Patient Safety? Check.

Can a checklist enhance patient safety via the collaboration between doctors and nurses?

Marlon Hartskeerl
Erasmus Universiteit Rotterdam

26-09-2013

Student onderzoeker

Marlon Hartskeerl

Studentnummer 362878

mhartskeerl@hotmail.com

Universiteit

Master Bestuurskunde: Arbeid, Organisatie & Management

Erasmus Universiteit Rotterdam

Begeleidend docent:

Dr. B. S. Kuipers

T 010-4082570

kuipers@fsw.eur.nl

Tweede lezer: Dr. L. Tummers

Opdrachtgever

Havenziekenhuis & Erasmus MC

Leidinggevende:

Prof. Dr. J.F. Lange

j.lange@erasmusmc.nl

Voorwoord

Tijdens mijn scriptie heb ik veel gesprekken mogen voeren met patiënten. In eerste instantie was het alleen mijn vraag of ze misschien mijn enquête over patiëntveiligheid in wilden vullen. Wat volgden waren vaak mooie gesprekken over de zorg, over ambities, over het leven. Anderen hadden het juist over hun pijn en verdriet. Over hoe ze een dierbare verloren waren en nu zelf kwetsbaar in het ziekenhuis lagen. Sommigen gaven aan dat ze zich niet veilig voelde in het ziekenhuis. Echter waren de meeste vol lof. Ze waren blij dat de zorg er was en ze er terecht konden in tijden van (persoonlijke) crisis.

Ik had nooit gedacht dat ik in een ziekenhuis stage zou lopen. Sterker nog, sinds het overlijden van mijn oma wilde ik zo ver mogelijk van ziekenhuizen vandaan blijven. Ik vond het een wereld van verdriet, angst en droefenis. Echter heeft mijn tijd in het Havenziekenhuis en Erasmus MC een andere kant laten zien. Een kant van hoop, vechtlust en zorgzaamheid. Een kant waarin iedere dag hard wordt gewerkt aan de gezondheid van mensen. En terwijl ik altijd dacht dat dit gebeurde in een negatieve sfeer, werd er juist vaak gelachen en waren met name de zorgprofessionals gepassioneerd bezig met het uitoefenen van hun vak.

In de afgelopen zes maanden heb ik de zorgsector dus van een andere kant mogen zien. Hierin heb ik veel geleerd van zowel patiënten alsmede verpleegkundigen en artsen. Daarnaast ben ik met name het Havenziekenhuis dankbaar dat zij mij de vrijheid hebben gegeven om zelfstandig een verandering door te voeren in het zorgproces van hun Chirurgie/Orthopedie afdeling. En hoewel ik nu wel stoer zeg dat ik dit zelfstandig deed, moet ik zeker een aantal personen hartelijk bedanken voor hun wijze raad en adviezen.

Allereerst mijn begeleider Ben Kuipers. Niet alleen omdat hij mij heeft geholpen om de structuur en inhoud van de scriptie te versterken en altijd snel reageerde op mijn vragen, maar ook omdat hij mij heeft gecoacht in mijn bescheiden rol als veranderaar.
Ook wil ik prof Lange en Michiel Vervoort bedanken, omdat zij ondanks hun drukke werkschema altijd snel reageerde op mijn vragen en verzoeken en mij met name in het begin van het traject goed op weg hebben geholpen om de focus te leggen op patiëntveiligheid en de checklist. De contacten van prof. Lange bij het EMC hebben er daarnaast voor gezorgd dat deze scriptie meer inhoud kreeg. Uiteraard wil ik ook alle verpleegkundigen, artsen, medisch specialisten en patiënten bedanken voor hun medewerking aan dit onderzoek. Zeker in het Havenziekenhuis waar ik regelmatig de zorgprofessionals heb benaderd voor de ontwikkeling en het gebruik van de checklist Visitelopen.
In dit dankwoord mogen mijn familie, vrienden en kennissen zeker niet ontbreken. Zij gaven me de rust en het vertrouwen om deze scriptie te schrijven en gaven me weer een lach als ik chagrijnig achter de computer vandaan kwam. Bedankt

Tot slot u als lezer. Ik hoop dat deze scriptie u inspireert, motiveert of op andere wijze tot actie aanzet om vanuit uw eigen expertise naar de zorgsector te kijken. Het is een mooie sector, waarin veel tranen worden gedroogd en glimlachen ontstaan. Het is een sector vol passie en doorzettingsvermogen, maar het heeft ook zeker zijn uitdagingen. Het is een zichtbare sector, één die vaak bekritiseerd wordt. Dit laat zien dat de maatschappij om de zorgsector geeft en dat we met zijn allen de ambitie hebben om deze sector verder te verbeteren. Laten we daarvoor vooral elkaars kennis gebruiken. Door samen te werken ontstaat innovatie. Daarbij moet de veiligheid van de patiënt voorop staan. Patient Safety? Check!

Marlon Hartskeerl
29-10-2013

Summary

Objective: To assess whether a checklist and its implementation in the daily health care process would enhance the collaboration between health care professionals and whether this affects patient safety.

Design, setting and participants: This study conducted an experiment. It used a pre-intervention and post-intervention design with two wards; intervention and control. Both a small hospital (SH) as well as an academic hospital (AH) in the centre of Rotterdam participated in this research. The study included nurses, doctors, medical specialists and patients in all wards. Morning rounds of both wards in the small hospital were observed ten times in total, five times before the intervention and five times after the intervention. In the academic hospital morning rounds in both wards were observed eight times in total. Overall, 40 health care professionals in the small hospital and 28 professionals in the academic hospital participated in the research. The approximate response rate of patients was 57%. Approximate response rate of health care professionals is: nurses (SH: 76%, AH: 22.5%), doctors (SH: 44%; AH: 30%) medical specialists (SH: 25 %; AH 19.5%). Medical students were excluded in this research.

The observations measured the quantity of information that was exchanged between the professionals during their ward round as well as their participation in decision-making. The surveys measured how they perceived their communication, participation in decision-making and empowerment as well as some control variables. Post-intervention measurements also included their satisfaction with the opportunity to participate in change and how often per week they used the checklist. Respondents also answered why they did or did not use the checklist. Patients were asked how they perceived their safety as well as the collaboration between health care professionals.

Intervention: Health care professionals of the stimulus group were asked to participate in the development of the checklist for their ward rounds, by suggesting items that should be discussed during these morning rounds. Also, in a meeting with nurses, the urgency of the checklist as well as how it should be used and where it should be located were discussed. Doctors and medical specialists were asked to structure the suggested items in a logical order.
No intervention was conducted at the academic hospital since it was said that they have already been using a similar checklist since spring 2011 (two years before this study).

Results: Three of the twelve hypotheses were accepted. The checklist was used 14 out of 40 times. It turned out that the academic hospital implemented the checklist but health care professionals did not use it. Due to the checklist, health care professionals exchanged more information during ward rounds, doctors made more decisions, if patients valued the collaboration between professionals high, they also felt safer and if health care professionals were satisfied with the opportunity to participate in change, they also used the checklist more often. Also, usage of the checklist decreased empowerment, while empowerment increased the collaboration between doctors and physicians.

Conclusion: The checklist did not enhance the collaboration between health care professionals. No evidence was found that their collaboration, other than how patients perceived it, increased patient safety. Also, empowering health care professionals to participate in the development of the checklist enhanced the amount in which they used the checklist.

Discussion: The study suggests that a top-down approach should be used to implement checklists, while also making sure that professionals can participate in its development. Also, whereas this study showed that a checklist enhances some effects, it only measured these outcomes two months after the implementation. Longitudinal studies should indicate when effects of a checklist reach their full potential and how long it takes to complete its implementation process.

Index

Introduction

Although the Dutch health care system is stated as one of the best in the world, it is also one of the most expensive. If no action would be taken, the Dutch population would be spending 31% of her national income on health care in 2040 (VWS, 2012). This fact, combined with the ongoing economic crisis, made health care an important topic during the last Dutch election contest. After elections, the government decided to focus on several priorities regarding the nation's health care system:

1. Improve the quality of delivered health care by reducing unnecessary medical actions and improving the measurements concerning the quality of delivered health care.
2. Controlling the increasing health care costs by preventing overtreatment, reducing overcapacity and unnecessary waste.
3. Stimulating collaboration between health care providers.

These priorities, especially the second, suggest that the health care sector should increase its efficiency and effectiveness. These terms are associated with New Public Management (NPM). In their book, Pollitt & Bouckaert (2004) define public management reform by '*deliberate changes to the structure and processes of public sector organizations with the objective of getting them (in some sense) to perform better*' (Pollitt & Bouckaert, 2004: 16). And while they argue that 'better' can be interpreted differently per actor, Kettl (in van de Walle & Hammerschmid, 2011) states that it often includes marketization, service orientation and decentralisation. NPM was introduced in the late 1970s with the perception that it would offer a solution for both the rising costs as well as the criticism that the public sector and its management received from economists and public choice theories (Newman & Lawler, 2009). It was claimed to save money, enhance efficiency and increase the effectiveness of policies (Pollitt & Bouckaert, 2004). Also, Hood (1995) states that the basis of NPM lay in not only lessening/removing differences between the public and private sector, but also in the change of a process oriented accountability to an output oriented accountability.
In health care, NPM is often described as health care reforms. Newman & Lawler (2009) explain that these changes are mainly focussed on four principles: service provision, HRM, quality & safety and management practice. Nurse managers are required to quantify these principles in detail so that performance can be analysed and improved. However, the authors found that the need for increased efficiency also entailed increased bureaucracy and centralized control. Nevertheless, increased efficiency does seem to decrease patient care costs (Weech-Maldonado et al, 2003; Laine et al, 2005). And while this might be true, there is also evidence that suggests the opposite (Adang & Borm, 2009).

But the quality and efficiency of delivered health care is not only important from a financial perspective. In 1999 Kohn et al published 'To err is Human' (Kohn et al., 1999) in which they argued that patient safety has to become the new focus of the health care sector. The report argues that hospitals and other health care companies should measure their amount and types of adverse events and should disclose this information. It also states that these organizations should be obligated to reduce situations in which unnecessary mistakes are made. The authors describe that to err is human, but that it is also in human nature to develop solutions or alternatives.
The report had a huge impact in the health care sector worldwide. In regard with the Netherlands, 'To err is Human' influenced the CBO (Centraal Begeleidingsorgaan)(CBO, 2013) institution to focus on patient safety. This organization was established by the National (Medical) Specialist Society in 1979. Its original goal was to focus on the development of the quality of health care providers. In 1999, it also started focussing on the organizational aspects of the quality in health care. According to the institutions' website however, it was not before 2004 when they initiated their first research regarding adverse events in hospitals (CBO, 2013). This integral research revealed that of the 1.3 million patients that were taken in, 5.7% was in a way damaged during treatment. The report also

showed that 40% of these treatments happened during surgical interventions in which 34% could have been avoided (de Vries et al., 2008;Wagner & de Bruijne, 2007).

International results show that adverse events happen in between 2,9 and 16,6% (Wagner & de Bruijne, 2007). With 5,7% the Netherlands is below average, but the authors state that a lot can be improved as well. To improve the Dutch health sector, KPMG Plexus (Lemmens et al, 2011) published their research concerning new ways of managing safety in health care. They explain that four levels of safety can be distinguished. The higher the level, the less chance there is that an adverse event occurs. The levels are separated by topics such as (implementing) standardization, collaboration, teams and communication. Aspects that, according to academic studies (Gurses et al, 2006; de Witte, 2012; Curley, 1998; Manias & Street, 2001; O'Leary, 2012), influence patient safety.

Integrating efficient and effective *collaboration* in health care is easier said than done. CBO mentions that six out of ten health care professionals state that team performances can be improved by 40 to 60%. TNO (Dutch research institute) argues that this is mainly caused by differentiations between the health care disciplines (van der Kruk, 2009). A theory that is supported by the World Health Organization (WHO, 2009). WHO mentions that both nurses and doctors give different definitions of what good collaboration is about. Nurses state that it is achieved when their input is being respected. Doctors on the other hand argue that good collaboration is when nurses anticipate the doctors needs and follow their instructions.

Several interventions have been tested to reduce the amount of adverse events and increase the collaboration between health care professionals. One of them is a *checklist*. This instrument, while heavily commented in the Dutch health care sector (Oelen, 2012a; Oelen, 2012b), is endorsed and promoted by surgeon Atul Gawande (2011). In his book, the author wonders why it is that experts struggle to master the complexities that they face. In a search to prevent adverse events from happening he reintroduces the checklist and describes several examples in which this '*technique for standardization*' not only cuts the rate of fatalities, but also saves unnecessary expenses. One of them contains the prevention of central line infections. A critical care specialist in Baltimore decided to create a checklist in which he described a few steps that doctors were required to take in order to avoid infections. It included 'wash your hands with soap.' The results were dramatic. Not only did the checklist avoid forty-three infections, it also prevented eight deaths and saved two million dollars in one hospital only (Atul Gawande, 2011). This example explains why checklists might enhance the safety in hospitals. It is also known that checklists might enhance the *collaboration* between physicians and nurses. Especially since it decreases the amount of mis*communications* (Lingard et al, 2008; de Vries et al., 2008; de Witte, 2012).

While Gawande promotes the use of checklists in health care, the Dutch health care system does not seem to welcome the checklist with open arms. In a recent article; health care professors announce that nurses have to fill in too many checklists per day. This results in uncompleted checklists or situations in which health care professionals fill in checklists afterwards. According to a health care professor, this does not create safety, but an appearance of safety (Oelen, 2012a).

Using an instrument such as a checklist from one day to another, is not something that should be underestimated. Not only its creation, but mainly its *implementation* in the daily health care process is not self-evident. It involves a process of change in which health care professionals need to adjust their daily work; their attitudes and behaviour. According to the change management literature, 70% of the changes fail to achieve their actual goal (Boonstra, 2000: 5). Keller & Aiken (2008) explain that this occurs because of the *"thing change managers are trying to transform: employee attitudes and management behaviour"* (Keller & Aiken, 2009: 2). Some authors state that change managers should implement a planned approach in order to succeed (Lewin (1947) in By & Macleod, 2009: 124), while others state that a change process is complex with political struggles and individual perspectives and

see changes through an emergent approach (Weick in By & Macleod, 2009: 118). Nohria & Beer (2000) state that both approaches are most effective when integrated together.

These theories are only a small example of all the change literature that has been published (Amazon.com gives 48,838 results on 'organizational change'). This however did not improve the amount of successful changes. It tends to state that the way in which a checklist is developed and implemented in the daily routine of health care can be a crucial factor in whether health care professionals will use it effectively.

Aims and Research question

- The main goal of this research is to indicate whether patient safety can be improved by increasing the collaboration between health care professionals via the development and implementation of a checklist.

This research focuses on four main variables: patient safety, collaboration between doctors and nurses, a checklist and its implementation in the daily care giving process. To emphasise this focus, the following main question has been defined:

- Does a Checklist and its implementation in the daily process of health care, lead to a better overall collaboration between nurses and doctors and does this relationship influence patient safety?

To answer this main question, three questions have been defined.

- How can a checklist be created and implemented so that health care professionals integrate it into their daily work?
- How does the checklist and its implementation affect the collaboration between doctors and nurses?
- How does the collaboration between doctors and nurses influence patient safety?

Relevance

Earlier, the essence of this research has been defined. The underneath will discuss its relevance.

Society

This report started by mentioning the current state of the health care sector in the Netherlands. Although that the quality appears to be above average, it is said to become too expensive as well. The new government therefore stated costs should be decreased and collaboration improved by introducing new public management elements. These measures involve a focus on marketisation in which health care managers are required to introduce budget and performance management. New health care managers were required to prioritize increased efficiency and effectiveness in order to lower health care costs. And while Weech et al (2003) found that higher quality of care achieves lower patient care costs, Adam & Borm (2007) found that increased health care economic performance does not necessarily entail improved citizen's satisfaction. Also, Newman & Lawler (2009) indicated that some health care reforms caused other than increased bureaucracy, greater levels of anger, decreased commitment and frustration among nurse managers. These consequences are very topical as seen in a health care magazine in which the Dutch minister of health care responds to the increased bureaucracy that nurses experience. She states that checklists, while criticized among nurses, are necessary to deliver qualitative health care (Oelen, 2013). Therefore, it is important to indicate whether the effects of a checklist on health care are positive and why it is that health care professionals value this instrument negatively.

But while checklists are (heavily) criticized by (Dutch) health care professionals, many authors have indicated that it is an important instrument to benefit patient safety. This insight was first introduced in other safety sectors such as aviation and the army (de Vries et al, 2008; Gawande, 2011). Those sectors implemented checklists to prevent errors or adverse events, caused by human actions, to appear. Several researches have indicated that a checklist might be a valuable instrument in the health care sector as well. This research can add results to this accumulation of knowledge, specifically because it is aimed at the Dutch health care sector and aimed at the daily ward rounds. The daily ward round is an important part of the health care industry because it is where patient, doctor and nurse come together to discuss and make decisions about the upcoming 24 hours of health care actions. Weber (2007) therefore stated that the daily ward round can be called the 'central market place of information exchange.' By standardizing the main information that has to be exchanged, communication errors, and possibly adverse events might be prevented. This research gives more insight in this issue and therefore adds to the improvement of the health care sector. It also adds to the research wishes that the RGO (Counsel of the Dutch health care) formulated in 2005 (RGO, 2005).

Scientific relevance
Checklists are a common thing in sectors like aviation and the army, but are still scarce in the health care sector. The effect of standardization in this sector therefore has not been researched as much. Several academic authors (Leonard, 2008; Gurses et al, 2006; Mickan, 2005; Manias & Street, 2001) mention that more research should be done to specify the effects of standardization / a checklist and collaboration. Manias & Street for example recommend to 'further explore nurses' and doctors' activities during the ward round in different types of units…' (Manias & Street, 2001: 449). Leonard et al. (2008) question how their studied institutions can be compared with others, regarding the communication failure and potential impact of the intervention (a checklist).
Furthermore, this study does not only focus on the effect of a checklist. It also measures the effect of the way in which this instrument is implemented. This study therefore describes the complexities that change managers face in changing the health care process. It also explains how a certain change process might be successful or what can be done to enhance its degree of success. Conley et al (2011) state that the effectiveness of safety checklists might vary because it is dependent on the way in which the checklist is implemented. They argue that further research should confirm their findings and reveal additional factors 'supportive of checklist implementation' (Conley et al, 2011: 878)
This research will also give more insight in the relationship between standardization and collaboration so that it might become of value outside the health care sector. It therefore can further accumulate the knowledge in issues regarding collaboration.

Order of reading
This report is divided in several parts. The next chapter, theoretical framework, discusses the literature. It will provide the research with outcomes that, according to theories and earlier researches, will be likely to appear. By using these theories, several hypotheses can be defined that concern the causal inferences between the checklist, collaboration and patient safety.
The third chapter, methods, describes how the variables will be measured. It also describes how the data is collected and statistically analysed.
The fourth and fifth chapter present the results of the study. The fourth tests the hypotheses, while chapter five discusses the intervention.
The sixth chapter concludes the study by answering the research question. It also discusses the topic as well as the limitations of the study.

Chapter 2. Theoretical Framework

This research contains several variables that need further attention in order to be measured in a reliable and valid manner. This chapter will discuss the literature regarding standardization, the collaboration between doctors and nurses combined with patient safety and change management. By discussing these variables, possible outcomes will come around. This chapter therefore will result in several hypotheses.

The main research question of this study is
Does a Checklist and its implementation in the daily process of health care, lead to a better overall collaboration between nurses and doctors and does this relationship influence patient safety?

It states that using, developing and implementing a checklist will enhance collaboration, which will have an effect on patient safety. Figure 1 underneath gives a schematic overview of the main variables for this study.
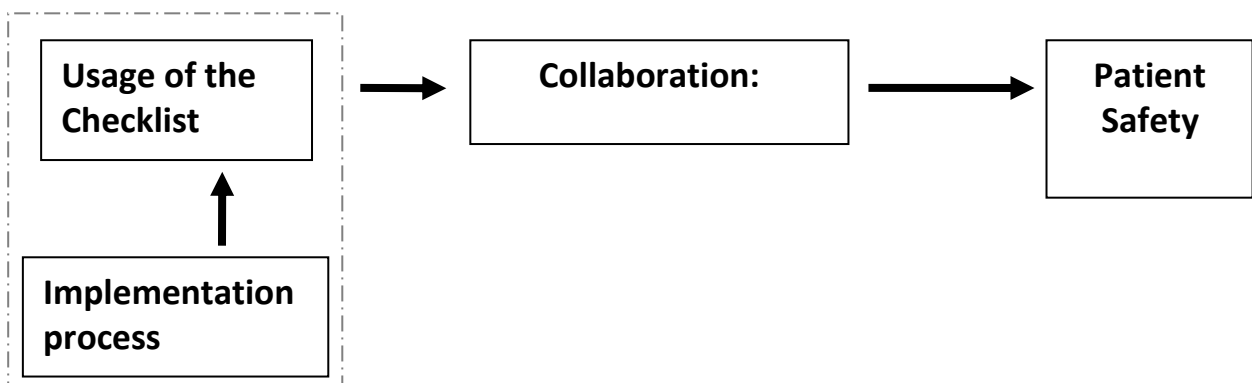

Figure 1: Simplified conceptual model

2.1 Patient Safety

As mentioned before, patient safety nowadays is an important outcome for health care organizations. Kohn et al (1999) estimate that, in the USA, 44,000 to 98,000 people die each year from mistakes. In addition, Pronovost et al (2005) summarise various researches that indicate that adverse events happen with approximately 17% of the patients. Also, self-reports and direct observations at a ICU found 1.7 errors per patient per day. By extrapolating these results to the entire health care of the United States, the authors estimate that 85,000 errors occur per day, *of which 24,650 potentially are life-threatening* (Pronovost et al., 2005; 2).

Regarding the Dutch health care, Wagner et al (2007) state that in 2004 approximately 1735 patients died in what they stated as an outcome that could have been prevented. They also claimed that 5.7% of the in-patients suffer from damage that was either preventable or avoidable. The Dutch institute for research in health care (NIVEL) explains that these numbers, while critical, are reputable in comparison with other countries. However, NIVEL emphasises the fact that there are enough opportunities for improvement (Wagner et al, 2007: 14).

In their search for defining and measuring patient safety, Pronovost et al (2005) define patient safety through *the absence of the potential for, or occurrence of, health care–associated injury to patients. Created by avoiding medical errors as well as taking action to prevent errors from causing injury.* (Pronovost et al, 2005; 3). Medical errors are defined as mistakes that are made in the process of care but result in, or have the potential to result in harm to patients. This can be either caused by the failure of planned actions to be completed or by carrying out a wrong plan. The authors further explain that this can either occur as an error of commission (the action is taken) or omission (the

action is not taken). NIVEL (Dutch institute for researching the health care sector) confirms this definition by stating that preventable is concerned with (the lack of) an action leading to damage, where in avoidable, the damage is caused by the lacking achievement of professional standards. By taking these definitions together the institute defines patient safety as: *the (somewhat) indeficiency of the occurrence that inpatients (might) get physical or emotionally damaged through preventable or avoidable events* (Translated from Wagner, 2007: 71).

2.2 Collaboration

Patient safety is often related to collaboration between health care professionals. Various authors emphasise the importance of collaboration and how it positively affects patient safety (Despins, 2009; Manias & Street, 2000). They conclude that both variables are *'interconnected.'* WHO quotes Schaefer et al. (1994) by saying that 70 to 80% of healthcare errors are caused through human actions. These mistakes are often caused by poor team communication and understanding.

Many authors have written on the subject of collaboration and each has different perceptions on its actual definition. Baggs and Schmitt (in Ellingson, 2002) for example explain that collaboration involves the coordination of individual actions, cooperation in planning and working together and sharing of goals, problem-solving, decision-making and responsibility. It occurs between two same or different disciplines or among small groups with participants who represent a range of disciplines. D'Amour (in San Martin-Rodriguez, 2005) adds that collaboration is built on a *'voluntary basis and necessarily implies negotiation.'* It requires to decline a competitive approach and instead adopt a collaborative environment, both internally as well as to other health care institutions. Authors seem to agree upon the idea that in order to speak of collaboration, there has to be a degree of sharing either knowledge and/or problems and goals. Roschelle and Teasley (in Lai, 2011) define collaboration as a coordinated, synchronous activity that is the result of a continued attempt to construct and maintain a shared conception of a problem. In their definition it is required to have a conception of a problem that all the participants agree upon. Roschelle also defined collaboration as an exercise in convergence. The author states that in order for participants to reach convergence, they are required to construct, monitor and repair shared knowledge. Convergence is also said to occur in an incremental manner (Lai, 2011).
Authors have also discussed the definition of collaboration in a health care environment. In their literature review D'Amour et al. (2005) explain that they found five concepts that were repeatedly used in definitions of collaboration: sharing (values, decisions or health care philosophy), partnership (which demands open and honest communication, trust and respect), interdependency and power (partnership characterized by the simultaneous empowerment of each participant). Furthermore, they underline the idea that collaboration is an evolving process.

Several authors mention that collaboration is not only important for enhancing patient safety. Leever et al (2010) for example argue that the amount of specialisations has grown rapidly and that collaboration is required to deliver qualitative health care. They state that in-patients of today are of a higher complexity and take more time to care and cure. In addition, health care costs are rising, so that hospitals need not only to be focussed on their health care processes, but also on their efficiency. Bolhuis (2002) expands these insights by adding social developments such as patient's education. The author states that due to patient's higher education, they are less easy satisfied. Other developments also contain ethical and juridical issues for example in regard to euthanasia. Emphasising on collaboration might be a solution to these problems. This makes collaboration not a goal on itself, but rather an instrument to achieve certain effects.

Although many studies have researched the benefits of collaboration in health care, it does not appear to be implemented in the sector. And while it is expected that nurses and physicians cooperate in their daily jobs, research suggests the opposite (WHO, 2009; van der Kruk, 2009; CBO, 2013). A possible explanation might be the vertical relationship between doctors and nurses, as

described by the sociology literature (Sweet & Norman, 1995). Doctors, mostly man at the time, had power and were dominant in constructing and maintaining a vertical relationship. Nurses in that time were subordinates. However, Stein (in Sweet & Norman, 1995) argues that this relationship of power was more or less a doctor-nurse game in which the nurse, as a subordinate, would advise the doctor via diagnostic and treatment recommendations in a submissive manner.

In the last decades, the exchange between these professions is said to have grown more horizontal, but most nurses still mention that they are not satisfied with this collaboration. Research indicates that both nurses and doctors are more concerned about their own status and relationships than with the health of patients (Mackay in Sweet & Norman, 1995). Nevertheless, the report also states that small hospitals are considered to have a more valuable collaboration than academic, large hospitals.

Teamwork versus Collaboration

When discussing collaboration, one might be tend to use teamwork and vice versa. And while it might be argued that teamwork and collaboration are synonyms, it must be made clear that the literature often defines both variables differently. O'Leary et al. (2012) define teamwork as *two or more individuals with specified roles interacting adaptively, interdependently, and dynamically toward a shared and common goal.* They thereby argue that teamwork exists through five core components; team leadership, mutual performance monitoring, backup behaviour, adaptability and team orientation. Those concepts are different from the concepts of collaboration by d'Amour (2005) which mainly focus on partnership, communication, shared values and decisions. So while it has some commonalities like partnership and interdependency, teamwork seems to require a leader and a shared goal in which every participant's performance can be mutually monitored, while collaboration requires shared values, negotiations and the simultaneous empowerment of each participant that is based on a voluntary basis.

Defining Collaboration

An example of a definition of collaboration is given by Baggs et al.: *"Nurses and physicians cooperatively working together, sharing responsibilities for solving problems and making decisions to formulate and carry out plans for patient care"* (Leever, 2010: 1). This definition however does not define collaboration in a concrete manner in the sense that it includes the concepts of D'Amour et al. (2005). Conversely, other authors (Henneman et al, 1995) define collaboration by: *'the joint communication and decision-making process with the expressed goal of satisfying the patients' wellness and illness needs while respecting the unique qualities and abilities of each professional.'*

Collaboration and Patient Safety

Besides the idea that both collaboration and patient safety are interconnected (Despins, 2009) other authors also argue that there is a strong relationship between the two variables. Scott Cawiezell & Vogelsmeijer (in WHO, 2009) found that teamwork, including communication and leadership, were all of the essence to enhance a safe environment. The World Health Organization therefore advises to, in order to increase patient safety, gain more knowledge about how teamwork can be developed to ensure a safe care for patients. Vazirani et al (2005) explain that collaboration reduces health care costs and the amount of days that inpatients stay in the hospital, without having any extra negative outcomes. Other authors claim that collaboration improves patient satisfaction as well as the health care outcomes (De Witte, 2012; O'Leary, 2012; Lingard et al. 2008). There is also evidence that team members are more satisfied with their job (Adams &Bond, 2000; Mickan, 2005), which has also been related to quality of care (Ellenbecker,2001 in Caers et al., 2008). These findings suggest that collaboration between health care professionals influence patient safety. This study therefore expected that

● H1.1 If in the perspective of patients the health care professionals collaborate well, patients feel safer.

The definition of collaboration mentioned communication as well as shared decision making and empowerment. Therefore, it was expected that those three variables would influence patient safety.

2.2.1 Communication

In health care, communication is of great importance. The Joint Commission (America's inspection in health care) shows that 70% of all mistakes made in health care are caused by miscommunications (Leonard et al, 2004:85). Miscommunications are therefore considered to be the first cause of adverse events. Furthermore, 75% of these errors result in the patient's death. This research suggests that far too often, professionals tend to have different perceptions on what should be done. The results show that the power of communication is underestimated and can have disastrous effects on health care outcomes.

In a review article, San Martin-Rodriguez et al (2005) sum up three reasons why communications in health care is essential. Firstly, *the development of collaborative practices demand that professionals understand how their work contributes to outcomes and team objectives and know how to communicate the content of this contribution to other professionals* (San Martin-Rodriguez et al, 2005: 142). Secondly, it enhances constructive negotiations with other professionals. Lastly, communication is an instrument in other determinants of collaboration, such as joint decision-making.

One can find many different definitions of communication in the literature. Holzhauer (2006) for example defines this concept as "Communication as social interaction with messages" or "the transmission of information from the brain of one person to the other(s). This transformation is done through messages *(Holzhauer, 2006: 2).*" While true, both definitions do not include why the transmission occurs. Stoter (1997) therefore defines communication by *"a transformation process of information that causes some effect, for example a change in knowledge, attitude or behaviour or in the sense of common creation of meaning or opinion"* (Stoter, 1997: 19).

Hypotheses Communication and Patient Safety
Communication can either be approached in a quantitative or qualitative manner. As was discussed earlier, Leonard et al. (2008) showed that the amount of communication failures decreased due to a checklist. This effect is quantitative since it describes communication as the amount of communication failures. Other authors (Vazirani et al, 2005) speak of the evaluation of collaboration and describe that both nurses and physicians value their communication and shared decision-making differently. This also had an effect on patient safety in that it reduced the length of stay and without any reductions in life or satisfaction. Boyle (in Richardson & Storr, 2010) found that high nurse-perceived nurse/physicians collaboration decreases adverse events. This suggests that one can separate the indicators of collaboration in a quantitative and qualitative element. Therefore, it was expected that:

- H1.2 If health care professionals communicate more with each other, patients feel safer.
- H1.3 If health care professionals value their communication higher, patients feel safer.

2.2.2 Participation in decision-making

The definition of collaboration as earlier discussed, also contained the process of joint decision-making. This expresses the idea that there is a difference between communication and participation in decision-making. This divergence can be explained by the variances in which one can participate. Van Ruler (2004) explains that while communication is mainly concerned about the exchange of information so that everybody gains more knowledge about the issue, participation in decision-making is about consensus-building. Weston (2010) adds by stating that participation in decision

making is the generation of (alternative) decisions, planning of implementations and/or evaluation of results.

D'Amour et al (2005) as well as Henneman et al (1995) state that collaboration is, among other things, based on shared decisions. They emphasise on the equal share in decision-making. Academic studies show that when nurses actively participate in realizing an agreement, it positively benefits the patient outcomes (Krairiksh & Anthony in Weston,2010). Also, while they often have different insights and information, they can generate alternative decisions or criticize decisions of other health care professionals. Their involvement in decision-making positively affects their influence and satisfaction (Weston, 2010; Kim, 2002; Perry, Mesch & Paarlberg, 2006). It also improves the degree of holistic information which enhances improved decision-making (Kirkman & Rosen, 1999). It was expected that

- H1.4 If nurses participate more in the decision-making during ward rounds, patients feel safer.
- H1.5 If health care professionals value their participation in decision making higher, patients feel safer.

2.3 Standardization in Hospitals

As mentioned earlier, the publication of the 'to Err is Human' report made the health sector focus more on (the improvement of) patient safety. The authors recommended that, to achieve this, the health sector should not be on its own (Kohn et al, 1999). Other sectors such as aviation and the army are typical examples of sectors in which safety is a first priority (Gawande, 2011; Thomassen et al, 2011). This means that they have more experience regarding implementing certain interventions to enhance the guarantee for safety so that they can contribute to the improvement of health care processes.

Another recommendation in this report states that more research is needed in order to improve the current state of patient safety. This was not only aimed at the medical science because other sectors like business administration, HRM and communication also started to collect information on how their discipline could contribute to patient safety. This might have helped the technical staff to have more influence in the primary processes of health care.

A last important recommendation of the report states that in order to improve patient safety, health care organizations need to implement clear safety principles. The authors mentioned that this includes the standardization and simplification of medical instruments, supplies and processes.

In the Netherlands, some organizations emphasize the importance of standardization. The Dutch national inspection for health care (IGZ) for example states that there is a lack of uniformity and structural process inside the operating theatre (IGZ, 2008). The inspection also criticizes the passive communication. The expectation of patients that medical specialists will verify and communicate important medical information before operating is often unlikely to be valid. The authority is also concerned about the differentiations in how hospitals communicate. These health care organizations have different habits regarding transfers, procedures, forms and checklists.

In 2007, the IGZ published a report in which the pre-operative processes were mapped. The results clarify that although health care professionals emphasise the essence of standardization, they rarely implement it in their daily work processes. In combination with this, the body again mentions that there is an unacceptable amount of diversity between hospitals when it comes to procedures, forms and completion of a medical file (IGZ, 2007: 12). Therefore, the IGZ emphasises that standardization is an important matter to be considered:

"A lack of standardization in the medical process entails waste of time, professionalism, inefficient education and unnecessary costs through the investment of needless diversity."(IGZ, 2007:7)

2.3.1 Checklist

A way to standardize certain work processes is a checklist. The previous chapter already discussed the potential of this instrument. A certain checklist can reduce the amount of miscommunications, uniform the entire health care process or even reduce the mortality rate (Haynes et al in Herring, Caldwell & Jackson (2011). The checklist however is not self-evident and requires effort to enhance its potential effect. To collect information about the way in which checklists should be developed, Thomassen et al. (2011) interviewed High Reliability Organizations (HRO's) to find best practices regarding this issue. Examples of these organizations are the aviation sector and the army. Those are organizations that support the need for checklists, but emphasise that this instrument should not be seen as a goal, but rather as a resource to achieve a goal. Thomassen et al (2011) explain that in order for a checklist to be successful it has to include:

Length	*For checklist, simplicity and limited length are of the essence. Also, the ABC-formula should be followed (A more important than B etc.)*
Lay-out/design	*Be attentive with fonts and graphics and make sure that the lay-out is adapted to its environment.*
Content	*The content directly relates to its environment and must describe the intended operation exactly.*
Foster resilient communication	*The informant should underline the importance of understanding and communication.*
Revision and validation	*Informants must participate in the content and revisions in order to maintain support and usage of the checklist.*

Table 1: Factors that enhance the success of a checklist (Thomassen et al, 2011)

Definition
The literature does not tend to have a certain definition for a checklist. Looking to the information above, the checklist can be defined as: *A concrete and attentively designed tool made and used by professionals to enhance the use and remembrance of their currently present knowledge.*

2.3.2 Checklists and collaboration

As mentioned earlier, several studies have indicated that a checklist might be beneficial for the collaboration between doctors and nurses. Lingard et al. (2008) for example showed that the usage of a preoperative checklist and a team briefing decreased the amount of communication errors. They conclude by saying that the checklist promoted proactive and collaborative team communication. Also, Herring, Caldwell & Jackson (2011) mention that the introduction of a checklist enhanced active participation from all health care professionals. Furthermore, the checklist, which was developed for the medical ward round, '*reignited'* team work. O'Leary (2012) agrees and states that interventions such as a checklist resulted in an improved interdisciplinary teamwork knowledge and higher rating of teamwork climate. This study therefore defined the following hypotheses in regard to the relationship between a checklist and collaboration.

- *H2.1: A checklist has a positive effect on the amount of communication between doctors and nurses.*
- *H2.2: A checklist has a positive effect on how doctors and nurses value their communication with the other health care professional.*
- *H2.3: A checklist has a positive effect on the amount in which nurses participate in decisions made during ward rounds*

- *H2.4: A checklist has a positive effect on how doctors and nurses value their participation in decision making.*

2.4 Empowerment

The collaboration between health care professionals is not particularly self-evident. However, research suggests that a checklist can enhance the collaboration between nurses and physicians. Richardson et al. (2010) in a qualitative study, found that nurses felt more comfortable in their collaboration with physicians if they used a checklist. It *empowered* them to '*intervene when they observed a physician violating the guidelines*' (Richardson et al., 2010: 8). Therefore, an important determinant that might make the interconnection between a checklist and collaboration evident, is the degree of empowerment. Laschinger et al (2003) found a significant correlation (0.37) between empowerment and collaboration between nurses and doctors. The authors conclude that greater access to workplace environment structures resulted in a positive nurse/physician relationship. D'Amour et al. (2005) argue that partnership is characterised by the simultaneous empowerment of each participant. Nevertheless, research shows that nurses often find it difficult to discuss their work-related problems with doctors (Rao, 2012; Reader et al, 2007). This works against the quality of (open) communication and can obstruct participation in decision-making.

In her article, Gibson (1991) defines empowerment as *"a social process of recognizing, promoting and enhancing peoples' abilities to meet their own needs, solve their own problems and mobilize the necessary resources in order to feel in control of their own lives"* (Gibson, 1991: 359). Empowerment, the author explains, is about helping people control their own lives. It can be viewed as a combination of personal choice and social responsibility, but is difficult to define as a single concept (Spreitzer, 1995). However, it can be differentiated into two separate concepts: psychological (personal) empowerment and environmental (structural) empowerment. This research will mainly focus on the psychological empowerment. Spreitzer (1995) states that psychological empowerment is based upon four elements: meaning, competence, self-determination and impact. Meaning is the value of a work goal and is said to have a positive effect on commitment. Competence is the individuals belief in his or her capability to perform the necessary activities. Self-determination is the sense of choice one has to initiate and regulate actions. Impact is the degree to which an individual can influence the outcomes of work and appears to be connected with high performance and absence of withdrawal in difficult situations (Spreitzer, 1995: 1448).

Empowerment combined with checklists in health care can be interpreted in two ways. The first is described in the previous chapter in which nurses criticized the amount of checklists that they have to use per day (Oelen, 2013). In this case, checklists are perceived as bureaucracy, which is impeding for empowerment (Kuokkanen et al, 2007). Howevervarious authors (Lingard et al, 2008; Herring, Caldwell & Jackson, 2011) view checklists as an instrument that enhances teamwork, for example because nurses with the checklist, felt empowered to interrupt the surgeon when he forgot an action. Rao (2012: 401) summarizes this by: *"Unless nurses feel empowered to act, however, they will rely too heavily on rigid bureaucratic structures rather than their own professional power to guide practice."* Besides, Thomassen et al (2011) in table 1, argue that in order to enhance the usage of a checklist, it is required to empower informants to participate in its development. It was expected that:

- H2.5: Empowerment mediates the effect between the checklist and the collaboration between doctors and nurses.

2.5 Change Management
As has been discussed earlier, by only developing a checklist, one cannot expect that health care professionals will also use the checklist on a day to day basis. By introducing a checklist to the daily health care process, one initiates a change. By introducing a new work process or any other kind of change, it is essential to not only construct the content of the change but also the process and meaning (Steijn & Groeneveld, 2009). In the change literature, it is said that 70% of all changes fail (Boone, 2000: 5). An important reason might be the underestimation of the importance of the change process and meaning by change managers. This research contains an experiment in which a checklist will be created and implemented in the health care process. By discussing the topic of change process and meaning, more knowledge will be gained for the implementation and possible effects of the change process.

In the way Dunphy and Stace (Macleod & By, 2009: 117) observe it, there are a wide variety of approaches to change. The two most popular however, are the planned and emergent approach.

2.6.1 Planned
In planned change, the emphasis is placed on the collaborative nature of the change effort. Various participants of all levels in the organization jointly initiate problem-solving measures. They thereby diagnose what the problem is and '*jointly plan and design the specific changes'* (Burnes in Macleod & By, 2009: 126). Another important author that is often quoted when the planned approach is discussed is Kotter (in Rainey, 2009). In his eight steps of change he explains the determinants that enhance the success of change. His steps include the important of the establishment of an urgency (why should we initiate change), the creation of a powerful guiding coalition and the creation, communication and empowerment to act upon a vision. Also, short-term wins should be created and celebrated. Furthermore, the author argues that improvements should be consolidated and the new approach institutionalized (Rainey, 2009: 408). Conley et al. (2011) confirm these determinants of successful change. In their study to how a checklist can be successfully implemented, they found that it is important to create and communicate the 'why' and 'how.' The why creates the urgency. Hence, it explains to health care professionals why they should work with a checklist, either by discussing the benefits of checklists or why the checklist is consistent with the values of the institution. The how includes consistent real-time coaching and feedback on how nurses and physicians should use the checklist.

2.6.2 Emergent
Advocates of the emergent approach state that change is a continuous, dynamic and contested process emerging in an unpredictable and unplanned manner (Macleod & by, 2009: 118). It is an ongoing adaptation and alterations without intentions to act upon. Because of this, this approach states that change goes rather unnoticed. Emergent change occurs when employees deal with contingencies, breakdowns and opportunities. Furthermore, Hayes (in Burnes, 2004) explains that the emergent approach originates from the idea that key decisions regarding matching the organization's resources with opportunities and demands in the environment evolve over time. These decisions are also the outcome of cultural and political processes in organizations (Burnes, 2004: 889).
Though there is much support for the emergent approach, it also has its drawback from the perspective of NPM (Macleod & by, 2009:118). Firstly, the emergent approach states that change is caused by incremental and unnoticed actions. This diminishes the influence of potential participants. Secondly, the emergent approach advocates the use of power and politics to accomplish change. This entails that this approach became too much focused on the political aspect of change, rather than openly confront and resolve conflict.

2.6.3 Change related participation
Both approaches of change do not seem to guarantee success. The (mostly) intense and hard changes of the planned approach and the incremental changes of the emergent approach seem to have their adverse side-effects. Beer & Nohria (2000) state that although both are separate, they need to be combined in order to build a company that adapts, survives and prospers over the years. To manage this, the authors explain that spontaneity needs to be planned. The top needs to set directions and engage the people from the bottom up.
Including employees in the process of change is believed to enhance positive attitudes towards change. There is evidence that states that participation in decision making during change leads to a higher involvement and overall acceptance towards change (Graham & Verma, 1991 & Coyle-Shapiro, 1999 in Bordia et al, 2004). Employee involvement also reports higher levels of clarity and is said to reduce psychological strain (Bordia et al, 2004).

- *The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on their usage of the checklist.*

Nyhan (2000) quotes Sashkin (1984) who mentions that participative management has positive effects on performance, productivity and employee satisfaction, because it fulfils the three basic human needs: increased autonomy, increased meaningfulness and decreased isolation (Nyhan, 2000: 91). By discussing participative management in the public sector, Nyhan also describes that participative management entails higher trust which reduces the barrier to cooperation. It was expected that:

- *H3.2 The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on the collaboration.*

2.6 Conceptual model
This chapter described the various variables that will be measured in this research. It gave an indication of what, according to the (academic) literature, might be expected to occur. This final paragraph will summarize the above and concludes by summarizing the hypotheses.

Unlike sectors like aviation and the army, standardization has not been popular yet in the health care sector. The 'To err is Human' report changed this by putting more weight on the importance of patient safety. Nowadays, many authors have described the benefits of possible standardization techniques such as the checklist (Herring et al. 2011; Lingard et al. 2008; O'Leary, 2012; de Witte, 2012).

In this research, collaboration will be indicated through communication and participation in decision-making. Communication is said to have an essential role in collaboration since it makes the transmission of information possible (Leonard et al, 2004). Participation in decision-making is also relevant because research shows that mostly doctors make the decisions. If however nurses participate in the decision-making, the patient outcomes will improve (Krairiksh & Anthony, 2001). Empowerment became popular in the eighties, but for the most part has not been related to collaboration. However, it might be an important variable, because it can either be positively or negatively influenced by a checklist. Positively through the concept in which it empowers health care professionals to act and negatively through the perception that counts as bureaucracy and hinders the professionals to act as being powerless (Laschinger et al, 2003; Rao, 2012; Richardson et al., 2010: 8)

Overview of Hypotheses

H1. Collaboration and Patient Safety

• *H1.1 If in the perspective of patients the health care professionals collaborate well, patients feel safer.*

• *H1.2 If health care professionals communicate more with each other, patients feel safer.*

• *H1.3 If nurses participate more in the decision-making during ward rounds, patients feel safer.*

• *H1.4 If health care professionals value their communication higher, patients feel safer.*

• *H1.5 If health care professionals value their participation in decision making higher, patients feel safer.*

•

H2 The effect of the checklist used during ward rounds, on the collaboration between doctors and nurses.

• *H2.1: A checklist has a positive effect on the amount of communication between doctors and nurses.*

• *H2.2: A checklist has a positive effect on how doctors and nurses value their communication with the other health care professional.*

• *H2.3: A checklist has a positive effect on the amount in which nurses participate in decisions made during ward rounds*

• *H2.4: A checklist has a positive effect on how doctors and nurses value their participation in decision making.*

• *H2.5: Empowerment mediates the effect between the checklist and the collaboration between doctors and nurses.*

H3 The change process and Outcomes.

• *H3.1 The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on their usage of the checklist.*

• *H3.2 The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on the collaboration.*

Conceptual Model

The image underneath will clarify the hypotheses in this research in a schematic way.
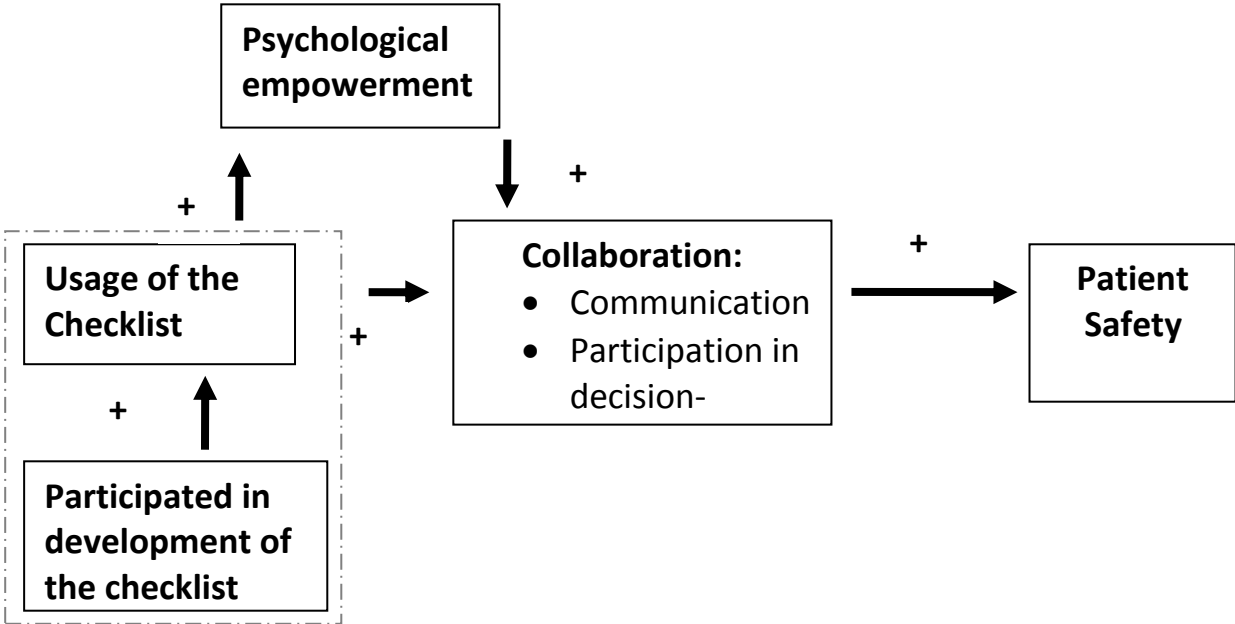

Figure 2: Conceptual Model

Chapter 3. Methods

This chapter will explain how the data was collected and measured. It describes the overall strategy of the research and argues whether certain limitations may reduce the reliability and validity of the study.

3.1 Research strategy

This study wants to indicate whether a checklist and its implementation have a (significant) effect on patient safety via the collaboration between health care professionals. In order to measure whether those variables have an effect, a comparison is made between two groups; a stimulus group and a control group. The stimulus group received the implementation of a checklist, while the researcher did not intervene in the daily health care process of the control group. Both groups were measured twice, five morning rounds before the intervention and five morning rounds after. By doing this, it can be determined whether a (significant) change occurred in the desirable variables that were discussed in the previous chapter. However, in order to measure those variables, certain methods have to be chosen. This study primarily contains observations and surveys. It was also decided to include interviews in the measurement after the intervention for reasons that will be presented later.

The experiment was organized in two wards of a small hospital and two wards of an academic hospital. The researcher only intervened in the small hospital by implementing a checklist at the stimulus group. It was said by several professionals that the academic hospital already had a checklist, but that one ward did not use it while another did. This created the situation that the experiment could have been conducted there as well. However, it appeared that neither ward used the checklist.

The stimulus group (in the small hospital) was a surgical/orthopaedic ward, the control group an internal medicine ward. Health care professionals in both wards were not randomized. Not randomizing the experimental groups entails that the research can be described as an observational research that was conducted in the field rather than in a lab (Druckman et al, 2011). An observational research often limits external validity since it cannot guarantee that the intervention is the cause of predetermined results. Unmeasured variables might have had an influence as well. A randomized assignment would have guaranteed that both groups would have behaved the same had the other group received the intervention. Randomization was not possible in this study.

3.2 Research methods

In both wards, the morning rounds were observed five times in both the measurement before as well as after the intervention. The observations were participative and structured. By participating in ward rounds the researcher had the opportunity to fully engage in the situation. However, it also increased the risk of 'going native' (van Thiel, 2010: 93). This means that the researcher might miss or neglect certain events. This was prevented by using a structured observation which focused the researcher on the predetermined variables only. It enhanced his ability to not only prevent going native, but also to not miss any occurrences that were of interest for the study. The observation scheme that was used in this research was previously used by de Witte (2012), but modified to this study. It included variables that measured communication and participation in decision making and several control variables such as amount, gender and profession of the participating health care professionals. Because de Witte (2012) also used the observation scheme for ward rounds, the scheme fitted the situation so that validity of the study increased.

While observations measured objective data, surveys were included to measure the perception of both patients as well as health care professionals. Patients were asked how they valued their safety and the collaboration between nurses and physicians, while health care professionals were asked

how they valued variables such as communication and participation in decision-making etc. Both surveys included valid scales that were used and validated in previous studies. All were asked to complete a survey in both the situation before the intervention as well as after the intervention. Surveys not only measure the perception of respondents, which was necessary to test certain hypotheses, but are also able to collect data on a lot of variables. However, surveys are often plagued with non-response. To prevent this, the researcher asked the respondents in person to complete the survey. And while patients were told that their survey was anonymous, health care professionals had to fill in their date of birth so that it was clear how many health care professionals completed the survey in both measurements. Health care professionals were guaranteed that their answers would not be communicated or given to anyone other than the researcher.

The last method that was included in this study is the interview. Interviews measure qualitative data and are often used to study motives and indicate why certain (statistical) results occur. In combination with surveys, which mainly measure quantitative, statistical data, interviews can offer holistic information on a certain issue.

The researcher conducted 26 interviews in the post intervention measurement to question health care professionals why they did or did not use the checklist. These interviews took place immediately after ward rounds of the stimulus group and the wards rounds in both wards of the academic hospital. Twelve interviews were conducted at the small hospital, 14 at the academic hospital (more details about the respondents can be found in chapter 5).

Interviews are said to be completely reliant on the researcher since he or she interprets the answers. By preparing and structuring the interview, a researcher can prevent to completely include his own interpretation to the answers. Interviews in this research only contained one question to which the answers were immediately written down. Also, both (ward) doctors as well as nurses and medical specialists have been asked why they did or did not use the checklist. This increased both the variance and amount of answers.

3.3 Sample and data collection

The study was conducted on four units in two hospitals. Both hospitals are stated in the centre of Rotterdam city. The small hospital had a capacity of 260 beds and around 506,4 fte. in 2011. The academic had a capacity of 1320 beds and 8836,2 fte. in 2012.

The subjects of the small hospital were junior doctors and nurses of the Surgical/Orthopaedic (SO) ward (this hospital combined the two specializations in one ward) and contained 26 beds, while the Internal Medicine (IM) ward had 19 beds. The SO-unit served as the stimulus group. Both wards have seven medical specialists and eight (mostly young) ward doctors who are also studying to become a specialist. The IM-ward has 17 nurses, the SO-ward 24 nurses. This composition did not change during the course of the study, with few exceptions.

The academic hospital included two Surgical wards, south and centre, with both 34 beds. The south ward had 22 medical specialists, 5 doctors and 43 nurses, the centre ward had eight medical specialists, 5 doctors and 37 nurses. At first, the south wing served as the intervention unit while the centre wing was the control group, but it became clear that neither ward used the checklist. Therefore, both groups were treated the same.

	Small Hospital		Academic Hospital	
Intervention	SO-ward	IM-ward	South ward	Centre Ward
Beds	26	19	34	34
Nurses	24	17	43	37
Medical Specialists	7	7	22	8
(Ward) doctors	8	8	x	x
Observations	Pre & Post Intervention	Pre & Post	Post	Post
Surveys	Pre & Post	Pre & Post	Post	Post
Interviews	Post	Post	Post	Post

Table 2: Characteristics of the hospitals

Data were collected in two phases. The first measurement took place between the 6th and 24th of May, the second measurement was conducted between the 8th and 19th of July. The ward rounds of both the Surgical and Internal Medicine were observed five times and every medical specialist, unit doctor or nurse seen in or around the time of the ward round was asked in person to fill in a survey. All health care professionals that were asked to fill in the questionnaire collaborated and gave their input. A side note must be made that most medical specialists, in some cases doctors as well, were not present on the ward very often. To measure whether they filled in the survey in both before and after the intervention, respondents were asked to fill in their date of birth. Due to non-response, the figure shows the minimal amount of respondents who completed the survey in both measurements.

	Stimulus Group				Control Group			
Intervention	Pre M		Post M	SD	Pre M	SD	Post M	SD
Gender (% men/women)	19/81		9/91		22/78		22/78	
Age	32.75	9.24	32.58	9.96	42.93	10.31	41.63	9.99
Work hours (per week)	31.50	12.87	33.82	11.97	30.05	11.00	33.50	11.35
Experience in current profession (in years)	7	7.88	7.09	8.10	14.58	10.51	12.61	9.03
Current profession:								
Nurse	16 (67%)		16 (67%)		16 (94%)		13 (76%)	
Doctor	5 (62,5%)		4(50%)		2 (25%)		3 (37,5%)	
Medical Specialist	2 (29%)		2(29%)		1 (14%)		2(29%)	
Work experience on current ward	4.19	4.20	4.24	3.43	8.32	6.18	10.28	11.12
N	25		22		19		18	
N that filled in the survey in both pre and post measurement			13				10	
Amount of the patients that filled in the survey	15/25 (60%)		16/30 (53%)		22/40 (55%)		13/23 (56,5%)	

Table 3: Descriptive results on the individual level of the small hospital

Table 3 shows several control variables that were measured during the study. It also contains the response rate of the health care professionals and patients. T-tests show that within the ward, the respondents did not significantly differ. However, between groups, the stimulus group significantly differed from the control group on the experience on the current ward, experience in current profession and age.

The table also describes that in the small hospital, doctors and medical specialists are less represented than nurses. In addition, most respondents are women, moderately experienced and between the age of 32 and 43.

In the academic hospital, only the health care professionals that participated in ward rounds were asked, immediately after the ward round to fill in a survey. This partly explains the low response rate of both nurses and medical specialists. The main reason for excluding other health care professionals, mainly nurses, was that they had no to less experience with communicating with medical specialists or junior doctors. Also, only senior nurses were mainly allowed to participate in ward rounds (although sometimes a junior nurse participated and also received a survey). Thirdly, as it turned out that no health care professional seemed to use the checklist, the researcher decided to only focus on the collaboration and its effect on patient safety during ward rounds.

Post intervention	South	Centre
Nurses	10 (23%)	8 (22%)
Nurse Practitioners	2	x
Doctors	1 (20%)	2 (40%)
Medical specialists	3 (14%)	2 (25%)
Age M/SD 1= 18-24 2=25-34 3=35-44 etc.	2.44/1.31 (mostly, between the age of 25-34)	3/1.414 (mostly, between the age of 35-44)
Work experience in current profession (in years, Mean/SD	9/11	7/6,5
Work years in current ward (Mean/SD)	6.69/8.55	9,5/8.20
Work hours per week	35/8.2	40/16.47
Gender (% men/women)	25/75	33,3/66.6
Total amount of respondents	16	12
Inpatients response	21/37 (56,8%)	21/37 (56,8%)

Table 4: Descriptive results on the individual level of the academic hospital

Table four shows that in the academic hospital, nurses are represented more than doctors and medical specialists, but this is only in the amount of completed surveys (note that the wards have more nurses than doctors and medical specialists). The age of health care professionals is the same as in the small hospital (30-38), as well as the amount of women in comparison to the amount of men. Respondents of the academic hospital are moderately experienced and mostly full-timers.

3.4 Context
In the small hospital, the ward rounds of both groups always included two participants, a junior (unit) doctor and a nurse. During the ward round, the nurses relieved each other, depending on the in-patients they were responsible for. For the surgical ward it was said that a medical specialist would participate in the ward rounds on a daily basis, but this was not always the case. Two medical specialists usually participated on respectively Wednesdays and Thursdays. Other medical specialists did not always participate in ward rounds. They either had no patients or visited them on a different

time. Two medical specialists of the internal medicine ward participated two times per week. The other medical specialists rarely participated in ward rounds.

The academic hospital usually included more health care professionals in their ward rounds. Both wings (south and centre) had at the least a nurse, junior doctor and medical specialist (mostly two or more, especially in so called 'grote artsenvisites' (large ward rounds in which more medical specialists participated to discuss complex patients). Medical students also participated in most ward rounds, as well as nurse practitioners although they participated less frequent. Medical students were excluded in this research.

3.5 Operationalization

This paragraph describes how the indicators, as described in chapter 2, were measured. This is done by using the three steps as described in Van Thiel (2010). In this, the first step is to define the indicator. This simplifies the indicator and makes it more concrete. The next step includes the way in which the indicator can be measured. This for example includes the questionnaire items. The last step is about the value of the variables. This also includes the method that should be used to measure the indicators since certain methods can only take on certain values.

Indicators	Definition	Variables	Methods
Patient Safety	the (somewhat) indeficiency of the occurrence that inpatients (might) get physical or emotionally damaged through preventable or avoidable events	Patient safety was measured by presenting certain statements to patients. These statements were developed by NIVEL (Dutch institution for research in health care) The following items were presented: 1. Employees of this ward have enough attention for unsafe situations. 2. During the moment that medicines are handed over, employees check whether or not the medicine is for me, for example by asking my name or date of birth. 3. When I ask for help (by using an alarm) I get help as quickly as I want it to. 4. Before treatment, health care professionals always ask my name and date of birth. 5. Employees of this ward have enough attention for making sure that accidents do not occur. 6. With employees on this ward, I feel safe. 7. During your treatment in this hospital, did you have any of the following occurings: - Did you fall? - Did you have any form of decubitus - Did you experience any	Survey Answer possibilities were based on a 5-point Likert-scale. 1 being strongly disagree and 5 being strongly agree. Question seven had the answer possibilities 'yes' or 'no.'

		mistakes concerning your medicines. - Did you have any wound infections? - Did you any complication because of a treatment. Patients were also asked what they thought about the collaboration between doctors and nurses. The following questions were concerned with this topic: 1. The synchronization between doctors and nurses is not a problem. 2. The doctors give me clear and complete information 3. The nurses give me clear and complete information 4. I am satisfied with the transmission of information between the health care professionals (for example between doctor and nurse) 5. Thinking about this mornings' ward round, I am satisfied with the way the health care professionals communicated with me. 6. Thinking about this mornings' ward round, I see a team that collaborates properly.	Answer possibilites were based on a 5-point Likert-scale. 1 being strongly disagree and 5 being strongly agree.
Empowerment	Empowerment, according to the literature, is difficult to define. Gibson describes it as: A social process of recognizing, promoting and enhancing peoples' abilities to meet their own needs, solve their own problems and mobilize the necessary resources in order to feel in control of their own lives. (Gibson, 1991: 359)	1. I decide how I do my job. 2. I can decide on my own how to go about doing my work. 3. I have opportunities for independence and freedom in how I do my job 4. My impact on what happens in my ward is large 5. I have a great deal of control over what happens in my ward. 6. I have significant influence over what happens in my ward 7. I am confident about my ability 8. I am self-assured about my capabilities to perform my work. 9. I have mastered the skills necessary for my job 10. The work I do is very important to me 11. My job activities are personally meaningful to me.	Answer possibilities were based on a 5-point Likert-scale. 1 being strongly disagree and 5 being strongly agree. Cronbach Alpha is (.84)

		12. The tasks I do are meaningful to me.	
Collaboration	The joint communication and decision-making process with the expressed goal of satisfying the patients' wellness and illness needs while respecting the unique qualities and abilities of each professional.	Communication Participation in decision making	Observations Survey Survey items of Communication and participation in decision making together have a Cronbach Alpha of (.89)
1. Communication	An either verbal or non-verbal transformation process of information that causes some effect, for example a change in knowledge, attitude or behaviour or in the sense of common creation of meaning or opinion	Communication has been measured through six questionnaire items. These items were published by S. Vazirani, R.D. Hays, M.F. Shapiro en M. Cowan in the article: 'Effect of a Multidisciplinary Intervention on Communication and Collaboration Among Physicians and Nurses' 1. I receive complete information from the other health care discipline. 2. I have good communication with the other health care discipline. 3. I feel certain about the accuracy of information that I receive from the other health care discipline. 4. I collaborate with highly qualitative colleagues. 5. I can easily ask questions to the other health care discipline 6. I have the idea that all my questions are answered properly. 7. I am satisfied with the collaboration between doctors and nurses Communication was also measured by the observations. The following items were part of the observation 1. How often does the nurse give information about the status of the patient 2. How often does the doctor give information about the status of the patient. 3. How often are doctor and	Survey. Answer possibilities were based on a 5-point Likert-scale. Cronbach Alpha (.87) The items were counted each time that they occurred.

		nurse in a dialogue concerning the patient. 4. How often does the doctor ask questions to the nurse about the status of the patient 5. How often does the nurse ask questions to the doctor about the status of the patient. 6. How often does the doctor ask questions to other doctors	
2. Participation in decision-making		1. Both doctors and nurses have their share in decision making 2. Did nurses and doctors cooperate in decisions? 3. Did nurses and doctors plan together before making decisions? 4. Was there open communication between doctors and nurses in making decisions? Observations 1.How many times does the doctor make a decision without discussing with the nurse. 2. How many times does the nurse give his/her opinion about a decision 3. How many times does the doctor ask for the nurse's opinion 4. How many times does the nurse propose a decision.	Answer possibilities were based on a 5-point Likert-scale. 1 being strongly disagree and 5 being strongly agree. Cronbach Alpha (,79) The items were counted each time that they occurred
Participated in the development of the checklist	In the measurement after the checklist was implemented, respondents had to answer whether or not they felt that they had participated in the development of the checklist.	1. The degree in which I had the opportunity to participate in the development of the checklist was:	Answer possibilities were based on a 5-point Likert-scale. 1 being very bad and 5 being very good. 6 I didn't work on this ward during the implementation of the checklist.
Checklist	In the measurement after the checklist was implemented, it was necessary to measure whether or not the health care professionals used the checklist.	Respondents were asked how many times per week, on an average basis, their ward used the checklist How many times did the ward round team use the checklist.	Answer possibilities were: 1 (Never, 2 (1 time per week) 3 (2 times per week) etc. 7 (Don't Know) Observations

3.6 Data Analysis

The data was analysed by using SPSS Statistics 21. In order to analyse the data properly, the results of the patient surveys were aggregated to the team level. This created the possibility to analyse the observations and patient results with each other. The results from the survey , that was handed out to the health care professionals, were not aggregated, but analysed individually so that it was possible to analyse the various variables.

The level of significance was set on 95% for the individual level and 90% (0,1) for the team-level since a limited amount of ward rounds, 28, were observed. Therefore, p needs to be lower than 0,05 on the individual level and 0,1 on the team level in order to be significant (Field, 2009).

The first step in the analysis is the correlation matrix. This matrix defines whether a certain correlation exists between two variables. Correlations can be either positive or negative. Positive indicates that if a certain variables changes, the other changes in the same direction. In a negative correlation, the variables change in opposite ways. Also, correlations are always between 0 and 1. Zero stands for no correlation between the variables, one for a perfect correlation (if one variable changes, the other variable changes in the same amount). The correlation matrix will be presented in the next chapter

The hypotheses that were defined in the previous chapter will be tested via different statistical methods. Hypothesis 2.1 till 2.5 are analysed via an ANOVA-test. This test (analysis of variance) compares group means and indicates whether multiple groups are significantly different from each other. However, ANOVA only states whether there is a difference, it does not indicate which groups differ. Therefore, t-tests were conducted to specify whether the stimulus group differs from the control group (Field,2009). Hypotheses 1.1 till 1.5 as well as hypotheses 3.1 to 3.2 are tested via a regression analysis. This method tests if a certain model (hypothesis) is a better predictor for the dependent variable than its mean. If this test is significant, it can as with correlations either be a positive or negative causal inference. Results from regression analysis also state how much of the dependent variable can be predicted by the model (R^2). Most of these analyses are multiple regression analysis. They also include control variables such as age, work experience, current profession and the ward. By doing this, the dependent variable is first explained through these variables, so that certain independent variables such as communication or the checklist can indicate whether they significantly improve the model. However, due to a low N (amount of respondents / data) it was decided to not always include control variables. This was mainly the case in hypotheses that were tested via data collected from observations. Data from observations has an N of 18 (mornings rounds of the pre-intervention measurement were excluded in order to compare the small hospital with the academic hospital). Field (2009) explains that the ratio of variables to N should be 1 to 5 at the least, but preferably (above) 1 to 10. This entails that control variables are included if N was above 20. Also, they were only included if they had a moderate to high correlation with the dependent variable.

Hypothesis 2.5 states that a mediating relation exists between the independent and dependent variable. Mediating variables explain the effect between the independent and dependent variable. They are usually caused by the independent variable and have a certain effect on the dependent variable (Baron & Kenny, 1986). There are various ways in which one can determine whether a mediating effect exists. This thesis used the Baron & Kenny (1986) test. In this test, three steps are required to execute. The first step is to determine whether the independent variable has a significant effect on the mediating variable. Then, a two-step regression analysis has to be done. The first is an analysis between the independent and dependent variable, the second is an analysis between the mediating variable and the dependent variable.

Chapter 4: Results

Chapter two defined several hypotheses and the third chapter explained how the experiment was conducted and how the data was collected. This chapter will test whether the hypotheses must be accepted or rejected.

4.1 Correlations

This paragraph indicates whether certain variables are correlated. This will first be done for the individual level, the health care professionals. For this analyses, only the measurement results after the intervention and those of the academic hospital are included.

4.1.1 Correlation analyses on the individual level

The analysis is done in a specific order. Firstly, possible correlations between patient safety (dependent variable) and other variables will be analysed. Then the correlations between collaboration and control/mediating variables will be discussed. Again, correlations do not necessarily entail a causal effect.

Patient safety and other variables
There is a significant correlation, with a medium size effect between the amount in which the patients feel safe and the way they value the collaboration between health care professionals (.526 p<.01). Also, the age of patients is correlated (.323 p<.01) with their perception of their safety. In other words, older patients tend to feel safer or patients who feel safe tend to be older.
In general, patients tend to feel less safe in the academic hospital (-.321 p<.01) than at the stimulus group (small hospital) (.252; p<.05).

Collaboration and other variables
The way health care professionals value their participation in decision making is positively correlated with the age of patients (.299 p<.05). This entails that health care professionals perceive their participation in decision making higher if they are discussing an older patient. Also, participation in decision making is highly correlated with communication (.551 p<.01). If health care professionals value their communication high, they also value their participation in decision making high (and vice versa). Furthermore, older health care professionals are more positive about their communication than younger health care professionals(.260 p<.05).
Doctors and medical specialists tend to value their participation in decision making higher than nurses. This is shown in the correlation between current profession and participation in decision making (.316 p<.01).
Collaboration (communication and participation in decision making combined) is correlated with the age of health care professionals (.269 p <.05), with patient's age (.354 p<.01) and the academic hospital (-.322 p<.01, indicating that health care professionals of the academic hospital valued their communication and participation in decision making lower than the small hospital (reference group)).
Finally, there is also a correlation between collaboration and empowerment (.378 p<.05).

The checklist and collaboration

The correlation analysis found a correlation between the amount in which health care professionals state that the checklist is used and their empowerment. This correlation is negative, so that more use of the checklist entails a lesser value of empowerment (-.438; p<.05). Lastly, a correlation exists between the usage of the checklist and the work experience on the current ward (-.373; p<.05). This presumes that health care professionals who have been working on a ward for a longer period of time are less likely to use the checklist.

Almost no correlation was found between the way in which health care employees valued the degree of participation in the development of the checklist and other variables. However, a correlation seems to exist between their satisfaction with the opportunity to participate in change and participation in decision-making (.320 p<.05). Also, if their satisfaction with their participation in change increases, they also state that they use the checklist more often.

Lastly, health care professionals in the academic hospital state that they were not satisfied with the opportunities to participate in the change (-.690 p<.01). The stimulus group of the small hospital however, was (.690 p<.01).

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1. Gender	1,79	,41	-																					
2. Experience on current ward	6,38	6,28	,174	-																				
3. Work hours (per week)	35,30	12,04	-,402**	-,365**	-																			
4. Experience in current profession	9,06	9,07	,105	,505**	-,386**	-																		
5. Age Health care professionals	2,73	1,22	,069	,591**	-,282*	,589**	-																	
6. Current Profession	5,10	2,20	-,363**	-,126	,656**	-,277*	-,001	-																
7. Patient's Gender	1,52	,50	,131	,163	-,271	,139	-,005	-,118	-															
8. Patient's Age	5,21	1,67	-,212	,042	,164	,232	-,048	,262	,262*	-														
9. Current Days in Hospital	1,68	1,17	-,073	,114	-,100	-,031	-,016	-,283	-,190	-,202	-													
10. Patient Safety	3,94	,61	-,257	-,275	,236	,008	-,179	,054	,032	,323**	-,135	-												
11. Patient's perspective on collaboration	3,94	,57	-,218	-,060	,043	,138	-,169	-,191	,000	,018	-,002	,526**	-											
12. Academic hospital	,52	,50	-,160	,061	,156	-,086	-,036	,084	-,197	-,288*	,309**	-,321**	-,255*	-										
13. Stimulus group after intervention	,28	,45	,189	-,225	-,079	-,137	-,149	-,018	,122	,258*	-,212	,252*	,206	-,645**	-									
14. Control Group after intervention	,20	,40	-,020	,165	-,091	,239*	,195	-,075	,108	,071	-,150	,116	,086	-,522**	-,314**	-								
15. Communication	4,09	,65	-,083	,123	,001	,238*	,260*	,082	,060	,271	-,128	-,021	-,068	-,213	-,157	,405**	-							
16. Participation decision making	4,08	,62	-,103	,188	,088	,106	,197	,316**	,087	,411**	-,294*	,167	,140	-,435**	,080	,400**	,551**	-						
17. Job Satisfaction	4,25	,62	-,077	,204	-,019	,138	,183	,162	-,062	-,144	-,166	,057	,112	,026	-,013	-,015	,325**	,111	-					
18. Affective Commitment to change	3,54	,66	,055	,042	-,237	,049	-,079	,002	,224	,299*	-,178	,084	,097	-,117	,059	,068	,249*	,268*	,040	-				
19. Empowerment	3,99	,49	-,053	,238*	-,018	,237*	,162	,113	,085	,190	-,230	-,042	,108	-,043	-,166	,224	,360**	,295*	,452**	,131	-			
20. Collaboration	4,06	,56	-,102	,166	,036	,216	,269*	,189	,084	,354**	-,092	,018	,058	-,322**	-,047	,435**	,944**	,795**	,280*	,288*	,378*	-		
21. Usage of the checklist	2,70	1,84	,158	-,373*	-,054	,146	-,032	,037	-,072	,194	-,345	,339	,373	-,305	,305	.	,153	,143	-,163	,598**	-,438*	,172	-	
22. Satisfied with participation in the development of the checklist	2,83	1,31	,067	-,290	-,075	-,143	,010	,026	,089	-,039	-,363	,359	,267	-,690**	,690**	.	,082	,320*	-,107	,179	-,013	,186	,425*	-

Table 5: Correlation matrix on the individual level. Correlations are significant if p<,05 (*) or p<,01 (**) N on average is 70. For variables 21 & 22 N=30

4.1.2 Correlation analyses on the ward level
The following correlation matrix contains the variables that were measured during the observations. At first, correlations will be discussed that involve patient safety. Next are the correlations between control variables and communication. Last are the liaisons between the checklist and communication.

Patient safety and various variables
According to the correlation matrix, three correlations exist that involve patient safety.
As indicated earlier, there is a correlation between patient safety and the way in which patients view the collaboration between health care professionals. This correlation is positive (.577 p<.05). Also, a negative correlation seems to occur between patient safety and the percentage of doctors in the ward rounds (-.564 p<.01). This presumes that the lesser amount of doctors in a ward round, the more patients feel safe.
Lastly, a correlation is assumed between patient safety and the amount of days (they were when they completed the survey) in the hospital. This liaison is negative, which indicates that the more days patients spend in hospitals, the less safe they feel (-.497; p<.05). This is also the case when looking at patient collaboration. Patients tend to value the collaboration between health care professionals lower when they have been spending more days in the hospital. Again, this is not a causal relation, but indicates that they are correlated.

Collaboration and control variables
Communication during observations was measured via eight items, of which four have been included in the analysis (12-15). The main reason for this was that items such as dialogues between the health care professionals were difficult to measure in a consistent way. Participation in decision making was measured via four items of which all have been included in the analyses (16-19).
A negative correlation was found between the % of female doctors in the ward round and the amount of information that the doctor gave to the nurse (-.610 p<.01). Lastly, the more female doctors in the ward round, the less amount of decisions a doctor will make (-.609; p<.01). However, an important side note here must be made, that also explains that correlations are not causal inferences, is that there often were female medical students during the ward rounds. And while they were excluded In the surveys, they were included in the analyses They only observed and did not intervene or participate in the ward rounds. Lastly, there is a correlation between the amount of doctors in the ward round and the amount of information that is given by a doctor (.572; p<.01).

The Checklist and collaboration
Two correlations seem to occur between the checklist and a variable that measured collaboration. The first one is the amount of information that was given by the nurse. This effect is positive and significant (.683; p<.01). The other is the amount of questions that the doctor asks the nurse, an effect that was also positive (.568; p<.01). The explanation for those occurrences is that when the checklist was used, the nurse would look at the checklist, read an item, communicate the information about that item to the doctor and continue to the next item. If a doctor would use the checklist, he or she would look at the checklist, read an item, ask the nurse about the item and continue to the next item. Also, to put the results into perspective, the amount of questions asked by the doctor and the information given by the nurse have a strong correlation (.913; p<.01). This was due to the fact that if the doctor asked a question the nurse often would answer.

Correlations

	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Patient Safety	3,96	,30	-																		
2. Patient's Gender	58,90	31,30	,099	-																	
3. Patient's Age	5,30	,80	,345	,478*	-																
4. Days in Hospital	1,55	,55	-,497*	-,266	-,406	-															
5. Patient's view on Collaboration	3,96	,27	,577*	,366	,199	-,585*	-														
6. % female nurses	81,37	34,3	,131	,555*	-,007	,264	,022	-													
7. % female doctors	60,19	37,55	,016	,387	,503*	-,385	,181	,043	-												
8. % doctors in ward rounds	60,19	19,01	-,564*	,064	-,367	,121	-,022	-,147	-,319	-											
9. Academic Hospital	,44	,51	-,626**	-,389	-,530*	,593**	-,497*	-,370	-,454	,566*	-										
10. Small Hospital stimulus group after intervention	,28	,46	,478*	,192	,443	-,367	,328	,038	,677**	-,510*	-,555*	-									
11. Checklist_sum	,78	2,18	,392	,115	,309	-,266	,356	,063	,400	-,214	-,328	,591**	-								
12. Nurse informs doctor	23,28	11,09	,269	,091	,187	-,127	,132	,166	,386	-,159	-,272	,652**	,683**	-							
13. Doctors informs nurse	14,56	7,76	,087	,227	-,300	-,030	,222	,347	-,610**	,572*	,068	-,457	-,135	-,137	-						
14. Question doctor to nurse	16,56	8,74	,278	,070	,209	-,184	,191	,047	,442	-,141	-,216	,617**	,568*	,913**	-,223	-					
15. Question nurse to doctor	4,56	2,28	,322	,132	-,061	-,007	,129	,185	-,310	,061	-,174	-,099	,132	,138	,424	,025	-				
16. Doctor makes decision	12,33	3,03	,247	-,168	-,452	-,007	,285	,044	-,609**	,428	,165	-,154	,270	,155	,688**	,019	,457	-			
17. Nurse gives opinion	,72	1,13	,018	,515*	,151	-,354	,171	,252	,372	-,094	-,283	,044	,093	-,121	-,015	-,073	,064	-,195	-		
18. Nurse is asked for her opinion	,39	,50	,412	-,283	-,208	-,113	,201	-,130	-,431	-,111	-,025	,014	-,185	,191	,153	,189	,211	,413	-,214	-	
19. Nurse makes decision	1,56	1,29	,395	-,011	,144	-,368	,066	-,156	,422	-,455	-,395	,614**	,046	,214	-,396	,325	,228	-,245	,152	,101	-

*.Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

Table 6: Correlation matrix on the ward level. (N=18 mornings rounds (Both hospitals , post intervention only)

4.2 Collaboration and Patient Safety

For the analyses in hypothesis H1.1, H1.2 & H1.3, both the observations as well as the results of the patient surveys were aggregated. In this, all variables that were measured during the observations were summed up. Results of the items for the patient survey were calculated to an average per item per day. This entails that the data has 28 cases (days). However, for most analyses only the results of the academic hospital as well as the small hospital after the intervention are included. The measurements that were done before the intervention are excluded. Therefore, N is 17. Hypothesis 1.4 and 1.5 are analysed on the individual level. This entails that N is 39.

H1.1 If in the perspective of patients the health care professionals collaborate well, patients feel safer.

Coefficients[a]					
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
1 (Constant)	1,444	,892		1,620	,125
Patient's view on Collaboration	,635	,225	,577	2,829	,012

a. Dependent Variable: Patient Safety

Table 7: Regression Analysis on Patient Safety and Patient's view on Collaboration (N=18 Observations).

Regression analysis in table 7 show that there is a significant (p = <.05) causal inference between patient safety and the way in which patients value the collaboration between health care professionals (b=.635 SE .225; t(17)= 2.829. It predicted patient safety by 33 % (R^2). The model was not controlled for variables because of the insufficient N.

This analysis only included the surveys at the academic hospital, as well as the surveys taken after the intervention in the small hospital, so that the academic hospital and small hospital can be compared. Due to the significant effect and moderate effect size, **hypothesis 1.1 is accepted**.

H1.2 If health care professionals communicate more with each other, patients feel safer.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,768	,157		23,942	,000
	Question nurse to doctor	,042	,031	,322	1,362	,192
2	(Constant)	3,619	,203		17,869	,000
	Question nurse to doctor	,041	,031	,316	1,347	,198
	Question doctor to nurse	,009	,008	,270	1,154	,266
3	(Constant)	3,625	,211		17,179	,000
	Question nurse to doctor	,043	,033	,331	1,313	,210
	Question doctor to nurse	,014	,021	,395	,646	,529
	Nurse informs doctor	-,004	,017	-,137	-,222	,828
4	(Constant)	3,616	,252		14,364	,000
	Question nurse to doctor	,042	,038	,323	1,121	,282
	Question doctor to nurse	,014	,022	,402	,626	,542
	Nurse informs doctor	-,004	,017	-,139	-,217	,832
	Doctors informs nurse	,001	,011	,021	,072	,944

a. Dependent Variable: Patient Safety

Table 8: Regression Analysis on communication and Patient Safety (N observations= 18 morning rounds days)

Table 8 shows several models in which various variables of the amount of communication are measured. Four models have been designed, each containing a new variable that measured communication. The variables were entered high to low according to their correlation with patient safety. As can be seen in the table, neither variable significantly causes patient safety to change. Also, no item seems to have a moderate to strong effect on patient safety. Therefore**, the hypothesis is rejected.**

H1.3 If nurses participate more in the decision-making during ward rounds, patients feel safer.

		Unstandardized Coefficients		Standardized Coefficients	T	Sig.
Coefficients^a						
Model		B	Std. Error	Beta		
1	(Constant)	3,865	,085		45,588	,000
	Nurse is asked for her opinion	,246	,136	,412	1,809	,089
2	(Constant)	3,745	,109		34,365	,000
	Nurse is asked for her opinion	,225	,130	,376	1,728	,105
	Nurse makes decision	,083	,050	,357	1,640	,122
3	(Constant)	3,452	,326		10,593	,000
	Nurse is asked for her opinion	,161	,146	,270	1,103	,289
	Nurse makes decision	,099	,053	,427	1,853	,085
	Doctor makes decision	,024	,025	,240	,953	,357
4	(Constant)	3,435	,343		10,004	,000
	Nurse is asked for her opinion	,169	,154	,283	1,096	,293
	Nurse makes decision	,097	,056	,417	1,730	,107
	Doctor makes decision	,024	,026	,244	,937	,366
	Nurse gives opinion	,017	,062	,062	,265	,795

a. Dependent Variable: Patient Safety

Table 9: Regression Analysis Participation in decision making and Patient Safety (N=18 morning rounds)

The table shows four tables of regression. As with H1.2, the independent variables were added in such an order that the highest correlation with patient safety was first and the lowest last. The table shows that two variables are significant. If nurses were asked for their opinion, patients felt safer (.246 p<.1). Also, if nurses would make a decision, patients felt (slightly) safer (.099 p<.1). Other variables did not seem to be significant. An ANOVA test shows that the first two models significantly predict patient safety better than its mean (F(1)= 3.274 p<.1; F(2)3.155; p<.1). They predicted patient safety for respectively 17% and 12.6%. However, while two items enhance patient safety, there is not sufficient evidence to suggest that the amount of participation of nurses makes patients feel safer. **Hypothesis 1.3 is rejected.**

H1.4 If health care professionals value their communication higher, patients feel safer.

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,589	,367		9,778	,000
	Academic hospital	-,417	,201	-,320	-2,076	,045
	Patient's Age	,094	,061	,239	1,549	,130
2	(Constant)	4,754	,703		6,765	,000
	Academic hospital	-,530	,203	-,406	-2,614	,013
	Patient's Age	,122	,060	,308	2,016	,052
	Communication	-,305	,159	-,303	-1,920	,063

Coefficients[a]

a. Dependent Variable: Patient Safety

Table 10: Regression Analysis Quality of Communication on Patient Safety. Results are on the individual level (N=39).

Patient safety only correlated with the control variables of the academic hospital and patient's age. When controlling for these variables, patient safety is predicted for 19.7% (R^2). By adding communication, the model slightly increases in significance and predicts patient safety by 27.3 %. However, it has a negative effect on the dependent variable. This effect was significant (-.305 p<.10). This states that the higher the health care professionals value their communication, the lower patient safety. The main reason for this is that the academic hospital and the small hospital significantly differ in patient safety (F 5.182 p<.05). This fact can also be seen in table 11, where the dummy variable Academic hospital, has a negative correlation with patient safety (-.416 p<0.05). Also, the control group significantly (p<.01) differs in their perception of the quality of communication from both wards at the academic hospital (t = 3.366 (south ward) & 3,410 (centre ward). When the academic hospital is excluded from the analysis, the effect of communication decreases immensely: -.059 (p=.708) on patient safety. This effect is still negative (and insignificant), but explains that the academic hospital is responsible for most of the effect.

The hypothesis stated that the effect is positive. The analysis shows that the effect is negative. **The hypothesis must be rejected.**

H1.5 If health care professionals value their participation in decision making higher, patients feel safer.

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,589	,367		9,778	,000
	Academic hospital	-,417	,201	-,320	-2,076	,045
	Patient's Age	,094	,061	,239	1,549	,130
2	(Constant)	4,141	,814		5,090	,000
	Academic hospital	-,481	,219	-,369	-2,198	,035
	Patient's Age	,112	,066	,284	1,711	,096
	Participationdm	-,151	,198	-,137	-,762	,451

a. Dependent Variable: Safety

Table 11: Regression analysis Participation in Decision Making on Patient Safety. Results are on the individual level (N=39).

Participation in decision making does not improve the model that predicts patient safety. Hence, it only increases the model by 1.3%, but this model decreases in significance. Participation in decision making has a negative correlation with patient safety (-.151), but this effect was not significant (p>.1). This indicates that the way health care professionals value their participation in decision making does not improve patient safety. **The hypothesis is rejected**.

4.3 The Checklist and Collaboration
Five hypotheses were defined in which the causal inference between the checklist and collaboration was tested.

Table 14 shows the significant results of the variables that measured collaboration during the observations between the stimulus and control group before and after the intervention. The results show that for the four variables, significant differences occur between the four group means. Note that three of the variables measure communication (information nurse to doctor, information doctor to nurse and question doctor to nurse). Only one out of four variables that measured participation in decision making significantly differed between the groups. However, ANOVA tests do not indicate which groups differ(Field,2009). Therefore, several t-tests have been conducted to test the hypotheses.

ANOVA						
		Sum of Squares	df	Mean Square	F	Sig.
Information nurse to doctor	Between Groups	1129,800	3	376,600	4,782	,015
	Within Groups	1260,000	16	78,750		
	Total	2389,800	19			
Information doctor to nurse	Between Groups	668,400	3	222,800	6,519	,004
	Within Groups	546,800	16	34,175		
	Total	1215,200	19			
Question doctor to nurse	Between Groups	621,350	3	207,117	4,726	,015
	Within Groups	701,200	16	43,825		
	Total	1322,550	19			
Decision by the doctor	Between Groups	214,000	3	71,333	6,605	,004
	Within Groups	172,800	16	10,800		
	Total	386,800	19			

Table 12: ANOVA (significant) results for the comparison between the four groups in the small hospital

H2.1: A checklist has a positive effect on the amount of communication between doctors and nurses.

On average, nurses of the stimulus group gave more information about the patient in the post intervention (M = 34.6 SD 12.80) than before the intervention (M 15.4; SD 5.46). With equal variances assumed, this effect was significant $t(8)=-3.086$, $p < .05$; and represents a large-sized effect r=0.73. Also, the amount of questions asked by the doctor was improved in the post intervention (M= 25 SD 6,51) in comparison with before the intervention (M= 12 SD 5,15). With equal variances assumed, this effect was significant $t(8)= -3.499$, $p < .05$ and has a large-sized effect of r= 0.78. The amount in which the doctor gives information also changed (Before: M 4; SD 2, After M 9; SD 4.47), but this effect was not significant (p = .52). The amount of questions that the nurse asks to the doctor did not change (M difference -2.2). This effect also was not significant (p= .124).

All observational results at the control group were not significant. Nurses, on average, gave less information about the patient (M 17.2; SD 5.9) after the intervention than before (M 21.2 SD 9.3). This effect was not significant $t(8)= 0.812$ p>.05.
Also, Doctors appeared to ask less questions after the intervention (M 11.4 SD 5.85) than before the intervention (M 19,0. SD 8,49). The effect was not significant $t(8)= 1.648$ p >.05. Furthermore, doctors did not take more decisions in the second measurement (M 12.2. SD 4.60) than in the first (M 13.0 SD 2.12).

The results show that the stimulus group improved the amount of communication. Only one of four indicators of communication, amount of questions that the nurse asks to the doctor, did not significantly improve. The doctors significantly both gave more information as well as asked more questions. Also, nurses significantly gave more information. **Hypothesis 2.1 is accepted.**

H2.2: A checklist has a positive effect on how doctors and nurses value their perceptive quality of communication with the other health care professional.

In the stimulus group, the way the health care professionals perceive the quality of their communication did not change. Their communication after the intervention (M 3.942; SD .72) slightly improved compared to the measurement before the intervention (M 3.919; SD .65).
However, the control group did show a significant improvement. Nurses and medical staff valued their communication higher after (M 4.52; SD .34) than before (M 4.16; SD .52) the intervention. With equal variances assumed t(35)=-2.522 p<.05. So while no intervention was implemented, health care professionals of the control group valued their communication higher. **Hypothesis 2.2 is rejected** as the quality of communication did not improve significantly at the stimulus group**.**

H2.3: A checklist has a positive effect on the amount in which nurses participate in decisions made during ward rounds

During the observations, the researcher counted how many times a doctor took a decision during the ward round, but also how many times a nurse would give her opinion, when a doctor asked the nurse for his/her opinion or propose an action. These last three items were considered as (a nurse) participating in decision making. The items were analysed via a t-test between pre and post intervention. Results show that nurses did not significantly participate more after the intervention than before. However, as can be seen in table 14, the results show that doctors took significantly more decisions after the intervention (M 11.6; SD 3.21) than before (M 4.8; SD 2.68). With equal variances assumed t(8)= -3.635 p<.01.

In the control group, there were no significant changes. Doctors of the control group made less decisions before the intervention than afterwards (mean difference .80; t(8)=.353 p>.05).
The hypothesis stated that nurses would participate more in the decisions made during ward rounds. However, according to the test results the opposite seems to be true. Doctors significantly took more decisions after the intervention. **Hypothesis 2.3 is therefore rejected.**

H2.4: A checklist has a positive effect on how doctors and nurses value their participation in decision making.
The intervention did not seem to have an influence in the way how health care professionals value their participation in decision making. With a mean difference of .016 the t-test, t(46)=.095 was not significant (p>.05). The same is true for the control group in which a mean difference of -.276 occurred. Equal variances assumed t(35)= -1.560 was not significant (p > .05).

Due to a low mean difference and insignificant result, **this hypothesis is rejected.**

H2.5: Empowerment mediates the effect between the checklist and the collaboration between doctors and nurses.

According to Baron & Kenny (1986), a mediating effect exists when first a causal inference exists between the independent and mediating effect. Second, it is required that the independent variable has a significant effect on the dependent variable, but that this effect vanishes when the mediating variables is included in the model. Table 15.1 & 15.2 show the results of the analyses.

Regression analysis Dependent Variable: Empowerment	Model 1 Control Variables	Model 2: The Checklist
B	,022	**-,115***
SE	,042	-,043
Standardized	,094	**-,442***
T (p)	,524	-2,708*
F	,275	3,833*
R2	,009	,204

Table 13.1: Regression Analysis usage of the checklist on empowerment. Control variable is 'current profession.' N=33

Table 13.1 shows that the control variable (current profession) does not significantly influence empowerment. However, model 2 shows that the usage of the checklist does influence empowerment negatively. This effect is significant (-.115; p <.05). The table also shows that model 2 is a better predictor for empowerment than model 1 (F = 3.833 (2) .275 (1)) and the usage of the checklist predicts empowerment by 20.4%.

Regression analysis Dependent Variable: Collaboration	Model 1 Control Variables	Model 2: The Checklist	Model 3: Empowerment
B	,048	,046	,327
SE	,044	,049	,204
Standardized	,193	,165	,309
T (p)	1,093	,934	1,601
F	1,194	1,030	1,577
R2	,037	,064	,140

Table 13.2: Regression Analysis. Dependent Variable: Collaboration. Control variable is 'current profession.' N=33

Table 13.2 shows that no model is significant in predicting collaboration. The third model (independent variable is empowerment) is the best predictor for collaboration (F= 1.577; 14% (R^2)). The independent variable, the usage of the checklist, is the worst predictor for collaboration. It also has no significant influence on this dependent variable. Baron & Kenny (1986) state that in order to accept mediating effects, it is required that a direct effect between the independent and dependent variable exist. This entails that the hypothesis cannot be accepted. **H2.5 is rejected.**

4.4 Participation in change

During the change, respondents had the opportunity to participate and develop the checklist. Four hypotheses were defined that include participation in the development of the checklist as an independent variable.

H3.1 The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on their usage of the checklist.

		Coefficients[a]				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,551	,466		7,628	,000
	Experience on current ward	-,128	,059	-,393	-2,181	,038
2	(Constant)	2,006	,867		2,314	,029
	Experience on current ward	-,102	,057	-,315	-1,807	,083
	Satisfied with participation in the development of the checklist	,512	,247	,360	2,067	,049

a. Dependent Variable: Usage of the checklist

Table 14: Regression analysis on the effect of participation in developing the checklist on using the checklist (N=29, individual level, N is lower due to missing values)

The satisfaction that health care professionals have with the opportunity to participate in the development of the checklist predicts using the checklist by 18%. It also has a significant strong effect (.512 p<.5). The F-value (4.815 p<.05) indicates that participation is a better predictor (R² is 27.8%) of the usage of the checklist than the first model, in which a control variable, experience on the current ward is included (F 4.757 p<.05; R² 15.5%). While participation in the development of the change enhanced its use, the amount of experience a health care professionals has on its current ward, does not (-.128 p<.05). These results indicate that the **hypothesis can be accepted**.

H3.2 The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on the collaboration.

		Coefficients[a]				
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,806	,490		7,765	,000
	Current profession	,054	,040	,223	1,359	,182
	Gender	-,054	,216	-,041	-,251	,803
2	(Constant)	3,619	,505		7,163	,000
	Current profession	,052	,040	,214	1,314	,197
	Gender	-,076	,215	-,057	-,353	,726
	Satisfied with participation in the development of the checklist	,085	,064	,211	1,328	,192

a. Dependent Variable: Collaboration

Table 15: Regression analysis of the degree in which professionals were satisfied with the opportunities for participating in the development of the checklist (IV) and collaboration (DV) N=39, individual level

The next table shows that participation in the development of the checklist does not have a significant effect on collaboration. Hence, neither control variable seems to have a significant effect on collaboration. The control variables predict collaboration by 5.6%. By adding participation, this effect increases slightly to 10%. Both models are not significantly better than the mean.

The direct effect between participation and collaboration is .085, but this effect is not significant (p>.05). Those results indicate that the alternative hypothesis cannot be accepted. **H3.2 is rejected.**

4.5 Summary of tests

Hypotheses	Accepted or Rejected
H1.1 If in the perspective of patients the health care professionals collaborate well, patients feel safer.	Accepted
H1.2 If health care professionals communicate more with each other, patients feel safer.	Rejected
H1.3 If nurses participate more in the decision-making during ward rounds, patients feel safer.	Rejected
H1.4 If health care professionals value their communication higher, patients feel safer.	Rejected
H1.5 If health care professionals value their participation in decision making higher, patients feel safer.	Rejected
H2.1: A checklist has a positive effect on the amount of communication between doctors and nurses.	Accepted
H2.2: A checklist has a positive effect on how doctors and nurses value their communication with the other health care professional.	Rejected
H2.3: A checklist has a positive effect on the amount in which nurses participate in decisions made during ward rounds	Rejected
H2.4: A checklist has a positive effect on how doctors and nurses value their participation in decision making.	Rejected
H2.5: Empowerment mediates the effect between the checklist and the collaboration between doctors and nurses.	Rejected
H3.1 The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on their usage of the checklist.	Accepted
H3.2 The satisfaction of health care professionals about the opportunity to participate in the development of the checklist has a positive effect on the collaboration.	Rejected

Figure 3: Overview of hypotheses results

Chapter 5: The Intervention

This chapter describes how the change was conducted, implemented and received by the health care professionals.

5.1 Small Hospital

In the small hospital, the surgical/orthopaedic ward received two treatments: the checklist and the possibility to participate in the development of the checklist. The goal of the checklist was not only to structure the ward rounds, but also to treat patients simultaneously and increase the quality of information shared during the ward rounds.

The implementation started on the 28th of May. Health care professionals of the ward were asked to write down items that they would like to discuss during ward rounds on a large paper sheet that was hung up in the ward room. On the 5th of June, 19 items were written down and discussed during a meeting among nine nurses of the ward. They talked about the urgency of the checklist (no direct urgency), the location of the checklist (same location as the health care files) and how to use the checklist (ABC-formula, read & do, both nurse and doctor were responsible to use the checklist). Health care professionals had the opportunity to give feedback about the content till the 11th of June, the day the checklist was implemented in the daily process. The ward doctors were asked what they thought about the items and in what order they would organize the various items. Both doctors collaborated and gave suggestions about the order of reading. Also, the medical specialists were asked if they had any feedback on the current items and how they thought about the order in which the items should be discussed. Only one replied. It was decided by the researcher to use the suggestions of the ward doctors, because they were the once who always participated in ward rounds, medical specialist were not always present in this event.

It was not until the 13th of June that the first nurse used the checklist in its entirety. This nurse stated that she was enthusiastic in regard to the checklist since it gave her structure and it speeded up her ward round. She was asked to share her experiences with her colleagues in order to promote its use.

On the 17th of June, doctors switched their day/night schedule. The checklist was therefore reintroduced to the new doctors and they were told that some nurses found it an instrument that benefitted their work. Also, team leaders were asked to ask nurses whether they used the checklist and whether they found it helpful during the ward rounds. This mainly took place between the 24th of June and 1st of July. Also during this time, the ward rounds of the small hospital were not observed.

Discuss	Indicators
Physical state of the patient	
Daily Checks	(O2) Saturation, Temperature, Pulse Pressure
Intake + Output	Regimen, Water Balance, Drain, Drip, Production of Urine, Defecation
Pain / Nausea	VAS, night's rest
Consultations	
Wound	
Mobilisation	
(Lab) Results	Lab (blood, urine) + (X-ray, CT-scan, MRI etc.)
Medication	
Schedule	OT, discharge,
Opinion of the nurse	
Administration / Remaining agreements	
Doctors' initials for agreements	

Figure 4:Ward round Checklist (translated from Dutch)

This is an example of the checklist. It has a 'read and do' structure. This entails that health care professionals would read an item in the left column and inform the participating professionals about the current status of that item. The right column has information about what should be communicated, indicators such as saturation or regimen. The checklist is meant to be used per patient and does not require any written 'checks.'

The checklist was implemented by a Taskforce in 2010. The taskforce had members of several disciplines including doctors, medical specialists and nurses, all with an interest in the topic of patient safety. They collected information by asking different wards (including the studied centre and south ward) what should be discussed during ward rounds. One nurse and doctor in particular visited meetings of two test units to promote and test the checklist and to ask the health care professionals to start using the checklist and to give feedback if there were any inconveniences. After this, the checklist was implemented in all collaborating units. According to a quality advisor, the compliance appeared to be good in the beginning. Team leaders promoted the checklist by introducing it in ward rounds, promote it in the newsletter and discuss it in meetings. They also communicated its benefits to the health care professionals and managers participated in meetings in order to enhance the importance and use of the checklist.

5.2 Results of the intervention at the small hospital

As was said earlier, the checklist was first used on the 13th of June by a nurse. The post intervention measurements were one month later. During the measurements, the checklist was used on 14 (out of 40) patients during a time period of five days (0,3,9,1,1). This indicated that the implementation of the checklist might not have been successful. In order to understand this contingency, several health care professionals of the stimulus ward were asked why they did or did not use the checklist. In total, seven nurses, three ward doctors and two medical specialists were questioned. The answers are quantified in table 20.

Certain answers indicated that not using the checklist might have had other reasons. A medical specialist for example answered by mentioning that the checklist was used, not by looking at the checklist, but by discussing the items that were mentioned on it. Due to experience and a structural manner of doing ward rounds, the professional believed that the checklist was used. This was underlined by a ward doctor. She indicated that both medical specialists did not use the checklist, but did discuss the items that are included in this list.
Another medical specialist indicated that he had not yet found the time to implement the checklist in his ward round routine. He mentioned that he was the only medical specialist that day and had to hurry. This was confirmed by the nurse who stated that the ward round was *'very messy.'*

Respondents also gave impressions why they did use the checklist. A ward doctor mentioned that she used the checklist whenever a discussion in the ward round became '*chaotic*.' Also, one of her colleagues [1] mentioned that she used the checklist whenever a patient was more complex. Both used the checklist after the main discussion and checked whether they had forgotten to discuss a certain topic.
Nurses on the other hand used the checklist before the main discussion. They would read a certain topic on the checklist, for example 'main status of the patient' and would inform the other health care professionals about (her view on) this topic. This went on till all relevant topics were discussed. This explains the increase in communication that was discussed in the previous chapter. Health care professionals who used the checklist would often inform their colleague about all items so that more information was transferred between them.

---

[1] This was the same ward doctor who mentioned that the checklist can also be used by not looking on it, but only discuss its items.

Reasons why the checklist was not used	Nurses		Ward doctors		Medical specialists		Total
	SH	AH	SH	AH	SH	AH	
Total respondents	7	5	3	6	2	3	**26 (SH=12)**
Already know the items by heart	1	3	1	1	1	1	**8**
Unfamiliar with the checklist	1	1	-	4	1	1	**8**
Forgot to use the checklist	4		1				**5**
Enhances discussion unnecessary information		1		1		1	**3**
Not enough time	2				1		**3**
Extra bureaucracy				2			**2**
Only handy for young professionals	-		1		1		**2**
Lack of empowerment		1					**1**

Table 20: Reasons why health care professionals did not use the checklist. For both the small (SH) and the academic hospital (AH)

5.3 The academic hospital

The researcher did not intervene in the daily health care process of the academic hospital. Again, it was said that the south ward used the checklist, while the centre ward did not. This would have given the opportunity to compare both wards and indicate whether there existed a difference between them. However, it turned out that neither ward used the checklist. Since this research both studied the effect of a checklist as well as the implementation, health care professionals were asked why they did not use the checklist.

The checklist was implemented by a Taskforce in 2010. The taskforce had members of several disciplines including doctors, medical specialists and nurses, all with an interest in the topic of patient safety. They collected information by asking different wards (including the studied centre and south ward) what should be discussed during ward rounds. One nurse and doctor in particular visited meetings of two test units to promote and test the checklist and to ask the health care professionals to start using the checklist and to give feedback if there were any inconveniences. After this, the checklist was implemented in all collaborating units. According to a quality advisor, the compliance appeared to be good in the beginning. Team leaders promoted the checklist by introducing it in ward rounds, promote it in the newsletter and discuss it in meetings. They also communicated its benefits to the health care professionals and managers participated in meetings in order to enhance the importance and use of the checklist.

Two ward doctors, a medical specialist and three senior nurses were asked separately why they did not use the checklist. One of the nurses, as well as the medical specialist and both doctors revealed that they had never seen the checklist before. When the researcher showed the checklist the doctors and the medical specialist mentioned that they already discussed the items that were on the list. They therefore saw it as an extra burden. One of the doctors said: *'I am under the impression that everyone, due to their education, knows what should be discussed during ward rounds. Furthermore, the items are not in a logical order and are not relevant for all patients. It is some extra bureaucracy. First a preoperative checklist that does not work and now this…'* However, the medical specialist said that such a checklist would be handy in so called large ward rounds, ward rounds in which several medical specialists discuss various patients.

The other nurse, who did know about the checklist, had the opinion that the checklist would be a handy guidebook during ward rounds. However, '*the doctors go their own way, they are a bit stubborn, so it makes no sense to propose that we should use the checklist.*'

The remaining nurse was previously a warden and also a participant in the task force that introduced the checklist. He explained that the checklist was probably not used because of three reasons. 1. alternation of health care professionals during the years; 2. the work instructions for new personnel and 3. lack of management (steering). He mentioned however that at the time of the implementation, senior nurses, the warden and the medical coordinator were really steering on the usage of the checklist. He confirmed that health care professionals seemed to, at first, be enthusiastic about the checklist.

At the south ward, three nurses, two doctors, a medical specialist and the unit warden were asked why they did not use the checklist. Both ward doctors mentioned that they did not know about the checklist. While one of them answered that she would not use the checklist, because she has '*most of the questions that she wants to ask to the nurse in her head,*' the other found it useful to use the checklist. Although she stated that she knew most items by heart, '*I find it important to use the checklist, because otherwise you would focus on the indicators that altered during the night. This entails that you finish the ward round and then later, in the afternoon, hear that the patient also has a cold.*'

All nurses knew about the checklist. One did not know why she did not use the checklist. Another stated that it is meant as a memory aid and that it is not used often enough. He explained that the ward works via an A,B,C,D method. If A is good, the other items do not have to be discussed. This was partly confirmed by the third nurse who explained that '*the patients' medical files reveals which information has the interest of the doctor and I therefore know which indicator I have to know about.*'

The medical specialist(s) stated that the checklist is mainly handy for young health care professionals. *As a medical specialist, I do not have to know each item of every patient every day, unless measurements are out of the ordinary.* (at this point another medical specialist intervened and said that the checklist is '*pure non-sense*').

The unit warden thought that the checklist is not being used because of three main reasons. Firstly, the doctor is in, or takes, charge and does not find it necessary to use the checklist. Secondly, doctors often have too little time and are judged by the time that they spend on the ward round. Thirdly, nurses think that they learned the list by heart, but usually forget about several items.

5.4 Feedback on the implementation process

The two main reasons why health care professionals stated that they did not use the checklist were their unfamiliarity with the checklist and the perspective that the checklist was not necessary, because they already knew the items by heart. Nonetheless, in order to describe how the health care professionals might have used the checklist more, several respondents were asked what could have been done better during the change process. This was mainly conducted at the stimulus group of the small hospital. In total, five nurses, one medical specialist, one ward doctor and one warden were asked how the change process could have been more effective. The medical specialist said: '*As a change manager in the health care sector, you need to give an overkill in information.*' '*Also, you need to involve the professionals, but that was done well in this change project.*' The nurses mainly emphasised that communication is important: '*keep managing/repeating that they should use the checklist during their ward rounds, keep empowering the discipline that is required to use the checklist.*' Another nurse agreed by saying '*organize meetings and make health care professionals responsible.*' The ward doctor advocated the top-down process: '*impose the new ward round process top-down.*' The warden, by reflecting back on the implementation process in the academic hospital, said: '*We should have managed, steered if you will, on the usage of the checklist.*' Also, the respondent argued that health care professionals are under the impression that their sector has too many rules, but '*that is true, however, health care should also be concerned about improving its quality.*'

Chapter 6 Conclusions

The first chapter of this study defined a research question with several questions. Chapter four and five presented results. In this chapter, both parts will be combined by answering the questions. It will first answer the various smaller questions, so that all information can be used to answer the main question of this research.

The main question of this research was:

Does a Checklist and its implementation in the daily process of health care, lead to a better overall collaboration between nurses and doctors and does this relationship influence patient safety?

The main question contains three secondary questions:

How can a checklist be created and implemented so that health care professionals integrate it in their daily work?
How does the checklist and its implementation affect the collaboration between doctors and nurses?
How does the collaboration between doctors and nurses influence patient safety?

This research studied the effect of the usage of a checklist on collaboration and tried to indicate whether collaboration between health care professionals would affect patient safety. It also aimed to describe the challenges that occur during the implementation of a checklist in the health care sector.

6.1 The Checklist and Health Care Collaboration

Several hypotheses were defined to indicate whether the checklist has an effect on the collaboration between health care professionals. Of these propositions, only one was accepted. In ward rounds of the stimulus group where the checklist was used, health care professionals significantly communicated more with each other. Both doctors and nurses exchanged more information with each other. Also, when the checklist was used, doctors significantly asked more questions to the nurse. These results were significant and describe that using the ward round checklist enhanced the exchange of information.

The checklist did not increase the participation in decision making by the nurse, or enhance the quality of either communication or participation in decision making. The strong indication that participation in decision making of nurses did not increase is rather remarkable, since the checklist included an item, proposed by a nurse, that asks for the opinion of the nurse. The checklist and/or this item was not used enough to have a significant effect. However, a significant effect that was found was the growth the amount of decisions made by doctors. So while it was hypothesized that nurses would participate more, doctors increased their decision-making. The explanation might be present in the usage of the checklist. Both doctors and nurses would use the checklist differently. nurses would read an item and give the relevant information regarding that item. Doctors would ask the nurse about a certain item (an item discussed a certain health indicator of the patient). In both situations, the doctor or medical specialist required the information. By using the checklist, they would acquire more information so that more decisions were made. Also, doctors and specifically medical specialists are responsible so that they want to make the right decision. The checklist did not change this, but enhanced the amount of information.

Lastly, an interesting causal inference was found between the usage of the checklist and empowerment. Subjects who indicated that they used the checklist, felt less empowered. Also, this empowerment had a strong positive inference with collaboration. In other words, the checklist tends to decrease empowerment, while this variable increased the perception of quality in collaboration. This occurrence can be interpreted in various ways, which will be discussed in the discussion.

6.2 Collaboration and Patient Safety

Although it was expected that collaboration would enhance patient safety, this study indicates that collaboration between health care professionals does not affect patient safety. Hence, it even suggested that there is a negative effect between the two variables. Where in previous studies it was stated that collaboration and health care teams would enhance patient safety (O'Leary, 2012; de Witte, 2012) or reduce health care costs and the duration of the hospital stay (Vazirani, 2005), this study did not confirm this. This study even indicated that communication has a negative effect on patient safety. This entails that if professionals have the perception that their communication is of a high quality, patients feel less safe. This was partly explained by the significant difference between the two hospitals. Patients in the academic hospital tend to feel less safe, while its health care professionals do not significantly qualify their communication lower than the stimulus (larger) group of the small hospital. However, the control group in the small hospital significantly improved their perception of the quality of their communication. So while patient safety in the small hospital was higher, only one ward had a significantly better perception of their communication than the academic hospital, which had a significantly lower patient safety than the small hospitals in both wards. The same probably occurred with collaboration, which was the combination of how health care professionals perceive their communication and participation in decision making. This might explain some of the unexpected effects.

This research found that if patients have the perception that health care professionals are collaborating well, they also feel safer. Patient safety did not increase because of the amount in which health care professionals exchanged information with each other. Furthermore, no causal inference was found between the degree in which physicians and nurses qualified their communication or participation in decision making and patient safety. Two indicators that measured the amount in which nurses participated in decision-making, had a significant effect on patient safety. Nurses who were asked for their opinion, as well as, nurses that make a decision significantly improved how patients perceived their safety. So while the checklist improved some indicators of communication, it had no effect on patient safety via collaboration.

6.3 Implementing a checklist in health care

In general, participants would not use the checklist very often. It was only used 14 out of 40 times. Both nurses, ward doctors and medical specialists indicated that they did not use the checklist, because they either did not know that there was a checklist or already knew the items it discussed by heart so that they found it unnecessary to (double)check. Conley et al (2011) indicate that to make sure that health care professionals use the checklist, the 'why' and 'how' should be communicated. Most respondents in this study confirm this. A medical specialist said that in order to enhance the usage of the checklist, an overkill of information should be given. They tend to emphasise on a top-down approach, while health care professionals should also be either held responsible or asked to participate in the change process. This importance of letting users participate in a change process should not be underestimated. The study found a significant effect between participation in the development of the checklist and the usage of the checklist. This states that health care professionals who were satisfied with the way in which they had the opportunity to contribute to the development of the checklist, also stated that they used it more times per week. This underlines several theories that state that participation in change enhances acceptance of change (Nyhan, 2000)

Chapter 7 Discussion

The study confirms the perspective that it is difficult to enhance the usage of checklists in the health care sector. Not only because this study showed that the checklist was only used during 14 out of 40 discussions about patients, but also because of the motives that were given to not use the checklist. Almost all ward doctors as well as medical specialists explained that they already have certain questions that they know by heart and want to ask to the nurse. Hence, they described that the checklist would be useful for young health care professionals so that they could learn which items to discuss during ward rounds. In addition, a medical specialist announced that she did not change her ward round routine because of the checklist, another medical specialist described the ward round checklist as '*pure non-sense.*' Moreover, Dutch nurse magazine *Nursing* even reported that several nurses of a hospital complained about the amount of checklists that they have to fill in per day (Oelen, 2013b). Even health care professors stated that the amount of checklists in health care is not advantageous for health care (Oelen, 2013a). However, the results show that the checklist does enhance the exchange of information. By using a checklist, items cannot be forgotten. This is often linked to an improvement of patient safety. As was mentioned earlier, many studies have indicated that a checklist does benefit the communication (Lingard et al., 2008; Vazirini, 2005; de Witte, 2012), collaboration between health care professionals (O'Leary et al., 2012; Herring et al , 2011) and even reduce mortalities and health care costs (Gawande, 2011, WHO,2009). This study, unfortunately, did neither confirm nor deny this.

While the benefits of a checklist seem to be inevitable, this study appears to create the impression that health care professionals do not want to work with checklists. With the advantages of checklists being so clear, one might wonder why checklists are still not used as much. This study found two possible reasons that both are strongly related to the way the checklist is implemented.
Firstly, this study showed a strong effect between the amount in which health care professionals, being the users of the checklist, perceived that they had the opportunity to participate in the development of the checklist and the amount in which health care professionals used the checklist. This effect (,594 p<,05) inclines to state that participation during change increases the success of the implementation. This effect is congruent with the advice of Thomassen et al (2011) that was presented in the second chapter. In this study, participants had the opportunity to participate through either writing down items that they wanted to discuss during ward rounds, or commenting on the sequence in which items should be discussed. In addition, both nurses as well as (ward) doctors and medical specialists, on average, were of the opinion that they had moderate opportunity to participate (M 3,17). Improving this perception might therefore have enhanced the usage of the checklist.
Second, this study found a negative causal inference between the usage of the checklist and empowerment. The small, negative effect of the checklist on empowerment was -.115 (p<.05). In addition, most health care professionals stated that they already knew the items that were required to discuss during ward rounds, by heart. Some even explained that a checklist would be extra bureaucracy or enhance the exchange of unnecessary information. These results show that most respondents do not find the checklist beneficial for health care outcomes, but rather an extra burden. It is also congruent with the resistance of the Dutch health care sector against checklists, and matches academic results in which empowerment is positively related to variables such as job satisfaction and collaboration and negatively with burnouts and job strains (Rao, 2012).
So while health care professionals used the checklist more often, because they felt that they had the opportunity to participate in its development, it also made them feel less empowered. The effect might imply that although nurses and doctors felt less empowered, this effect was less than would have happened if they had no opportunity to participate in the implementation process.

The intervention in this research mainly concentrated on empowering the informants to participate in the development of the checklist, congruent with Thomassen (et al, 2011). However, some health care professionals argued that the implementation process neglected a top-down approach. It did not mandate health care professionals to use the checklist nor did it give an overkill on information. This might give an indication of why the health care professionals did not use the checklist as was expected. In addition, it neglected discussing its urgency and necessity that are said to result in a buy-in among health care professionals (Conley et al, 2011). So whereas this study indicates that participation in the development of the checklist is an important variable to include, implementers should also be attentive to use a top-down approach in which they keep empowering the health care professionals to use the checklist. Also, they should discuss why and how health care professionals should use a checklist. Hence, change managers might involve the health care professionals in discussing how the checklist should be used, why it is necessary to utilize or in any case communicate that opinions and experiences are valued (Conley, 2011). Further research is needed to indicate how (satisfaction with) participation in the development of the change, a top-down approach and discussing the urgency and necessity can be combined and whether this combination enhances the success of the implementation process.

7.1 Limitations

For an experiment, it is important to discuss the context and environment of the intervention (Druckman et al, 2011). It gives an holistic perspective of the study and clarifies several uncertainties. It also forces the experimenter to take possible side effects into account.

The small hospital had a few possible issues in regard to the context of the study. Firstly, the hospital, and most of its employees, had little experience with researchers or observers. This was taken into account by the experimenter by observing many ward rounds, without measuring. In this way, health care professionals became used to the observer so that there would be less bias by the time that the collection of data started.

Secondly, the culture in the small hospital had a personal, non-hierarchical atmosphere. All health care professionals, except for some surgeons, appeared to communicate in an informal manner. Also, the surgical ward often had empty beds, where in the academic hospital they were mainly working at full capacity.

Thirdly employees of both wards were not randomly assigned. The main reason was that, although the surgical ward could have been divided into two separate parts (wings), all its employees would find out about the intervention. Also, employees, mainly nurses, often switch to the other wing so that they would have been exposed to the checklist. It was not possible to freeze their position during the time of the research.

Also, this research was mainly initiated to study the effect of a checklist on collaboration and patient safety. However, the checklist was not used as much, so that results are less reliable. Besides the reasons that were mentioned earlier, the period between the implementation and the second measurement was only two months. In comparison, another process in which a checklist was implemented in the Dutch health care sector took more than a year to develop, as well as more than five months to test (de Vries et al, 2008). In addition, checklists have not been common in the daily health care process for a very long time (de Vries et al, 2008; Gawande, 2011), which implies that it might take more time to make it a daily routine.

It was expected that the academic hospital, as was said, also used a similar checklist in certain wards and that this could empower the results of the study. This unfortunately was not the case, so that the study mainly focussed on the difficulties of implementing checklists in the health care sector, collaboration between health care professionals and patient safety.

In addition, the significant difference between the stimulus group and the control group in several control variables somewhat reduced the reliability of the study. However, the response rate of patients as well as health care professionals was relatively high, while it must be mentioned that not all respondents that were included in the measurement before the intervention, also completed the

survey after the intervention. It should also be noted that nurses are represented more than doctors and medical specialists. Therefore, results can be somewhat biased.

Results might also be dependent on the sort of checklist. Checklists in the core of hospital health care (such as the OR) might have other results than in the periphery. Hence, there is reason to believe that a difference exists between an implementation process in the mainstream of the organization and its edge (Higgs & Rowland, 2005). The authors found that emergent approaches are often initiated at the edge of an organization and have the highest effect on success.

In this research, the focus lay on a morning round checklist that did not require any written checks,it had a read & do structure. Checklists in other studies might have a check once done structure that influences the results in another way. Therefore, it might be a recommendation to create a definition for a checklist so that researches that study the checklist are more comparable.

Lastly, the time period between the implementation of the checklist and the second measurement was only two months. The study showed some effects, but it did not include a longitudinal element to indicate whether its effects increase. It might take more time to see more results, since health care professionals are not used to use checklists. Hence, the implementation in this study did not focus on a top-down approach in which health care professionals could have been more instructed to use the checklist. This might have slowed down its use, as well as its outcomes. Lingard et al (2008) measured effects of a health care checklist a year after its implementation. This was not possible for this research. A longitudinal research should indicate when a checklist achieves its effects and how long it takes before health care professionals consistently use a checklist.

7.2 Recommendations for further research

This study found some essential results that should inspire other researchers to initiate further research. First, this study indicated that while the checklist might have a lot of benefits for the health care sector, health care professionals do not seem to give it a warm welcome. Hence, this research showed that the checklist was only used 14 out of 40 times. An important reason for this is the way the checklist is implemented. This study showed that participation in the change process is essential. It also suggests that a more planned and top-down approach should be used to enhance the use of a checklist. Further research should indicate whether such an approach with an element of participation is the best approach to implement a checklist in the health care sector.

Another essential outcome of this research is the effect between the checklist and empowerment. While this effect was relatively small, it suggests a possible explanation of why health care professionals do not want to use a checklist. Further research should indicate whether a checklist truly influences empowerment negatively and whether this has an effect on job satisfaction, motivation and patient safety.

Lastly, this research did not confirm the positive effects of a checklist on patient safety as has been found in other studies. Further research should indicate whether a checklist does benefit patient safety and how this effect can be explained.

7.3 Practical implications

A ward round checklist in health care enhances the amount of information that is being exchanged between nurses and doctors. This increased the amount of decisions that were taken by the doctor and slightly enhanced the participation of nurses in decision-making. This suggests that it improves the collaboration between health care professionals, which has been related to an increased patient safety in other researches (Vazirani, 2005; Lingard et al, 2008; O'Leary, 2012).

In addition checklists are often neglected in the Dutch health care sector. This research found a possible explanation for this avoidance in the negative relation between the usage of a checklist and a health care professional's empowerment. This study indicates that the implementation of a health care checklist should not only focus on its content, but also on the change process. This can be done by letting health care professionals participate in the development of the checklist. It also suggests that a top-down approach, in which (change) managers consistently manage health care professionals to use the checklist is, in combination with participation in its development, beneficial for its success.

Literature

Adang, E.M.M. & G.F. Borm (2007). Is there an association between economic performance and public satisfaction in health care? *European Journal of Health Economy, 8:* 279-285

Adams, A. & S. Bond (2000). Hospital nurses' job satisfaction, individual and organizational characteristics. *Journal of Advanced Nursing*, 32(3), 536-543

Aiken, C. & S. Keller (2009). The irrational side of Change Management. McKinsey Quarterly

Alvarez, G., & E. Coiera (2005). Interruptive communication patterns in the intensive care unit ward round. *International Journal of Medical Informatics, 74*(10), 791-796.

Baggs, J.G. & Schmitt, M.H. (1988). Collaboration between nurses and physicians. *Journal of Nursing Scholarship.* 20(3), pp 145-149.

Baron, R.M. & D.A. Kenny (1986). The Moderator-Mediator Variable Distinction in Social Psychological Research: Conceptual, Strategic and Statistical Considerations. *Journal of Personality and Social Psychology.* Vol. 51, No. 6, 1173-1182.

Beer, M. and N. Nohria. 2000. *'Cracking the Code of Change'*, Harvard Business Review, 133-141.

Best, M.F. & N.E. Thurston (2004). Measuring Nurse Job Satisfaction. *JONA,* Vol. 34, No. 6

Bolhuis, S. (2002). *Multiprofessioneel samenwerken in de gezondheidszorg. Onderzoek naar educatieve interventies.* UMC St Radboud. Nijmegen april 2002.

Boonstra, J.J. (2000). *Lopen over water. Over dynamiek van organiseren, vernieuwen en leren.* Amsterdam: Vossiuspers AUP

Bordia, P., E. Hobman, E. Jones, C. Gallois, V.J. Callan (2004). UNCERTAINTY DURING ORGANIZATIONAL CHANGE: TYPES, CONSEQUENCES,AND MANAGEMENT STRATEGIES. *Journal of Business and Psychology*, Vol. 18, No. 4,

Burnes, B. (2009). *The case for planned change*. In By, R.T. & Macleod, C. (2009). Managing organizational change in public services: international issues, challenges and cases. Londen: Routledge.

Burnes, B. (2004). Emergent change and planned change - competitors or allies? the case of XYZ construction. *International Journal of Operations & Production Management, 24*(9-10), 886-902.

By, R.T. & Macleod, C. (2009). *Managing organizational change in public services: international issues, challenges and cases.* Londen: Routledge.

CBO: Centraal Begeleidingsorgaan (2013). http://www.cbo.nl/thema/Pati-ntveiligheid/

Chang, W. (2009). Job satisfaction and perceptions of quality of patient care, collaboration and teamwork in acute care hospitals. *Journal of Advanced Nursing, 65*(9), 1946; 1946-1955; 1955.

Conley, D,M. S.J. Singer, L. Edmondson, W.R. Berry& A.Gawande (2011). Effective Surgical Safety Checklist Implementation. *Journal of the American College of Surgeons. 212(5)* 873-879.

Coopman, S. J. (2001). Democracy, performance, and outcomes in interdisciplinary health care teams. *Journal of Business Communication, 38*(3), 261-284.

Curley, C., J.E. McEachern, & T. Speroff (1998). A firm trial of interdisciplinary rounds on the inpatient medical wards: An intervention designed using continuous quality improvement. *Medical Care, 36*(8), AS4-AS12.

D'Amour, D., M.F. Videla, L. San Martin-Rodriguez &M-D Beaulieu (2005). The conceptual basis for interprofessional collaboration: Core concepts and theoretical frameworks. *Journal of Interprofessional Care. 1* 116-131

Ellingson, L.,L. (2002). Communication, Collaboration, and Teamwork among Health Care Professionals. *Communication Research Trends, 21,* NO 1-3.

Field, A (2009). *Discovering Statistics using SPSS*. London: SAGE Publications Ltd.

Gawande, A (2011). *The Checklist Manifesto: How to get things right.* London: Profile Books

Gurses, A. P., & Y. Xiao (2006). A systematic review of the literature on multidisciplinary rounds to design information technology. *Journal of the American Medical Informatics Association, 13*(3), 267-276.

Henneman, E.A., Lee, J.L. & Cohen, J.I. (1995). Collaboration: a concept analysis. *Journal of Advanced Nursing*. 21(1), 103-109.

Herring R., G. Caldwell, & S. Jackson (2011). Implementation of a considerative checklist to improve productivity and team working on medical ward rounds. *Clinical Governance: An International Journal, 16*(2), 129-136.

Herscovitch, L. & J.P. Mayer (2002). Commitment to Organizational Change: Extension of a Three-Component Model. *Journal of Applied Psychology,* Vol. 87, No. 3, 474–487

Higgs, M. J. & D. Rowland, (2005). All Changes Great and Small: Exploring Approaches to Change and its Leadership, *Journal of Change Management*, Vol. 5, No. 2, 121–151.

Hood, C. (1995). The "new public management" in the 1980s: Variations on a theme. *Accounting, Organizations and Society. Vol. 20,* No. 2-3. 93-109.

Keller, S. & C. Aiken (2000). The Inconvenient Truth About Change Management: Why it isn't working and what to do about it. McKinsey&Company. Retrieved from: http://www.mckinsey.com/App_Media/Reports/Financial_Services/ The_Inconvenient_Truth_About_Change_Management.pdf

Kim, S. (2002). Participative management and job satisfaction: Lessons for management leadership. *Public Administration Review, 62*(2), 231-241.

Kirkman, B. L., & Rosen, B. (1999). Beyond self-management: Antecedents and consequences of team empowerment. Academy of Management Journal, 42, 58- 74. Kohn, L.T., J.M. Corrigan & M.S. Donaldson, (Eds.) (1999). To Err is Human: Building a safer health care system. *National Academy Press*, Washington DC.

Kuokkanen, L. T. Suominen, S. Rankinen, M-L. Kukkurainen, N. Savikko, D. Doran (2007). *Journal of Nursing Management* 15, 500–507

Lai, E.R. (2011). *Collaboration: A Literature Review.* Research Report. Pearson

Laine, J., U.H. Finne-Soveri, M. Björkgren, M. Linna, A. Noro, U. Häkkinen (2005). The association between quality of care and technical efficiency in long-term care. *International Journal for Quality in Health Care*; Volume 17, 259–267

Laschinger, H. K. (1997). Empowerment and staff nurse decision involvement in nursing work environments: Testing kanter's theory of structural power in organizations. *Research in Nursing & Health, 20*(4), 341; 341-352; 352.

Lemmens, K., G. van Schooten & M. Berg (2011). *Verkenning Sturingsmodaliteiten voor Veiligheid bij ambigue, complexe en onzekere risico's in de zorg*. Den Haag: Regieraad Kwaliteit van zorg.

Leever, A.M., Hulst, M. v.d., Berendsen, A.J., Boendemaker, P.M., Roodenburg, J.L.N. & Pols, J. (2010). Conflicts and conflict management in the collaboration between nurses and physicians – a qualitative study. *Journal of interprofessional Care.* 24(6), pp 612-624.

Leonard, M., S. Graham, & D. Bonacum (2004). The human factor: The critical importance of effective teamwork and communication in providing safe care. *Quality & Safety in Health Care, 13*

Lingard, L., G. Regehr, B. Orser, R. Reznick, G. Baker, D. Doran, et al. (2008). Evaluation of a preoperative checklist and team briefing among surgeons, nurses, and anesthesiologists to reduce failures in communication. *Archives of Surgery, 143*(1), 12-17.

Manias, E & A. Street. (2001). Nurse-doctor interactions during critical care ward rounds. *Journal of Clinical Nursing, 10*(4), 442.

Mickan, S. (2005). Evaluating the effectiveness of health care teams. *Australian Health Review, 29*(2), 211-7.

Newman, S. & J. Lawler (2009). Managing health care under New Public Management A Sisyphean challenge for nursing. *Journal of Sociology. (45)* 419-432

Nyhan, R.C. (2000). *CHANGING THE PARADIGM: Trust and Its Role in Public Sector Organizations*. Academic Review of Public Administration. 30:87

Oelen, M (2013a). Hoogleraren: 'Checklistdrift in de zorg slaat door.' *Nursing, 7.* Retrieved from http://www.nursing.nl/Verpleegkundigen/Nieuws/2013/7/Hoogleraren-Checklistdrift-in-de-zorg-slaat-door-1313356W/

Oelen, M (2013b). Schippers: 'Checklist moet verpleegkundigen niet meer last opleveren.' *Nursing, 6.* Retrieved from http://www.nursing.nl/Verpleegkundigen/Nieuws/2013/6/Schippers-Checklist-moet-verpleegkundigen-niet-meer-last-opleveren-1276667W/

O'Leary, K. J., N.L. Sehgal, G. Terrell, M.V. Williams & High Performance Teams Hosp Future. (2012). Interdisciplinary teamwork in hospitals: A review and practical recommendations for improvement. *Journal of Hospital Medicine, 7*(1), 48-54.

Perry, J.L., Mesch D. & Paarlberg L. (2006). '*Motivating Employees in a New Governance Era: The Performance Paradigm Revisited*'. Public Administration Review, 4. 505-514.

Piko, B.F. (2006). Burnout, role conflict, job satisfaction and psychosocial health among Hungarian health care staff: A questionnaire survey. *International Journal of Nursing Studies,* 43. 311–318

Pollitt, C. & G. Bouckaert (2004). *Public Management reform: A Comparative Analysis.* Oxford: Oxford University Press.

Pronovost, P.J., D.A. Thompson, C.G. Holzmueller & L.L. Morlock (2005). Defining and measuring patient safety. *Critical Care Clinics, 21*(1) 1-19*.*

Reader, T. W., R. Flin, K. Mearns & B.H. Cuthbertson (2007). Interdisciplinary communication in the intensive care unit. *British Journal of Anaesthesia, 98*(3), 347-352.

Reinders, J.J. (2011). *Wat is de invloed van professionele rolidentiteit op interprofessionele samenwerking tussen medici en paramedici na taakherschikking?* Promotievoorstel, Hanzehogeschool Groningen.

Rao, A. (2012). The Contemporary Construction of Nurse Empowerment. *Journal of Nursing Scholarship,* 44:4, 396–402.

RGO: Raad voor Gezondheidsonderzoek (2005). *Advies Onderzoek Patiëntveiligheid.* Den Haag.

Ruler, v., A.A. (2000). Communication management in the Netherlands. *Public Relations Review, 26*(4), 403-423.

Spence Laschinger, H. K., J. Almost D. Tuer-Hodes (2003). Workplace Empowerment and Magnet Hospital Characteristics. Research in Nursing & Health: Making the link*, Journal of Nurse Administration 33*(7/8), 410-422

Spreitzer, G.M. (1995). PSYCHOLOGICAL EMPOWERMENT IN THE WORKPLACE: DIMENSIONS, MEASUREMENT & VALIDATION. *The Academy of Management Journal*, Vol. 38, No. 5 1442-1465.

Steijn, B. & Groeneveld, S. (2009). Strategisch HRM in de publieke sector. Assen: Koninklijke Van Gorcum

Stewart, J. G. (2010). Psychological empowerment and structural empowerment among nurse practitioners. *Journal of the American Academy of Nurse Practitioners, 22*(1), 27-34.

Stoter, A (1997). *De Communicerende organisatie: Communicatie in relatie tot organisatieverandering.* Utrecht: LEMMA

Thomassen, O., A. Espeland, E. Softeland, H.M. Lossius, J. K. Heltne & G. Brattebo (2011). Implementation of checklists in health care; learning from high-reliability organizations. *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine,* 19:53.

Vazirani, S., R.D. Hays, M.F. Shapiro & M. Cowan (2005). Effect of a multidisciplinary intervention on communication and collaboration among physicians and nurses. *American Journal of critical care Volume 14, NO 1*.

Vries, E. de, S. Smorenburg, D. Gouma, & M. Boermeester (2008). Een checklist voor het gehele chirurgische traject. *Nederlands Tijdschrift Voor Evidence Based Practice, 6*(1), 17-19.

Wagner, C. & M. de Bruijne (2007). *Onbedoelde Schade in Nederlandse Ziekenhuizen.* Amsterdam: EMGO Instituut

Walle, S. van de & G. Hammerschmid (2011). "The Impact of the New Public Management: Challenges for Coordination and Cohesion in European Public Sectors." *Halduskultuur – Administrative Culture* 12 (2), 190-209.

Weber, H., M. Stöckli, M. Nübling, & W.A. Langewitz (2007). Communication during ward rounds in internal medicine. *Patient Education and Counseling, 67*(3), 343-348.

Weech-Maldonado, R. G. Neff & V. Mor (2003). The relationship between quality of care and financial performance in nursing homes. *Journal of Health care Finance. 29(3)* 48-60. Retrieved from http://www.ncbi.nlm.nih.gov/pubmed/12635994

Weston, M.J. (2010). Strategies for enhancing autonomy and control over Nursing Practice. *Online Journal of Issues in Nursing (15)*1, Retrieved from: http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Vol152010/No1Jan2010/Enhancing-Autonomy-and-Control-and-Practice.html

Witte, L. de (2012). *Samenwerking tussen artsen en verpleegkundigen*. Rotterdam: Erasmus University

WHO: World Health Organization (2009). *Human Factors in Patient Safety: Review of Topics and Tools*. Geneva

Appendix

1. Observation form

Datum:		
Afdeling:		
Tijdsduur Visite	Start Visite:	Einde Visite:
Aantal Verpleegkundigen:	Man:	Vrouw:
Aantal Dokters:	Man:	Vrouw:
Aantal Patiënten	Man:	Vrouw:	Aantal P survey ingevuld: van

Hoe vaak geeft de **verpleegkundige informatie** over de status van de patiënt (eenrichting)	
Hoe vaak geeft de **arts informatie** over de status van de patiënt (eenrichting)	
Hoe vaak zijn **arts & verpleegkundige** in een dialoog over de patiënt (tweerichting)	
Hoe vaak zijn **artsen samen** in een dialoog over de patiënt	

Communicatie

Hoe vaak **stelt de arts vragen** aan de verpleegkundige over de patiënt en de zorg van de patiënt	
Wanneer stelt de arts vragen aan de verpleegkundige over de patiënt	Begin: Tijdens: Einde:
Hoe vaak **stelt de verpleegkundige vragen** aan de arts over de patiënt en de zorg van de patiënt	
Wanneer stelt de verpleegkundige vragen aan de arts over de patiënt	Begin: Tijdens: Einde:
Hoe vaak stelt de **arts vragen aan andere arts**	

Participatie in besluitvorming

Hoe vaak **neemt de arts een besluit** over een actiepunt zonder te overleggen met een verpleegkundige	
Hoe vaak geeft de **verpleegkundige haar mening** over een genomen besluit over een actiepunt	
Hoe vaak wordt om de **mening van de verpleegkundige gevraagd** door een arts bij het nemen van een besluit over een actiepunt	
Wanneer wordt om de mening van de verpleegkundige gevraagd door een arts bij het besluiten over een actiepunt	Begin: Tijdens: Einde:
Hoe vaak **stelt de verpleegkundige zelf een actiepunt voor** of vraagt deze aan de arts	

2. Patient Survey

Beste patiënt,

Het bieden van goede patiëntenzorg is natuurlijk waar het om draait in een ziekenhuis. Een belangrijk onderdeel van goede patiëntenzorg is de veiligheid op een afdeling. Voor ons onderzoek naar de patiëntveiligheid op deze afdeling vragen we u als patiënt om deze vragenlijst van 16 vragen in te vullen. Dit zal circa 5 minuten in beslag nemen. In deze vragenlijst wordt uw mening gevraagd over onderwerpen op het gebied van veiligheid en de samenwerking tussen artsen en verpleegkundigen. Uw antwoorden en opmerkingen zullen anoniem blijven en gebruikt worden in een onderzoek naar het effect van de samenwerking tussen artsen en verpleegkundigen op de patiëntveiligheid in dit ziekenhuis.

Wij danken u alvast hartelijk voor het invullen!

De veiligheid op deze afdeling
Als in een vraag uw mening wordt gevraagd over de medewerkers van deze afdeling, worden zowel de artsen als verpleegkundigen van deze afdeling bedoeld.

Geef aan in welke mate u het eens of oneens bent met de volgende stellingen over de veiligheid op deze afdeling. Geef uw antwoord door per stelling één antwoord aan te kruisen.

1. Medewerkers van deze afdeling hebben genoeg aandacht voor onveilige situaties.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

2. Bij het verstrekken van medicijnen wordt nagegaan of dit medicijn ook echt voor mij bestemd is, bijvoorbeeld door te vragen naar mijn naam of het controleren van mijn polsbandje.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens
- ☐ Niet van toepassing

3. Wanneer ik op de bel druk, krijg ik zo snel hulp als ik wil of nodig heb.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

☐ Niet van toepassing

4. Voor een behandeling, onderzoek of ingreep begint, wordt gecontroleerd of ik de juiste persoon ben, bijvoorbeeld door te vragen naar mijn naam en geboortedatum.
☐ Zeer mee oneens
☐ Mee oneens
☐ Noch mee oneens, noch mee eens
☐ Mee eens
☐ Zeer mee eens
☐ Niet van toepassing

5. Medewerkers van deze afdeling hebben genoeg aandacht voor het voorkomen van ongelukken.
☐ Zeer mee oneens
☐ Mee oneens
☐ Noch mee oneens, noch mee eens
☐ Mee eens
☐ Zeer mee eens

6. Heeft u, tijdens uw opname in het ziekenhuis, te maken gehad met één of meerdere van onderstaande gebeurtenissen. Kruist u per gebeurtenis aan of u ermee te maken heeft gehad.

	Nee	Ja
Bent u gevallen in het ziekenhuis?	☐	☐
Zijn er bij u doorligwond(en) ontstaan?	☐	☐
Zijn er bij u fouten met geneesmiddelen gemaakt?	☐	☐
Heeft u wondinfectie(s) gehad?	☐	☐
Heeft u complicatie(s) van een operatie/ ingreep gehad?	☐	☐

7. Bij medewerkers op deze afdeling voel ik mij in vertrouwde handen.
☐ Zeer mee oneens
☐ Mee oneens
☐ Noch mee oneens, noch mee eens
☐ Mee eens
☐ Zeer mee eens

De samenwerking tussen artsen en verpleegkundigen. Geef aan in welke mate u het eens of oneens bent met de volgende stellingen over de veiligheid op deze afdeling. Geef uw antwoord door per stelling één antwoord aan te kruisen.

8. De afstemming van de werkzaamheden tussen artsen en verpleegkundigen onderling is geen probleem.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

9. De artsen geven mij duidelijke en eenduidige informatie.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

10. De verpleegkundigen geven mij duidelijke en eenduidige informatie.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

11. Ik ben tevreden over de informatieoverdracht van de ene naar de andere medewerker (bijvoorbeeld van arts naar verpleegkundige).
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

12. Als ik denk aan de visite van artsen en verpleegkundigen van deze ochtend, ben ik tevreden over de communicatie met mij als patiënt.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

13. Als ik denk aan de visite van artsen en verpleegkundigen van deze ochtend, zie ik een team dat goed samenwerkt.
- ☐ Zeer mee oneens
- ☐ Mee oneens
- ☐ Noch mee oneens, noch mee eens
- ☐ Mee eens
- ☐ Zeer mee eens

Over uzelf

14. Bent u een man of een vrouw?
- ☐ Man
- ☐ Vrouw

15. Wat is uw leeftijd?
- ☐ 18 t/m 24
- ☐ 25 t/m 34
- ☐ 35 t/m 44
- ☐ 45 t/m 54
- ☐ 55 t/m 64
- ☐ 65 t/m 74
- ☐ 75 jaar of ouder

16. Hoe lang ligt u al op deze afdeling?
- ☐ 1 tot 5 dagen
- ☐ 5 tot 10 dagen
- ☐ 10 tot 15 dagen
- ☐ 15 tot 20 dagen
- ☐ 20 tot 25 dagen
- ☐ 25 tot 30 dagen
- ☐ 30 dagen of meer

Uw opmerkingen
Hieronder kunt u uw opmerkingen kwijt over patiëntveiligheid, incidenten, de samenwerking tussen medewerkers en overige zaken.

Hartelijk bedankt voor het invullen van deze vragenlijst.

3. Survey Health care professionals

Beste zorgverlener,

Onderstaande vragenlijst betreft een onderzoek naar de samenwerking tussen artsen en verpleegkundigen en het effect hiervan op de patiëntveiligheid. De vragenlijst heeft 42 vragen, waarvan 35 stellingen en 7 algemene vragen.

De antwoordmogelijkheden in de stellingen zijn vijfdelig. Omcirkel het antwoord dat voor u het meest van toepassing is.

Alvast bedankt voor het invullen.

Communicatie

Geef aan in welke mate u het eens of oneens bent met de volgende stellingen over de communicatie. Geef uw antwoord door per stelling één antwoord aan te kruisen.

Met de **andere zorgprofessie** wordt arts **of** verpleegkundige bedoeld. Bent u arts, dan is de andere zorgprofessie de verpleegkundige. Bent u verpleegkundige dan is de andere zorgprofessie de arts.

	Zeer Mee Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Zeer mee eens
1. Ik ontvang volledige informatie van de andere zorgprofessie (zie uitleg over zorgprofessie hierboven)	1	2	3	4	5
2. Ik heb een goede communicatie met de andere zorgprofessie.	1	2	3	4	5
3. Ik voel mij zeker over de nauwkeurigheid van de informatie die ik ontvang van de andere zorgprofessie.	1	2	3	4	5
4. Ik werk samen met kwalitatief hoogwaardige zorgverleners.	1	2	3	4	5
5. Ik kan gemakkelijk vragen stellen aan de andere zorgprofessie.	1	2	3	4	5
6. Ik heb het gevoel dat al mijn vragen adequaat worden beantwoord.	1	2	3	4	5
7. Ik ben tevreden met de samenwerking tussen de artsen en verpleegkundigen.	1	2	3	4	5

Participatie in Besluitvorming

	Zeer mee Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Zeer mee eens
8. Zowel de artsen als verpleegkundigen hebben een aandeel in de besluitvorming rond de zorg van patiënten.	1	2	3	4	5
9. Verpleegkundigen en artsen werken samen bij de besluitvorming rond de zorg van patiënten.	1	2	3	4	5
10. De artsen en verpleegkundigen maken samen een plan voor het nemen van beslissingen rond de zorg van de patiënten.	1	2	3	4	5
11. Er is een open communicatie tussen artsen en verpleegkundigen tijdens de besluitvorming rond de zorg van patiënten.	1	2	3	4	5

Empowerment

	Zeer Mee Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Zeer mee eens
12. Ik beslis hoe ik mijn werk doe.	1	2	3	4	5
13. Ik kan zelf beslissen hoe ik mijn werk uitvoer.	1	2	3	4	5
14. Ik heb mogelijkheden om onafhankelijk en vrij in te vullen hoe ik mijn werkzaamheden verricht.	1	2	3	4	5
15. Mijn impact op wat er gebeurt op mijn afdeling is groot	1	2	3	4	5
16. Ik heb veel controle over wat er gebeurt op mijn afdeling	1	2	3	4	5
17. Ik heb veel invloed op wat er gebeurt op mijn afdeling	1	2	3	4	5
18. Ik ben zeker over mijn bekwaamheid	1	2	3	4	5
19. Ik ben zelfverzekerd over mijn capaciteiten om te presteren in mijn werk	1	2	3	4	5
20. Ik beheers de vaardigheden die noodzakelijk zijn voor mijn werk	1	2	3	4	5
21. Het werk dat ik doe is heel belangrijk voor mij.	1	2	3	4	5
22. Mijn werkzaamheden zijn van persoonlijke betekenis voor mij	1	2	3	4	5
23. De taken die ik uitvoer zijn betekenisvol voor mij.	1	2	3	4	5

Checklist Visitelopen

De Checklist visitelopen is een checklist die wordt gebruikt tijdens de artsenvisites. In deze checklist staan verschillende punten die volgens zorgprofessionals per patiënt zouden moeten worden besproken tijdens deze artsenvisites. Mogelijke voorbeelden van punten zijn: controles, medicatie, complicaties, voeding, ontslag etc.

De volgende stellingen richten zich op uw mening over deze Checklist Visitelopen.

	Zeer Mee Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Zeer mee eens
24. Ik geloof in de waarde van de Checklist Visitelopen. (*zie hierboven voor uitleg over de checklist*)	1	2	3	4	5
25. De Checklist Visitelopen is een goede strategie voor de organisatie.	1	2	3	4	5
26. Ik denk dat de organisatie een fout maakt met de Checklist Visitelopen.	1	2	3	4	5
27. De Checklist Visitelopen dient een belangrijk doel.	1	2	3	4	5
28. Dingen worden **niet** beter door de Checklist Visitelopen.	1	2	3	4	5
29. De Checklist Visitelopen is **niet** noodzakelijk.	1	2	3	4	5

Baantevredenheid

	Zeer Mee Oneens	Beetje mee oneens	Neutraal	Beetje mee eens	Zeer mee eens
30. Deze baan voldoet niet aan mijn verwachtingen	1	2	3	4	5
31. Wetende wat ik nu doe, zou ik weer voor deze baan solliciteren.	1	2	3	4	5
32. Ik speel vaak met de gedachte ontslag te nemen.	1	2	3	4	5
33. Ik weet dat het werk dat ik verricht de moeite waard is.	1	2	3	4	5
34. Ik ben tevreden met de relatie die ik heb met de verzorgende collega's van mijn afdeling.	1	2	3	4	5
35. Ik vrees dat mijn gezondheid lijdt onder mijn werk.	1	2	3	4	5

Tot slot enkele algemene vragen:

36. Wat is uw geslacht?
   - ☐ Man
   - ☐ Vrouw

37. Wat is uw leeftijd?

……………………….. Jaar

38. Hoe lang werkt u in dit ziekenhuis **op uw huidige afdeling**?

…………. Jaar   ………….. Maanden

39. Hoeveel **uren per week** werkt u gemiddeld in dit ziekenhuis?

……………………………… Uren per week gemiddeld

40. Hoe lang bent u werkzaam in uw huidige functie?
(*Voorbeeld: hoe lang bent u reeds verpleegkundige of dokter*)

…………………… Jaar   ………………… Maanden

41. Wat is uw functie in dit ziekenhuis?'

   - ☐ Verzorger
   - ☐ Verpleegassistent
   - ☐ Verpleegkundige in opleiding
   - ☐ Gediplomeerd verpleegkundige / Regie
   - ☐ Physician assistant / Nurse Practitioner
   - ☐ Co-assistent
   - ☐ Basisarts
   - ☐ Arts in opleiding tot specialist
   - ☐ Medisch specialist

Eventuele opmerkingen betrekkinghebbend op de samenwerking tussen verpleegkundigen en artsen kunt u hieronder invullen.

```



```

Bedankt voor het invullen van deze vragenlijst.

Tables & Figures