems.
6. Sensing, as orchestrator, what is needed for change: there is a lot of communication with the head nurse. With this information, the head nurse tries to do what is necessary to change things in a positive way.
7. Listening, sharing information and appreciating: Although effective communication is considered a weakness by GHN1, this was not mentioned by any of the nurses. The head

nurse also places emphasis on listening to the nurses and expressing appreciation for what they do.

Even though there is no effective policy on Lean, some characteristics of Lean leadership can be found in the leadership style of GHN1. This most certainly has a positive effect on the second-order problem-solving behaviour of the nurses.

4.3.3   Bundled Healthcare Initiatives Ostend

The BZIO consists of a rehabilitation hospital and centre, next to a rehabilitation care centre. It strives for high-quality, safe and scientifically based rehabilitation and reconditioning for all its patients. The website communicates that incidents, near misses and dangerous situations are registered and analysed, with improvement actions being implemented if necessary (BZIO, 2020). The study was carried out among nurses in different departments, which makes comparison both difficult and interesting. Further on, the differences between departments are clarified.

Over a period of four days, six nurses and a team leader were interviewed. Before the interviews were conducted, the nurses were informed via an online briefing. A briefing on the spot, as was the case at UH Ghent, could not take place due to the tight time schedule and the measures concerning Covid-19. The briefing was recorded by means of a video message providing the same information as the briefing in UH Ghent. The nurses were given a few days to decide whether to take part or not, however no nurse was obliged to take part. The interviews were conducted during working hours over a maximum duration of one hour. The experience of the nurses interviewed at BZIO is displayed at Chart 4. The years of experience only apply within BZIO. Experience in other hospitals or sectors has not been taken into account.

Chart 4: Experience Nurses at BZIO
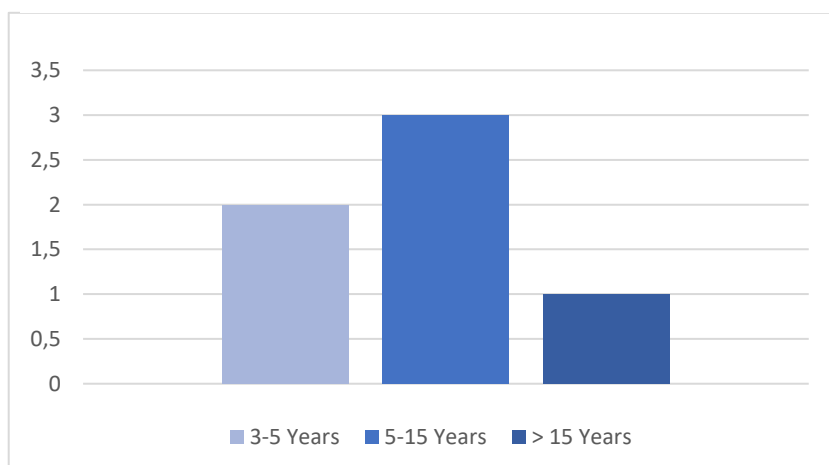
Just like UH Ghent's IML, BZIO also uses a safety platform to report incidents, near misses and dangerous situations, called FONA (Faults and Near Accidents). This system will be elaborated later on. In BZIO, the tasks of a head nurse are divided into two functions, the Reva coach and the Team Leader. The former focuses on everything that is patient-related, while the latter deals with personnel matters, thus reducing the time pressure of a classic head nurse. Clear and frequent communication between the two functions must be maintained in order to guarantee the holistic care of the patient.

An important difference between this hospital and UH Ghent, is the attention paid to Lean inside the hospital. Lean is carried within management and is passed on to the team leaders of each department by way of training and refresher courses. Several Lean tools are used. This will be discussed later.

BEHAVIOUR ANALYSIS

Table 8 lists the second-order problem-solving behaviour in BZIO as mentioned during the interviews. All nurses showed the first type of behaviour as they all communicated operational failures to the head nurse, or in this case the Reva coach or team leader, depending on the situation. Only half of those interviewed noted to communicate to the person responsible, which is a significant difference with BAS. Two nurses mentioned sharing ideas about the cause of the problem. Remarkably, no behaviour was observed with regard to implementing changes or verifying that changes have the desired effect.

Table 8: Absolute numbers of Second-Order Problem-Solving Behaviour at BZIO

Second-Order Problem-Solving Behaviour	Absolute Number
Communication to Head Nurse	6
Communication to the Person Responsible	3
Implement Changes	0
Sharing Ideas about the Cause of the Problem	2
Verify that Changes have the Desired Effect	0

On the foundation of the six nurses interviewed and their problem-solving behaviour, a generalisation was drawn up in Chart 5. It applies that 83.33% of the nurses in the BZIO would report operational failures to the head nurse. Of course, this is an assumption, as a sample size of 6 nurses is

too small. However within the scope of this dissertation, this is considered to be true. The use of FONA is enregistered as SOPS behaviour, but will be analysed in the next section.
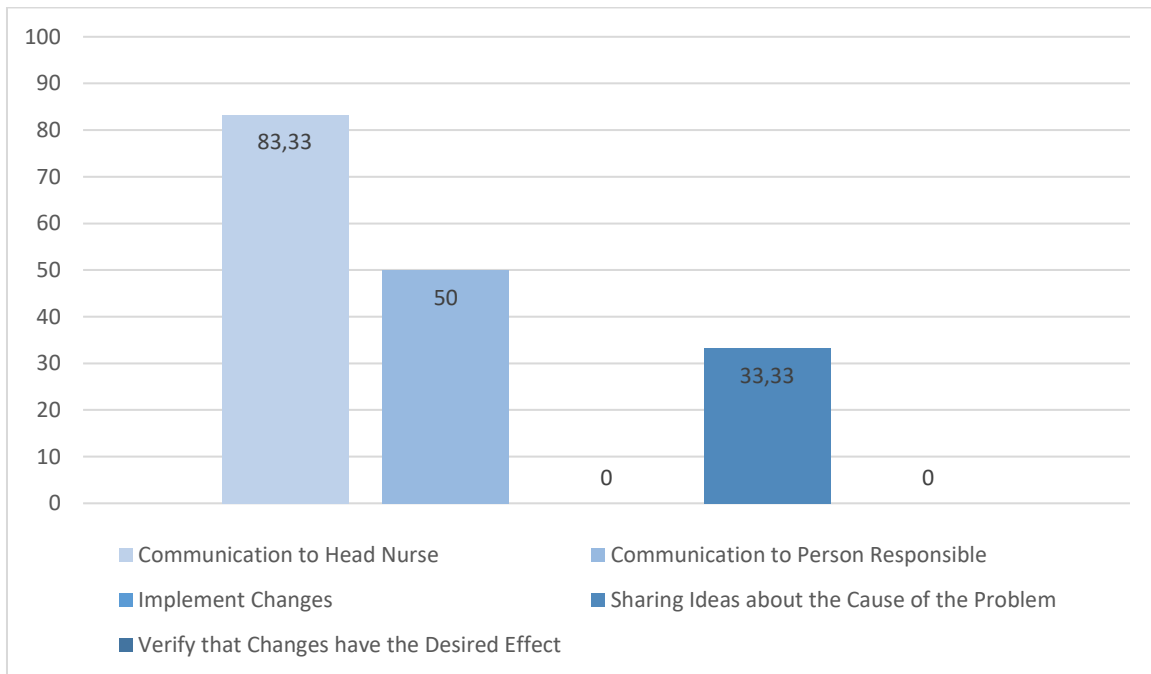
Some problem-solving behaviours are clarified by examples from the interviews. This is to make the coding process transparent and clear.

Most nurses spontaneously communicate with the supervisor; Reva coach or team leader, as a result of a problem. ON5 expresses this as follows:

"I'll always talk to the team leader about the problem."

When it became apparent that only one saturation gauge per department caused waiting times and frustration, ON4 decided:

"There was only one saturation gauge on the department. I mentioned this problem to the Reva coach, who almost immediately brought in a second one."

In case of an operational failure due to the actions of a colleague, ON1 says:

"I will always go to the person directly. I would rather say it in person than having to go behind someone's back. … Also, I will always make sure that what I say is substantiated."

This confirms that some nurses communicate to the person responsible. However, it appears that not all nurses condone this behaviour. The interview with ON2 shows this:

"I am not going to communicate this to the person. I will limit myself to my own tasks."

Two of the nurses interviewed look for the possible causes of the problem and share those possibilities with their colleagues or leader. When discussing a problem with the blood samples, ON1 states the following:

"If there is a problem with a delayed blood sample, I always go to see where it could have gone wrong. I will go over the different steps and try to find out where the problem is situated."

After finding out the failing step, ON1 communicated this to the supervisor. After a situation was presented in which an operational failure occurred, ON3 answered:

"First of all, I will examine where things are going wrong and ask the colleagues how they themselves experience those things."

DRIVERS ANALYSIS

The same format is used as with UH Ghent in discussing the motivational aspects driving the problem-solving behaviour. The same comparison is made between the drivers from the model of Tucker and the brainstorming session in relation to the interviews. However, it should be borne in mind that the various nurses work at different departments in the hospital. In other words, the nurses are part of separate teams and have different team leaders and Reva coaches. This should be kept in mind when analysing the interviews and drawing the conclusions.

Table 9: Absolute numbers of SOPS Drivers at BZIO

Drivers Second-Order Problem-Solving Behaviour	Absolute Number
Leadership	5
Platform / Framework	6
Time	4
Team Composition	2
Culture	3
Personal Motivation	3

Framework
17%

Culture
17%

Leadership
66%

■ Leadership ■ Culture ■ Framework
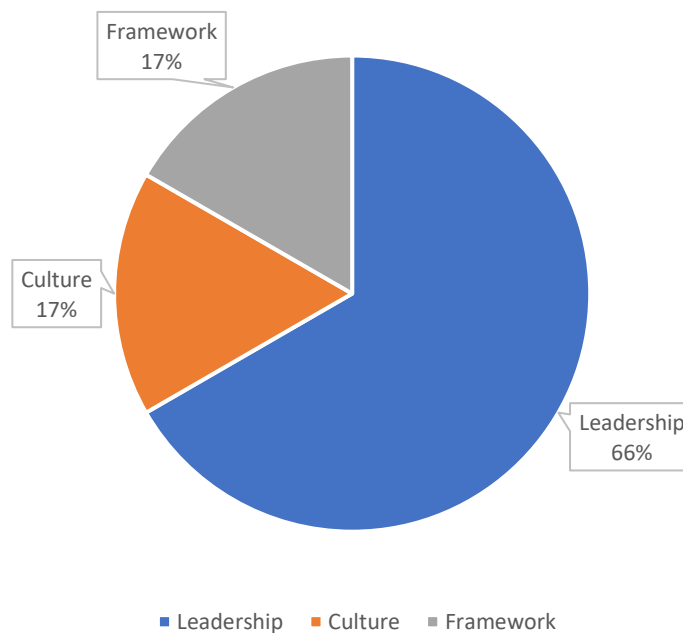
The most important drivers as perceived by the nurses at BZIO are shown in Chart 6. Leadership is also regarded as most important driver in this hospital, along with Culture and Framework. All drivers will be discussed in detail using the gathered feedback from the interviews. Before proceeding with this analysis, the distinction between the different departments is first discussed. As already mentioned, nurses were interviewed coming from three different departments within BZIO, each with a different culture, team and leader. Consequently, the observed problem-solving behaviour is different. The team leader interviewed is the leader of two out of three departments reviewed. This allows leadership to be analysed for both departments at the same time, although not for all reviewed departments. As only six nurses participated, it is not possible to analyse the different departments. This is because on average only two nurses from the same department were interviewed. Therefore, the hospital as a whole is analysed and the findings are always nuanced depending on the department.

The various drivers are, here too, sorted according to the potential place in Tucker's model of 2002. First, the Managerial Levers are clarified, subdivided into Nurse Manager Behaviour, i.e. Leadership, Organisational Context on the basis of Platform/Framework and Group Design via Time and Team Composition. Finally, the Culture and Personal Motivation are discussed as part of Worker Cognition.

Leadership

In general, Leadership in BZIO is regarded as the most important driver for positive problem-solving behaviour. In this respect, there is a clear difference between the various departments. First of all,

50

the department whose team leader was not interviewed, is analysed. It can be noticed that frustration reigns over the way the team leader deals with problems, which has an impact on the problem-solving behaviour. The problem with Leadership in this department is twofold.

On the one hand, there is a sense of frustration that little or nothing at all is being done with the problems communicated. This results in less communication with the manager, hindering SOPS behaviour. This is cited by ON2 and ON3.

ON2: *"Yes, sometimes I don't really say it any more, because sometimes nothing is done about it."*

ON3: *"It is taken into account and the leader actually listens, but it is not really addressed. Sometimes that stops me from saying other things. That is why I sometimes prefer to keep it to myself."*

On the other hand, according to the interviewed nurses, the manager's presence on the work floor is far too little. As a result, the team leader lacks feeling and a distance between manager and employee is created. It should be noted that every team leader is responsible for two departments.

ON3: *"I find that she lacks presence on the work floor, which makes her lack of insight."*

ON5: *"She comes to our department for a maximum of ten minutes a day. That way you can't really know and feel how things are going in our team. It is important to be present on the work floor, also to anticipate certain things."*

A different view prevails in the departments where OHN1 is in charge. All nurses interviewed from these departments indicate that operational failures are systematically communicated to OHN1. This is quoted by ON1:

"We get the feeling that if we have a problem, it will be tackled and a solution sought. If that would not be the case, it will continue to muddle on and eventually the communication to the team leader will stop."

It emphasizes the importance of the manager's feedback and effort to solve the problem in this matter. This is reiterated by ON4:

"If it seems to be impossible to solve a certain problem, OHN1 will always give feedback and report about it. OHN1 is going to be honest in any case."

Platform/Framework

Just as in UHG the IML platform is used for reporting incidents and near misses, in BZIO FONA is used. This system also enhances SOPS behaviour, as was the case with IML. However, some remarks must be made. With regard to the completion of the form, ON1 notes the following:

"But I find it very cumbersome to fill in the form. Because of this, many people say that they are not going to report, because it takes so long and it's not obvious. It should be made much easier."

An important difference with IML, is that feedback at FONA is voluntary. At the bottom of the form, the nurse can indicate whether or not to receive feedback from the concerned FONA. If desired, the feedback is provided verbally via the team leader.

Another framework used within the BZIO, is Hansei. This is cited by many nurses as an important element for effectively solving problems. It is perceived by one nurse as most important for problem-solving behaviour, as can be seen in Chart 6. Hansei stems from the Japanese culture and means self-reflection. The purpose of Hansei is to communicate about the errors and problems so it helps to prevent them in the past. Such techniques were used in the TPS and are in essence a Lean tool. However, due to the measures in place concerning Covid-19, the Hansei moments cannot take place.

A final framework used and mentioned during the interviews, is the improvement cross. The purpose of this is to create a better understanding of the frequency of certain operational failures. One cross is focused on a particular problem, for example missing medication. Whenever there is a problem with medication, this should be indicated on the cross, at the correct date. Over time, the cross will be analysed and the necessary conclusions will have to be drawn to prevent the problems in the future. This framework enables SOPS.

It is important to note that peer communication has become a problem due to the measures in force concerning Covid-19. It is not possible to organise a joint transfer of information about the patients. Therefore, one-to-one conversations are held with regard to the information transfer. As a result, nurses only have knowledge about their specific patients, and no information whatsoever about the other patients. This often is been pinpointed by nurses as a frustration. In itself, this does not lead to a change in problem-solving behaviour, but it does deserve a mention as it leads to operational failures, being 'Missing or incorrect information'. This issue is the same for all departments.

Time

The Time factor was cited by four nurses from different departments. However, this was never regarded as having negative consequences in relation to SOPS behaviour. It was found that Time was

not an issue, as several nurses stated that the work pressure was healthy. In other words, it is established that sufficient time is available in addition to the patient's care time to deal with operational failures. This is contrary to what has been claimed in the proposition generation.

This is confirmed by ON1 and ON3. ON6 goes one step further by clarifying that, even when there is a tight schedule, time is made.

ON1: *"Time is no factor in not reporting something or not tackling something."*

ON3: *"Time is not an issue, I think we certainly have ample time to get to the bottom of things."*

ON6: *"Usually we have plenty of time for it, and if we don't, I will make time for it, even if it means I'll need to stay 10 minutes longer."*

Team Composition

Two nurses from different departments state the importance of a good and balanced team composition with regard to the problem-solving behaviour. However, it must be questioned to what extent the composition of the team has a direct influence on the problem-solving behaviour. It is the opinion of the researcher that a balanced composition is more likely to have a positive effect on the psychological safety and worker's motivation, thus indirectly influencing problem-solving behaviour. For the sake of completeness, this is enclosed, with ON1 and ON3 respectively saying the following:

"The team is well balanced in terms of age. This has a positive effect is young can learn from old and vice versa."

"I also think that our team has a good composition because there is balance. The older nurses can learn from the younger ones in terms of ICT, while the older nurses have a lot more experience and maturity."

Culture

As the culture of the different departments is remarkably different, a distinction is made in the analysis. First, the culture is analysed in the department where the team leader was not interviewed. Only one out of three nurses interviewed in this department mentioned culture to be important. In addition, a negative effect of the current culture on the psychological safety and thus SOPS behaviour was observed. This was confirmed by ON2:

"I do not say anything to some colleagues when there is a problem, because I am usually snapped at."

This is also supported by the answer of ON2 to the question what would have to change in order to have a positive effect on the department's problem-solving behaviour:

"I would bring everyone together and communicate well. In addition, I would fire a lot of people in this case."

In the other departments, Culture was mentioned two out of three times as being an important driver and advantageous to SOPS behaviour. ON1 summarizes the importance of Culture in the following quote:

"In our team, there is a give and take atmosphere. When there is an atmosphere like this, things go well and problems can come up for discussion."

Personal Motivation

As in UHG, the presence of a critical attitude was often attributed to Personal Motivation. This will contribute to the SOPS behaviour. This will act as a catalyst in conjunction with the aforementioned drivers.

LEADERSHIP ANALYSIS

The questionnaire and interview is included in Appendix 1 are used to determine the leadership style of the team leader. Often, a mixture of several styles will be used. The average scores of the questionnaire are plotted in Table 10.

Table 10: Questionnaire Response OHN1

Leadership Style	Average Score (/5)
Transactional Leadership	4.5
Transformational Leadership	4.25
Servant Leadership	4.57
Coaching Leadership	3.92
Authentic Leadership	4.67

According to the questionnaire, the most prominent Leadership style used by OHN1 is Authentic Leadership, closely followed by Servant and Transactional Leadership. When analysing the interview

however, a mix of all types is noticed. Several characteristics are noticed linked to Coaching Leadership, as well as Servant and Transactional Leadership.

A typical Transactional characteristic cited by OHN1, is the knowledge and technical expertise in the field. OHN1 cites this as a personal strength. The importance of an open attitude and a good listener is also emphasized on. A leader whose attitude invites rather than frightens people into conversation. This is a characteristic of a Servant Leader. In addition, OHN1 uses Appreciative Inquiry instead of the classical performance reviews. This technique aims to envision the future by way of asking questions to create a positive relationship and build on the potential of an employee. This can be linked with feedforward communication and is a characteristic of Servant Leadership.

Next to the aforementioned Leadership styles, OHN1 uses characteristics as Empowerment, Conflict Management and acting as a Mediator to fulfil the tasks as leader. This can be linked to Coaching Leadership. The quotes below illustrate this.

When talking about the different teams, OHN1 notices:

"It is a team that is used to working independently. I do not have to give many instructions there."

This is also confirmed by nurses ON1 and ON6, both part of that team. In the event of a dispute between two workers, OHN1 deals with this very systematically, using the five different forms of conflict management. It is always explained and effectively communicated with both parties what is going on. This, in turn, is a sign of Servant Leadership. Finally, OHN1 often acts as a mediator, even when decisions are made that er not immediately supported by the nurses. There is room for discussion, including listening to the opinion of nurses. OHN1 will not stubbornly hold on to a particular opinion if sufficient evidence has been provided that the opposite is true. This is illustrated with following quote:

"They should not simply do something I say they do not support. I want to know why they do not think that is a good idea and, above all, I think they should substantiate their opinion with data and evidence."

To summarize, the most prominent leadership style, in both questionnaire and interview, is **Coaching Leadership**. OHN1 acts as a moderator when managing conflicts, is critical and capable of solving complex problems. In addition, a certain amount of autonomy and empowerment is given to the group, which is a clear characteristic of Coaching Leadership. The head nurse will always listen to the solutions and possibilities coming from the group and keep them in mind when making decisions.

LEAN ANALYSIS

The aforementioned studies of Gemmel et al. (2018) and Bijl et al. (2019) will be kept in mind when analysing the extent of Lean in BZIO. As already stated, Lean is supported and used to aa large extent in BZIO. Several Lean tools are used, such as Hansei and the safety cross. These tools are perceived by nurses as positive for problem-solving behaviour. When asked whether the nurses were aware of Lean, three out of the six nurses interviewed answered yes. This is a big difference with UHG.

Bijl et al. (2019) noticed seven Lean leadership practices in a nursing ward setting. They found that Lean leadership has a positive effect on SOPS. These practices were also questioned during the interview with the team leader.

1. Convincing and setting an example: not applicable, as no real Lean program is initiated. However, the leaders convince nurses to participate in Lean tools as Hansei and the safety cross.
2. Unlocking individual and team potential: by means of Appreciative Inquiry, the strong characteristics of employees are used to build on, exploiting their full potential.
3. Solving problems systematically: FONA's are expected to be drawn up in case of incidents and near misses. Also, Hansei is used to articulate and address possible problems. In addition, the safety cross data is used to perform a root cause analysis, using 5 Why.
4. Enthusing, actively participating and visualising: the team leader emphasizes motivation. This is clarified with following quote: *"My job is to ensure that everyone enjoys coming to work. If anyone comes to work against their thoughts, I go and ask what is wrong."*
5. Developing self-managing teams: as already mentioned in the leadership analysis, emphasis is placed on self-managing teams. This is also illustrated by following quote: *"I play a supportive role. I do not have to hold on to and control everything."*
6. Sensing, as orchestrator, what is needed for change: OHN1 tries to be present on the work floor as much as possible, visiting the work force every day in the morning.
7. Listening, sharing information and appreciating: OHN1 emphasis on the importance of being a good listener, but also communicating to the employees.

It can be deduced from the above that the team leader uses almost all Lean leadership characteristics. This most certainly has a positive effect on the second-order problem-solving behaviour of nurses. The use of Lean is cited by OHN1 as follows:

"The nursing manager has learned us a lot about Lean. We used to work very hard on this, but now we actually use it without overthinking it."

4.3.4 Cross-Hospital Analysis

This section compares the different hospitals in order to identify possible differences and their causes. The percentage of second-order problem-solving occurrences of both hospitals is shown in Chart 7. The numbers are identical to previously displayed charts. It is notable that UHG shows more SOPS behaviour per incident than BZIO.

Chart 7: Percentage Occurrences per Hospital
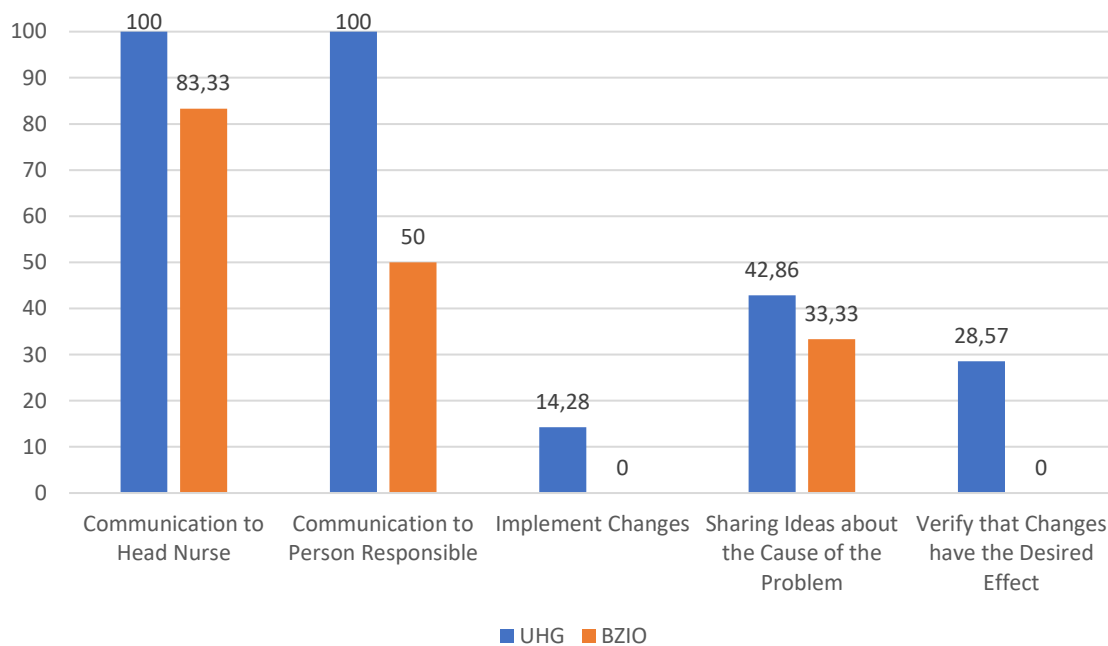
In order to explain this difference, a comparative study is carried out of the various drivers in both hospitals. First, Leadership is analysed. It is cited in both hospitals as the most important factor in problem-solving behaviour. Nevertheless, there is a clear difference, as is apparent from the interviews. The leadership style and characteristics of GHN1 appear to be positively influencing problem-solving behaviour, as is the case with OHN1. Both leaders display characteristics of a Coaching Leader. The leaders are present on the work floor, and an open attitude ensures easy communication. Follow-up of certain problems is ensured, which is of paramount importance for further communication and which is not the case for the team leader of the other department in BZIO. This can be a cause for a reduced display of SOPS behaviour, and in particular communication to the head nurse or team leader, as is also mentioned by a number of nurses from that department.

Secondly, the established platforms and frameworks for reporting incidents and near misses are compared. A similar system is used, with a number of minor differences. The most remarkable

difference is obtaining feedback. In BZIO this is voluntary, whereas in UHG it is done automatically and personally. However both platforms are positive drivers for second-order problem-solving as they offer the opportunity to report operational failures. It is noteworthy that in BZIO several frameworks have been set up for communicating and visualising problems, such as Hansei and the safety cross. Such Lean tools undeniably have a positive effect on SOPS behaviour. Although no framework is created, this also happens at UHG during the work meetings.

Next, the aspect of Time is compared. Interviews with nurses from BZIO show that work pressure is comfortable and there is no shortage of time to report or tackle problems. Time can be a problem in UHG. This is mainly due to the fact that BAS is a day hospital and therefore there are fixed hours for the patients. This problem has already to a large extent been solved by enlargement of the department and thus has a limited to non-existent impact on problem-solving behaviour.

Although this aspect is not included in Tucker's model, Team Composition is cited by both hospitals as an important factor. Similar remarks also apply in both hospitals, in particular that a balanced team with different backgrounds, personalities and ages is desirable.

Culture is also regarded as a very important factor, as it ensures a critical team and psychological safety in part. As is the case with Leadership, there is a significant difference between the two hospitals. Within BZIO there is also a clear difference between the departments. The departments in which OHN1 acts as team leader are in line with the department in UHG, while the other department has an apparently contradictory culture. In the former departments, there is room for communication between nurses, with an openness to comments and a desire to learn. In the latter department, a blame culture exists in which nurses refuse to communicate problems and frustrations to colleagues as a result. This has a negative influence on the SOPS behaviour, and in particular the communication to the person responsible, as this can often be a colleague.

A last similar driver noted in both hospitals is Personal Motivations. This will act as a catalyst in both cases, but will not be further analysed, as nurse characteristics are not included in the interviews and analysis.

Finally, Lean is compared, as this contributes to second-order problem-solving behaviour. Both hospitals were chosen bearing the difference in Lean management adoption in mind. It indeed shows that in BZIO several Lean tools are used. Nurses are also familiar with it. However, analysis shows that both leaders exhibit characteristics of Lean leadership, which, according to the study of Bijl et al. (2019), is beneficial for second-order problem-solving. It should, however, be mentioned that not all leaders of the analysed departments in BZIO were interviewed.

4.4 Conclusions

The proposition of this master's dissertation was expressed in following statement:

In healthcare organisations, problem-solving behaviour of nurses, whether first- or second-order, is driven by a variety of motivational factors, of which the head nurses' leadership style and patient care time are the most prominent.

The results of the empirical research seem to partially confirm this proposition. It can be acknowledged that several factors have an impact on the problem-solving behaviour of nurses. Of these factors, the head nurses' leadership is most prominent, as identified by both hospitals surveyed. It follows from analysis that leadership drives second-order problem-solving behaviour of nurses when certain conditions are met. First of all, an open attitude, with presence on the work floor and lending a listening ear to all employees seem to be leader's characteristics that must not be lacking. In addition, it appears that Coaching leaders strengthen SOPS behaviour by empowering nurses and involving them in decision making. The most important characteristic however of a leader enhancing SOPS behaviour, is the drive to effectively follow up problems, communicate about them and tackle them in depth. If the leader listens to these problems, but does not do any of those things, communication to the leader will decrease and eventually stop.

The second most prominent driver mentioned in the proposition, is patient care time. Although this is mentioned several times during the interviews, it does not appear to have a major influence on problem-solving behaviour. It was expected that patient care time would enhance FOPS behaviour and consequently reduce SOPS behaviour. A limited amount of time can on the one hand lead to quick fixes and workarounds in order to continue patient care, and on the other hand can prevent operational failures from being tackled at the root. Only the former appears to be true, as after a workaround, nurses tend to make time to tackle or at least communicate about the problem.

Besides leadership, the team culture has a major impact on the problem-solving behaviour of nurses. A culture where psychological safety is guaranteed and where nurses are open to giving and receiving constructive feedback is highly beneficial for SOPS behaviour. On the contrary, a blame culture inhibits this behaviour. In addition, it appears that a balanced team composition in terms of age and experience helps to achieve this beneficial team culture. It is also important to mention that platforms and frameworks, such as IML and FONA, encourage SOPS.

The analysis shows that, although both hospitals differ in terms of Lean implementation, this is not reflected in the problem-solving behaviour. This may be due to the fact that both hospitals use

several Lean tools and that characteristics of Lean leadership are identified in both leaders interviewed. In this way, the features of Lean that have an impact on the problem-solving behaviour are somewhat similar at both hospitals.

5. Final Remarks

5.1 Limitations

Firstly, the number of respondents at the departments was rather low. On the one hand, this was due to the tight time schedule in which the interviews had to be conducted. On the other hand, this can be due to the absence of personal benefits when participating in this research. A small number of respondents causes problems in terms of trustworthiness of the results. In addition, the nurses were asked voluntarily to participate in the study. This can also lead to a specific population of respondents who are already thinking critically.

The comparative study was conducted between UHG and BZIO, although the different departments are not easily comparable. An outpatient clinic of UHG was compared to multiple inpatient departments in BZIO. Some elements, such as patient care time, are therefore difficult to compare.

The next limitation can possible impact the accuracy of this dissertation. The interviews with the nurses were only conducted once. This implies that data was collected at a certain moment without any retesting. Consequently, nothing can be said about the consistency of the problem-solving behaviour.

As already mentioned is the external validity of this study very low, because only two hospitals were included. Furthermore, both hospitals are less than 70 kilometres apart, meaning that cultural and national differences are not investigated.

 The use of semi-structured interviews has both advantages and disadvantages with regard to the quality of the results. It preserves the creativity of the answers, but also causes a certain loss of structure. As a result, not all topics were discussed with everyone. This also meant that it was not possible to use scenarios. Therefore, it was assumed that if a nurse mentioned a behaviour in case of a specific operational failure, this behaviour was also applied to other operational failures. If a certain behaviour was noticed more than once with the same interview, it was only counted once, as the behaviour was attributed to the person interviewed rather than to a specific scenario. Also, it was assumed that every problem scenario has an equal chance for causing problem-solving behaviour.

5.2 Recommendations For further Investigation

In case of further research, the abovementioned limitations should be approached. A bigger group of respondents will enhance the trustworthiness of the research. Also, a larger number of departments and hospitals with a more extensive variety in characteristics is desirable. By doing so, statistical generalisation might be possible and higher levels of external validity will be reached. To achieve this, a mathematical model is necessary, enabling the measurement of the impact of several drivers and their combinations.

Additionally, nurses should be encouraged more to participate, by obtaining personal benefits through money or gifts. Besides the interviews, it would be advantageous to use additional ways to obtain information. Questionnaires and observation may be desirable.

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Appendix

1. Protocols Ethic Committee

Since the interviews are conducted in Dutch, the protocols are also drawn up in Dutch.

NURSE QUESTIONS:

De gesprekken met de verpleegkundigen zijn opgesteld om te polsen naar het probleemoplossend gedrag. Enkele vragen worden opgesteld dewelke zullen gesteld worden aan alle geïnterviewde verpleegkundigen. Een deel van het interview zal ook bestaan uit spontane vragen naargelang de evolutie van het gesprek. Dit teneinde de vlotheid en creativiteit van het interview te garanderen waardoor tevens unieke informatie kan verkregen worden. Voor de aanvang van elk interview, wordt telkens een korte uitleg gegeven over de inhoud en het onderzoek, zij het in beperkte mate. Verder volgt een korte kennismaking.

Inleidend:

- Welke opleiding heeft u genoten?
- Hoe lang werkt u hier al?
- Wat motiveert u het meest aan de job?
- Kunt u de sfeer van de dienst omschrijven?

Incidenten:

- Wat betreft operationele incidenten, kunt u een voorbeeld geven van de meest frequent voorkomende problemen? Ook problemen die u zelf heeft meegemaakt en opgelost.
- Hoe heeft u dit probleem opgelost?
- Waarom heeft u op deze manier gehandeld?
- Zijn er stappen ondernomen opdat het probleem niet opnieuw zou voorkomen? Indien ja, welke? Indien nee, waarom niet?
- Wat vindt u het belangrijkste bij het oplossen van deze operationele incidenten?
- Zijn er specifieke incidenten waar u anders handelt dan andere? Indien ja, waarom is er een verschil?

Steeds afhankelijk van het antwoord op de vraag zal al dan niet doorgevraagd worden. Het is van belang dat het gesprek spontaan evolueert op basis van de antwoorden van de geïnterviewde.

HEAD NURSE QUESTIONS:

De hoofdverpleegkundige van de dienst wordt geïnterviewd in verband met de gehanteerde leiderschapsstijl. Bij het opstellen van de vragen, worden de leiderschapsstijlen van Quinn bevraagd,

met name transactioneel, transformationeel, coachend, dienend en authentiek leiderschap. Initieel worden een aantal self-assessment formulieren ingevuld uit het boek Leiders Doen Groeien van Mieke Audenaert (2019) (zie bijlage A). Ook worden specifieke vragen omtrent Lean leadership gehanteerd. Deze vragen zijn opgesteld op basis van het onderzoek van Bijl et al. (2019).

Algemeen:

- Hoe zou u zichzelf beschrijven op professioneel niveau?
- Hoe ziet een typische werkdag eruit? Kan u uw functie als hoofdverpleegkundige omschrijven?
- Welke (al dan niet bedrijfsspecifieke) vaardigheden heeft u nodig om uw job uit te voeren?
- Welke vaardigheden zou u omschrijven als persoonlijke sterktes? Kan u ook uw persoonlijke werkpunten omschrijven?
- Als u iemand slecht nieuws moet brengen/ontslaan, hoe pakt u dit aan?
- Bij een groot meningsverschil tussen u en iemand anders, hoe pakt u dit aan? Maakt u hierbij een verschil tussen een meerdere, een gelijke en een ondergeschikte?
- Hoe lost u een geschil op tussen andere mensen?
- Hoe lost u een operationeel probleem op?
- Wat zijn de grootste problemen die u als leidinggevende ervaart?
- Hoe zou u uw leiderschapsstijl omschrijven in uw huidige functie?
- Is deze stijl veranderd door toenemende ervaring?
- Wat zijn prioriteiten en valkuilen om rekening mee te houden in uw functie?
- Moest u een toekomstige opvolger moeten opleiden, op welke skills zou u dan focussen?

Lean:

- Wordt er gemotiveerd om deel te nemen aan feedback – en verbeteringssessies of projecten voor individuele evolutie gebaseerd op eigen interesses?
- Is er een systematische manier om problemen op te lossen binnen de dienst? Bestaat er een protocol bij het opduiken van een probleem over hoe deze op te lossen?
- Wordt er nadruk gelegd op enthousiasme en motivatie bij het sturen van het team? Maakt men daarnaast gebruik van visualisaties (video's, foto's, …) om uiteenlopende redenen?
- Wordt de verantwoordelijkheid van de verpleegkundigen aangesproken en bevorderd door het stimuleren van leidinggevend gedrag en responsabiliteit?
- Wordt er nagedacht over mogelijke alternatieven en verbeteringen van huidige processen en systemen? Worden er mogelijkheden en middelen voorzien om deze alternatieven en verbeteringen door te voeren?
- Wordt er ruimte ingepland om te luisteren naar eventuele problemen of inspanningen van anderen? Is er bovendien sprake van het delen van informatie over lopende projecten via allerlei manieren? Kan er tot slot gesproken worden van appreciatie vanuit de leidinggevende?

Alvorens het interview van start kan gaan, dient een informatiebrief door elke deelnemer te worden ondertekend. Op die manier wordt de deelnemer op de hoogte gebracht van het onderzoek. Bijkomend kan deze op elk moment van het onderzoek beslissen hiermee op te houden zonder

gevolgen. Het integrale interview zal gepneudonimiseerd worden, waardoor de geïnterviewde niet herkend kan worden.

Uiteraard wordt tijdens het interview rekening gehouden met de geldende maatregelen omtrent Covid-19.

QUESTIONNAIRE HEAD NURSE:

1 = Helemaal oneens; 2 = Oneens; 3 = Noch eens, noch oneens; 4 = Eens; 5 = Helemaal eens

Self-Assessment 1	1	2	3	4	5
Ik maak duidelijk wat mijn medewerkers kunnen verwachten wanneer ze hun doelstellingen bereiken.					
Ik ondersteun mijn medewerkers in ruil voor hun inspanningen.					
Ik druk mijn tevredenheid uit wanneer mijn medewerkers aan mijn verwachtingen voldoen.					
Ik bespreek specifiek wie verantwoordelijk is voor bepaalde doelstellingen.					

Self-Assessment 2	1	2	3	4	5
Ik zorg ervoor dat mijn medewerkers zich goed voelen in mijn bijzijn.					
Ik druk met een paar simpele woorden uit in welke richting we kunnen gaan.					
Ik help mijn medewerkers om op nieuwe manieren over oude problemen te denken.					
Ik help mijn medewerkers om zichzelf te ontwikkelen.					
Mijn medewerkers hebben een compleet vertrouwen in mij.					
Ik schets mijn medewerkers een uitdagend beeld over wat we allemaal kunnen doen.					
Ik verschaf mijn medewerkers een frisse blik op de zaken.					

Ik laat mijn medewerkers mijn mening horen over hoe ze bezig zijn.					
Mijn medewerkers zijn trots om met mij geassocieerd te worden.					
Ik slaag erin mijn medewerkers bestaande ideeën die ervoor nog niet in vraag waren gesteld, te laten herdenken.					
Ik hecht persoonlijk belang aan hoe mijn medewerkers zich voelen.					
Ik geef persoonlijke aandacht aan medewerkers die zich ontmoedigd voelen.					

Self-Assessment 3	1	2	3	4	5
Mijn medewerkers zoeken mijn hulp op als ze een persoonlijk probleem hebben.					
Ik neem de tijd om met mijn medewerkers te praten op een persoonlijk niveau.					
Ik benadruk het belang om iets terug te doen voor de gemeenschap.					
Ik ben betrokken bij activiteiten voor de gemeenschap.					
Ik kan effectief denken bij complexe problemen.					
Ik kan werkproblemen oplossen met nieuwe of creatieve ideeën.					
Ik geef mijn medewerkers de verantwoordelijkheid om belangrijke beslissingen te nemen over hun job.					
Ik moedig mijn medewerkers aan zelf moeilijke, belangrijke werkbeslissingen te nemen.					
Ik maak de loopbaanontwikkeling van mijn medewerkers een prioriteit.					
Ik wil er zeker van zijn dat mijn medewerkers hun carrièredoelen halen.					
Ik stel de belangen van mijn medewerkers voorop.					

	1	2	3	4	5
Ik offer mijn eigen interesses op om aan de behoeften van mijn medewerkers te voldoen.					
Ik ben altijd eerlijk.					
Ik waardeer eerlijkheid meer dan winst.					

Self-Assessment 4	1	2	3	4	5
Ik help mijn medewerkers begrijpen hoe hun objectieven en doelstellingen gerelateerd zijn aan die van de organisatie.					
Ik help mijn medewerkers begrijpen wat het belang is van hun werk binnen de algemene effectiviteit van de organisatie.					
Ik help mijn medewerkers begrijpen hoe hun werk past binnen het groter geheel.					
Ik neem vele beslissingen samen met mijn medewerkers.					
Ik vraag vaak advies aan mijn medewerkers bij strategische beslissingen.					
Ik vraag de mening van mijn medewerkers over beslissingen die een invloed kunnen hebben op hen.					
Ik geloof dat mijn medewerkers veeleisende taken tot een goed einde kunnen brengen.					
Ik heb vertrouwen in het vermogen van mijn medewerkers om te verbeteren, zelfs al maken ze fouten.					
Ik uit mijn vertrouwen in het vermogen van mijn medewerkers om op hoog niveau te presteren.					
Ik laat mijn medewerkers toe zaken op hun eigen manier te doen.					
Ik maak het makkelijker voor mijn medewerkers om hun taak uit te oefenen door de regels en regelgevingen simpel te houden.					
Ik laat mijn medewerkers toe om snel belangrijke beslissingen te nemen, om zo de klant tevreden te houden.					

Self-Assessment 5	1	2	3	4	5
Ik kan mijn drie grootste zwaktepunten opnoemen.					
Ik kan mijn drie grootste sterktepunten opnoemen.					
Ik zoek feedback om beter te begrijpen wie ik ben als persoon.					
Ik accepteer de gevoelens die ik heb over mezelf.					
Mijn acties reflecteren mijn kernwaarden.					
Ik geef niet toe aan groepsdruk.					
Mijn medewerkers weten waar ik sta met betrekking tot controversiële onderwerpen.					
Mijn persoonlijke ethiek bepaalt wat ik doe.					
Ik raadpleeg mijn medewerkers alvorens ik een beslissing neem.					
Ik luister aandachtig naar de ideeën van mijn medewerkers die het niet met mij eens zijn.					
Ik benadruk mijn standpunt niet ten koste van mijn medewerkers.					
Ik deel openlijk mijn gevoelens met mijn medewerkers.					
Ik laat mijn medewerkers weten wie ik echt ben als persoon.					
Naar mijn medewerkers toe doe ik me zelden anders voor dan ik ben.					
Ik geef mijn fouten toe aan mijn medewerkers.					

2. Interview Overview

N°	Date	Hospital	Participants	Time
1	10/12/2020	UH Ghent	GN1	54:21
2	10/12/2020	UH Ghent	GN2	48:45
3	11/12/2020	UH Ghent	GN3	49:45
4	11/12/2020	UH Ghent	GN4	50:44
5	14/12/2020	UH Ghent	GN5	47:06
6	15/12/2020	UH Ghent	GN6	35:02
7	15/12/2020	UH Ghent	GN7	47:19
8	17/12/2020	UH Ghent	GHN1	01:08:05
9	21/12/2020	BZIO Ostend	ON1	48:22
10	21/12/2020	BZIO Ostend	ON2	43:32
11	21/12/2020	BZIO Ostend	ON3	44:58
12	21/12/2020	BZIO Ostend	OHN1	55:37
13	24/12/2020	BZIO Ostend	ON4	40:06
14	24/12/2020	BZIO Ostend	ON5	44:18
15	24/12/2020	BZIO Ostend	ON6	40:22
			TOTAAL	**11:58:22**

3. Transcription Protocol

The transcription protocol is set up using the guidelines of McLellan et al. (2003). An unambiguous method is used for the layout of the transcriptions, as well as the labelling of the participants and the details of transcription.

The layout is always kept the same when writing each interview, in particular: Calibri, 11, left align, with 1-inch margins left, right, top and bottom. An identical template will be used at the top left of each document, stating the following information:

"Participant ID:
Name interview:
Location:
Date of interview:

Interviewer ID:

Transcription by: "

As is prescribed by privacy law, the names of the participants will be encoded in order to ensure the anonymity and reliability of the interviews. The codes leading to the names of the participants will only be known by the researcher and will never be published. The first letter of each code, will be the location of the interview, varying between the letter G in Ghent and the letter O in Ostend. The following letters identify the participant, as the letter N stands for Nurse and the letters HN for Head Nurse. This code will be completed with the number of the interview.

For example, "*GN1*" = "*Interview in UH Ghent, with nurse number 1*"

Further details regarding the transcription are summed up below:

- The recording will be written down word for word, where background sounds will not be copied. However, non-verbal sounds will be copied as they may be of importance when investigating behaviour.
- Fillers ("ok", "euh", "hmm", …) will be transcribed.
- Words or sentences that are repeated will be transcribed, as they may indicate an increased importance.
- Words that are pronounced wrong will be corrected. In other word, cleaning up will be done (McLellan, MacQueen, & Neidig, 2003).
- Silences or pauses of the person speaking are indicated by "…".
- The questions asked are always fully included in the transcription, in bold and italics.
- Names are not included in the transcription but are encoded. Either via coding according to the protocol if these persons are also being interviewed, or via an anonymous coding such as 'Person X' when the person in question is not being interviewed.

4. Approval Ethics Committee UH Ghent

Afz.: Commissie voor Medische Ethiek

Prof. Dr. Paul Gemmel
Vakgroep Marketing, Innovatie en Organisatie - EB23
ALHIER

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Ons kenmerk	Uw kenmerk	datum	pagina
BC-08680	NVT	30/11/2020	1/3

Betreft :

Advies voor monocentrische studie met als titel:

"Problem-solving behaviour of nurses: a case study - Scriptie Miel Herreman"

B.U.N.: nvt

Begeleidende brief 9/10/2020
 Adviesaanvraagformulier 9/10/2020 Ontvangen dd 12/10/2020
 CV 9/10/2020
 Protocol 1 9/10/2020
 Diverse 9/10/2020 goedkeuring dienst UZ Gent + BZIO
 Antwoord onderzoeker dd 13/11/2020 op opmerkingen EC dd 10/11/2020
 Patiënteninformatie- en toestemmingsformulier Versie 2 11/11/2020 (Herwerkte versie n.a.v. opmerkingen EC dd 10/11/2020)

Advies werd gevraagd door: Prof. Dr. Paul Gemmel

BOVENVERMELDE DOCUMENTEN WERDEN DOOR HET ETHISCH COMITÉ BEOORDEELD. ER WERD EEN POSITIEF ADVIES GEGEVEN OVER DIT PROTOCOL OP 17/11/2020 INDIEN DE STUDIE NIET WORDT OPGESTART VOOR 17/11/2021, VERVALT HET ADVIES EN MOET HET PROJECT TERUG INGEDIEND WORDEN.
Vooraleer het onderzoek te starten dient contact te worden genomen met HIRUZ CTU (09/332 05 00).

THE ABOVE MENTIONED DOCUMENTS HAVE BEEN REVIEWED BY THE ETHICS COMMITTEE. A POSITIVE ADVICE WAS GIVEN FOR THIS PROTOCOL ON 17/11/2020 IN CASE THIS STUDY IS NOT STARTED BY 17/11/2021, THIS ADVICE WILL BE NO LONGER VALID AND THE PROJECT MUST BE RESUBMITTED.
Before initiating the study, please contact HIRUZ CTU (09/332 05 00).

DIT ADVIES WORDT OPGENOMEN IN HET VERSLAG VAN DE VERGADERING VAN HET ETHISCH COMITE VAN 17/11/2020.
THIS ADVICE WILL APPEAR IN THE PROCEEDINGS OF THE MEETING OF THE ETHICS COMMITTEE OF 17/11/2020.

° Het Ethisch Comité werkt volgens 'ICH Good Clinical Practice' - regels
° Het Ethisch Comité beklemtoont dat een gunstig advies niet betekent dat het Comité de verantwoordelijkheid voor het onderzoek op zich neemt. Bovendien dient U er over te waken dat Uw mening als betrokken onderzoeker wordt weergegeven in publicaties, rapporten voor de overheid enz., die het resultaat zijn van dit onderzoek.
° In het kader van 'Good Clinical Practice' moet de mogelijkheid bestaan dat het farmaceutisch bedrijf en de autoriteiten inzage krijgen van de originele data. In dit verband dienen de onderzoekers erover te waken dat dit gebeurt zonder schending van de privacy van de proefpersonen.
° Het Ethisch Comité benadrukt dat het de promotor is die garant dient te staan voor de conformiteit van de anderstalige informatie- en toestemmingsformulieren met de nederlandstalige documenten.
° Geen enkele onderzoeker betrokken bij deze studie is lid van het Ethisch Comité.

ALGEMENE DIRECTIE
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* Alle leden van het Ethisch Comité hebben dit project beoordeeld. (De ledenlijst is bijgevoegd)
* The Ethics Committee is organized and operates according to the 'ICH Good Clinical Practice' rules.
* The Ethics Committee stresses that approval of a study does not mean that the Committee accepts responsibility for it. Moreover, please keep in mind that your opinion as investigator is presented in the publications, reports to the government, etc., that are a result of this research.
* In the framework of 'Good Clinical Practice', the pharmaceutical company and the authorities have the right to inspect the original data. The investigators have to assure that the privacy of the subjects is respected.
* The Ethics Committee stresses that it is the responsibility of the promotor to guarantee the conformity of the non-dutch informed consent forms with the dutch documents.
* None of the investigators involved in this study is a member of the Ethics Committee.
* All members of the Ethics Committee have reviewed this project. (The list of the members is enclosed)

Namens het Ethisch Comité / On behalf of the Ethics Committee

Prof. dr. P. Deron
Voorzitter / Chairman

CC: UZ Gent – HIRUZ CTU
      FAGG - Research & Development; Victor Hortaplein 40, postbus 40 1060 Brussel

Ledenlijst 2019-2023:

Voorzitter: Prof.dr. P. DERON (UZG – chirurg, ♂)
Secretaris: Prof.dr. R. PELEMAN (UZG –internist, ♂)

Leden: Prof.dr. mr. T. BALTHAZAR (UG - jurist, ♂)
          Dhr. K. BENHADDOU (menswetenschapper, ♂)
          Prof.dr. W. CEELEN (UZG – chirurg, ♂)
          Prof.dr. J. DECRUYENAERE (UZG – internist, ♂)
          Dhr. C. DEMEESTERE (UZG – verpleegkundige, lic. Medisch sociale wetenschappen, ♂)
          Prof. dr. K. DHONDT (UZG – (kinder)psychiater, ♀)
          Prof.dr. D. DE BACQUER (UG - statisticus, ♂)
          Dr. K. DE GROOTE (UZG – kindercardioloog, ♀)
          Prof.dr. M. De MUYNCK (UZG – fysiotherapeute, ♀)
          Dhr. G. DE SMET (UZG – verpleegkundige, - lic. Medisch sociale wetenschappen ♂)
          Mevr. M. FOUQUET (UZG – verpleegkundige, ♀)
          Dr. L. GOOSSENS (UZG – neonatoloog, ♀)
          Dr. S. JANSSENS (UZG – geneticus, ♀)
          Mevr. K. KINT (UZG – apotheker, ♀)
          Prof.dr. F. MORTIER (UG – moraalfilosoof, ♂)
          Prof.dr. W. NOTEBAERT (UG – psycholoog, ♂)
          Dr. N. PETERS (UZG – fertiliteitsarts, ♀)
          Prof.dr. R. PIERS (UZG - geriater, ♀)
          Prof.dr. R. RUBENS (UZG – endocrinoloog, ♂)
          Prof.dr. P. SCHELSTRAETE (UZG – kinderpneumoloog/infectioloog, ♀)
          Prof.dr. S. STERCKX (moraalfilosoof, ♀)
          Mevr. C. VANCAENEGHEM (patiëntvertegenwoordiger)
          Dhr. B. VANDERHAEGEN (UZG - moraaltheoloog, ♂)
          Prof.dr. W. VAN BIESEN (UZG – nefroloog, ♂)
          Dr. J. VAN ELSEN (huisarts, ♂)
          Dr. G. VAN LANCKER (UZG – klinisch farmacoloog, ♀)
          Prof.dr. K. VAN LIERDE (UG – logopediste, ♀)
          Prof.dr. H. VERSTRAELEN (UZG – Vulva-arts, ♂)

5. Approval Ethics Committee BZIO Ostend

Ingrid Deweert <ingrid.deweert.oostende@gmail.com>
Vr 18/12/2020 13:38
Aan: Miel Herreman; Alain Antierens <Alain.Antierens@bzio.be>; Vanhoorn Sarina <Sarina.Vanhoorn@bzio.be>

Beste ,

hierbij laten wij u weten dat uw onderzoek goedgekeurd is door het Ethisch Comité van het BZIO en dat u met onmiddellijke ingang kan starten.

mvg

Dr Deweert Ingrid
voorzitter EC

Beantwoorden | **Allen beantwoorden** | **Doorsturen**