

# **A study of intervention functions and policy categories in implementing a complex nursing intervention (PREDOCS) in Dutch hospitals; a phase four implementation study**

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## **SAMENVATTING**

### **Achtergrond**

Om lijden, complicaties en kosten voor fragiele patiënten, die electieve cardiochirurgie ondergaan terug te brengen, is de verpleegkundige interventie “PREvention Decline in Older Cardiac Surgery patients” (PREDOCS) bedacht. Doel van deze interventie is om patiënten van 65 en ouder mentaal en fysiek te sterken, om postoperatieve complicaties te reduceren of voorkomen.

### **Doel**

Doel is inzicht krijgen in het gebruik van de beleidscategorieën (derde ring) en interventie functies (tweede ring) van Behaviour Change Wheel in de implementatie van verpleegkundige interventie PREDOCS. Gekeken wordt hoe interventie functies en beleidscategorieën gebruikt worden om gewenst gedrag van stakeholders te bereiken.

### **Methode**

Mixed method design met acht interviews, uitgevoerd door middel van realist review methode. Interviews zijn geanalyseerd, na transcriptie, met sensitizing concepts. Thema's zijn verkregen uit de interviews en gelinkt aan de tweede en derde ring van de Behaviour Change Wheel. Descriptive statistics om ziekenhuizen onderling te vergelijken op PREDOCS scores.

### **Resultaten**

Uit de data kwamen 7 thema's; verpleegkundig eigenaarschap, training, ondersteuning door management, ondersteuning door medische staf, ondersteuning door secretariaat, implementatieplan en enthousiasme. De thema's konden gelinkt worden aan alle interventies uit de tweede ring en aan 5 van de 7 van de derde ring. Alle interventie functies werden expliciet gebruikt tijdens de implementatie van PREDOCS, daarentegen werden de beleidscategorieën uit de derde ring impliciet gebruikt. Statistische data was niet beschikbaar waardoor vergelijking tussen de ziekenhuizen niet kon.

### **Conclusie en aanbevelingen**

(Senior) Verpleegkundigen hadden moeite met het maken van implementatieplannen. Gebruik van de Behaviour Change Wheel kan hierbij ondersteunen. Fundamenteel bij het slagen van de implementatie is verpleegkundig eigenaarschap gesteund door management en één cardio thoracaal chirurg. Kwalitatieve data was niet beschikbaar, hiermee een vergelijking tussen de ziekenhuizen onmogelijk makend. Wanneer data beschikbaar komt, zou deze vergelijking gemaakt moeten worden.

### **Sleutelwoorden**

PREDOCS, Behaviour Change Wheel, Implementatie, evaluatie

## **ABSTRACT**

### **Background**

Reducing burden, complications and costs for frail patients undergoing cardiac surgery a nursing intervention called “PREvention Decline in Older Cardiac Surgery patients” (PREDOCS) was conceived. Goal is to prepare these 65 and older patients, before admission mentally and physically to reduce or prevent postoperative complications.

### **Aim**

Is to gain insight in how policy categories (third ring) and intervention functions (second ring) of the Behaviour Change Wheel reflect in implementation of the PREDOCS and how supporting intervention functions and policies are used to reach desired behaviour of stakeholders.

### **Method**

Mixed method study design with eight interviews, conducted using realist review method. Interviews were analysed, after transcription, using sensitizing concepts. Themes were derived from interviews and linked to the second and third ring of the Behaviour Change Wheel. Descriptive statistics on the PREDOCS scores to compare hospitals.

### **Results**

From the data 7 themes were extracted, nursing ownership, training, support by management, support from medical staff, support by secretariat, plan of action and enthusiasm. Themes could be linked to all the interventions in the second ring and 5 out of 7 from the third ring. All the interventions were more or less explicitly used during the implementation, whereas the policies from the third ring were used more implicit. The statistical data was not available, what made comparison between the hospitals impossible.

### **Conclusions and recommendations**

Nurses and senior nurses had trouble making a plan of action and the behaviour change wheel could help with development. Fundamental in making the implementation succeed is nursing ownership, with back up by management and one cardiac surgeon. Quantitative data was not available, therefore comparison between hospitals were impossible. This should be done when data comes available.

### **Keywords**

PREDOCS, Behaviour Change Wheel, Implementation, evaluation

## Introduction

The share of older people in the western population is rapidly growing (1). Operation techniques and the use of anaesthesia have developed rapidly over the past decades, which now makes them available for older and frailer patients. Also in cardiac surgery and anaesthesia these development had taken place which allows older, sicker and higher-risk patients undergoing cardiac procedures. Even though these frail and older patients can now safely undergo the surgical procedure, they are at high risk of developing postoperative complications, including delirium (14,7% to 46.0%), depression (10,0% to 37.7%), pressure ulcers (10.6% to 18%) and nosocomial infections (8.3% to 54.5%) (1). These care related complications make them more vulnerable for a significant decrease in quality of life after they have been discharged out of the hospital and is associated with merging hospital costs (1). To reduce patient burden, complications and costs for this particularly frail category of patients a nursing intervention called “PREvention Decline in Older Cardiac Surgery patients” (PREDOCS) was conceived. The goal of the intervention is to prepare the 65 years and older patients undergoing elective cardiac surgery, before admission mentally and physically in such way that the targeted on the screened increased risk for one or more postoperative complications would be reduced or prevented. Two to four weeks prior to the admission a PREDOCS nursing consult is conducted which focuses on empowering patient and family to reduce an increased risk on one or more of the four regularly occurring complications after surgery in frail older people; delirium, depression, pressure ulcers and infections (1).

The consult consists of three phases;

- Phase 1 gives general information about the hospital stay with surgery, what the patient can expect during the admission and what patient could and should do before admission.
- Phase 2 consist of a prognostic screening for risk on postoperative delirium, depression, decubitus and/or nosocomial infections.
- The last phase of interviewing, the nurse gives personalized information about specific preventive measures to empower patient and family to decrease an increased risk on one or more postoperative complications before admission.

However, there seems to be a significant gap between the evidence for complex interventions and its implementation success (‘evidence–practice gap’) (2). After dissemination, implementation of complex interventions and the translation to effective use in practise is proven difficult and only moderate improvements have been produced (3,4)

The National Implementation Research Network defines implementation in healthcare as “a specified set of activities designed to put into practice an activity or program of known

dimensions” (5). To improve the quality of healthcare the development of better frameworks for implementation and complex interventions seem promising. Scientific knowledge doubles every decade and with this enormous amount of fragmented and highly contexted dependent information, coordinated actions are required to prevent the potential high failure costs when implementation fails (6,7,8,9). Alignment between management and the healthcare professional on the usefulness of the intervention (10) and understanding of the challenges likely to be present during implementation phases (11), are important prerequisite to effectively navigate the complex process of implementation.

When working against strong psychological, social or environmental factors the same principal applies (12). For this reason Michie, van Stralen en West (13) developed a system from the literature available on this topic, to make one comprehensive model. It was developed from 19 frameworks of behaviour change identified in a systematic literature review (13). None of these frameworks reviewed covered the full range of intervention functions or policies, and only a minority met the criteria of coherence or linkage to a model of behaviour. To fit all the criteria in one system, a wheel with three layers, as shown in figure 1, seemed the most appropriate (12).

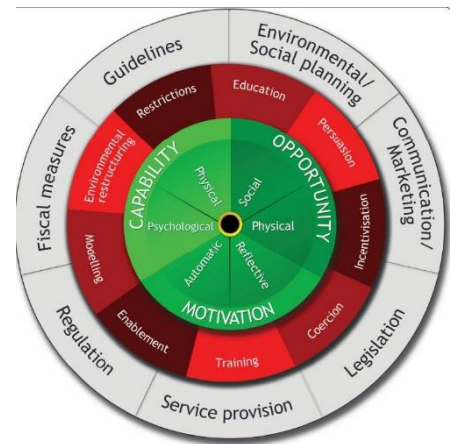


Figure 1 The Behaviour Change Wheel

The Behaviour Change Wheel (12) begins with a foundation of an inner circle which represents what the authors called ‘COM-B’ system’, the capability, opportunity and the motivation available to change behaviour. Surrounding this is a circle of nine intervention functions to choose from, depending on the particular COM-B findings, addressing discrepancies in one or more of these conditions (13). The outer circle represents seven types of policy functions that can be used to support the intervention functions. The concept consists of three stages with in total 8 steps (figure 2). When used all the way through it can be used to understanding why a particular intervention strategy is or is not meeting expectations (12).

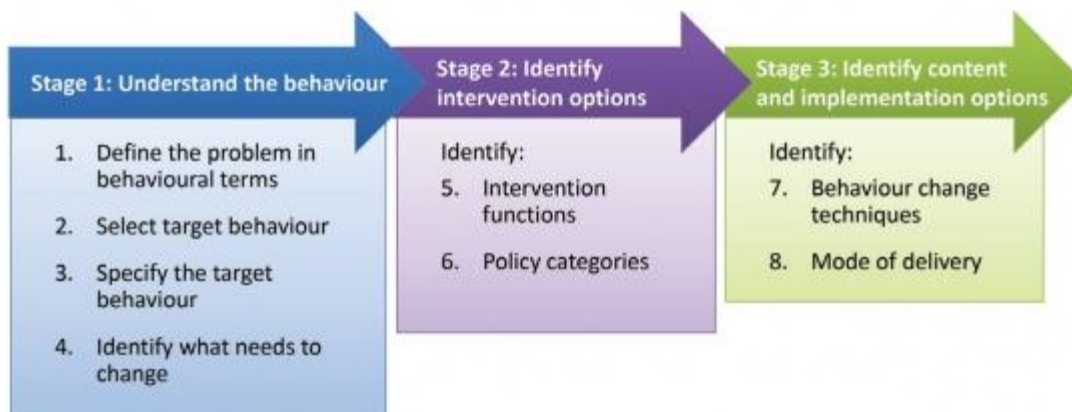


Figure 2 three stages of the behaviour change wheel

With the complex intervention PREDOCS starting to be implemented in 12 different Dutch hospitals following this stage plan:

1. Management assigns PREDOCS nurse (s) and plans specific PREDOC hours.
2. Depending on the length of the waiting list, the nurse reads the daily / weekly information about the (length of) waiting list. With a short waiting list (2-4 weeks) daily, with a long waiting list (> 4 weeks) weekly.
3. On the basis of the waiting list, the nurse determines the number of outpatient clinic days with the planner.
4. Planner plans patient 5 - 2 weeks before admission.
5. Planner will provide nursing information on patient planning.
6. Nurse / planner invites patient and manages outpatient clinic space
7. Nurse performs PREDOCS conversation according to schedule and actively sees the mechanism of action through.
8. Nursing determines in PREDOCS consult whether there is an increased risk of postoperative delirium, decubitus, depression or infection.
9. When the risk is greatly increased, the nurse will inform the surgeon / chief of the clinic.
10. Surgeon / Chief Clinique undertakes action (delay, etc) where necessary
  1. Gives OK schedule appointment OK for this patient
  2. Retransmits patient in heart team discussion for less stressful treatment
11. Surgeon / Chief Clinique asks for incidence numbers of postoperative complications (delirium, depression, decubitus, infection).
12. Nurse makes a note of PREDOCS actions in clinical nursing file
13. Nurse on the ward reads notes with PREDOCS actions at admission of the patient.
14. Nurse on the ward notes daily the postoperative complications (DOS score, GDS2-15, decubitus grade, infections) in patients file.

15. Nurse evaluates postoperative complications together with data manager compliance registration.
16. Data manager supplies quarterly a list of postoperative complications to the client.
17. Project leader evaluates monthly with PREDOCS nurses:
  1. Content PREDOCS conversations (partly based on feedback audio recordings)
  2. Processes (poli time)

Insight in comprehending desired behaviour for successful implementation is fundamental. Therefore this current study focussed on how the policy categories and supporting intervention functions of the behaviour change wheel are used in the implementation of the PREDOCS.

## **AIM**

Gain insight in how the policy categories (third ring Behaviour Change Wheel) and intervention functions (second ring Behaviour Change Wheel) are reflected in the implementation of the nursing intervention PREDOCS in the hospitals and how the supporting intervention functions are used to reach desired behaviour of involved stakeholders and policies from different categories are used to support the intervention functions.

## **METHOD**

### *Study design*

The study used a mixed method design. For the qualitative part of the study grounded theory based interviews were used to gain insight in the implementation strategies. The interviews were conducted with the realist review technique (14) and analysed using sensitizing concepts (15). For the quantitative part a pretest-posttest design was used and descriptive statistics to analyse the existing data from patients in the cardiothoracic wards undergoing cardiac surgery in the four different hospitals and to gain insight in the four outcome measures of the PREDOCS.

### *Population and domain*

The setting of this study are four hospital wards, namely the OLVG, Medical Spectrum Twente, Isala Hospital and the Haga hospital located in respectively west, east, north east and south we The Netherlands.

The study population are (senior) PREDOCS nurses working in the cardiac surgery field, project leaders and the managers supervising these wards.

### *Data collection and procedures*

Eight interviews were conducted using the realist review method (14) consisting of 4 PREDOCS nurses and four managers involved in the PREDOCS and one national project leader. All interviews took between 25 and 45 minutes. The data from the interviews and quantitative dataset was collected between June and August 2017.

The interviews took place at the hospital the interview subjects work, or over the phone. The interviews were conducted using the realist review method and was used to seek for the mechanism how the complex program work in particular context and setting (14). Starting point for the interviews is the stage plan as mentioned in the introduction and the aim of the thesis. From this underlying assumption, about how the PRECODS is meant to work the respondents are questioned and the relationship is trying to be explained between the context in which the intervention is applied, the mechanisms by which it works and the outcomes which are produced (14).

The interviews were executed by the researcher (BT), this will improve the reliability for all the interviews were conducted in the same manner. This also has a disadvantage in replicability, because different researcher make different focus in topics (16).

The quantitative data had to be send to the researcher anonymously stating the before and after scores of the PREDOCS interventions on all four outcomes postoperative delirium, depression, pressure ulcers and infections. Furthermore descriptive data about the patients should be added, stating age, gender, frailty and education level. The baseline data before the PREDOCS implementation was then being compared to the data of patients that have prepared themselves according to the PREDOCS-consult. Based on the assumption that the highest scores would be in the hospitals with the best implementation, data of four hospitals could be compared. This data was not yet available from the researched hospitals due to the phase of implementation they were in.

### *Data analysis*

Analysis of the interviews were done by transcribing the interviews and listening and reading the eight interviews several times (16), to familiarise with the data.

The interviews were coded by using fieldnotes and by using the constant comparative method, coding the other interviews, trying to identify patterns from all the respondents. All the different codes were compared to identify general patterns, differences and similarities until saturation of the data occurred (15). In the analyses from the codes themes are derived by identifying common threads that extend throughout the interviews (15). The sensitizing



concepts derived from the interviews are afterwards linked to the concepts of the Behaviour Change Wheel (15,13).

The quantitative data should be analysed by using Minitab (17). For all variables descriptive statistics should be used in the Minitab format. For the categorical variables percentages and frequencies were going to be used, whereas for the continuous variables means, standard deviations and ranges should be calculated.

### *Ethical approval*

The study was conducted according to the principles of the Declaration of Helsinki and in accordance with the Medical Research Involving Human Subjects Act (WMO). The UMCU METC gave a non WMO-declaration for this study. Respondents were asked if they agreed on taping the interviews.

## **RESULTS**

Eight interviews were conducted during this study, 4 were managers of the departments involved in the implementation of PREDOCS in their department, 3 were nurses or senior nurses at the department of thoracic surgery and one was senior researcher of the national PREDOCS study. Age ranged from 27 to 57 and all were female except for one manager. One of the respondents was a senior nurse at the start of the implementation and now has become a manager of the ward. Therefore one of the interviews was conducted with the former manager of the department, who was manager at the time of the start of the implementation.

From the interviews themes were derived from the data, which will be describes hereafter. The themes are supported by topics from the respondents and are linked to the second and third ring from the Behaviour Change Wheel.

<b>Theme: Nursing Ownership</b>	<b>Second Ring</b>	<b>Third Ring</b>
1 Project leader, nurse or senior nurse	enablement, persuasion	communication
Mandate from management and Medical staff		regulation
Ownership of nurses from the department	incentivisation	
Team maturity	education, training, modelling	
Communication with adjacent specialty and periphery		communication
Feedback of the results to department	education	
Bottom-up	enablement	

The first theme which came forward was nursing ownership. Recipients from the different hospitals stated that nursing ownership was fundamental for the implementation of the PREDOCS. One nurse said: “It really feels like something from ourselves, from which I see my own results back on the ward when we see the patients again”. It was felt important that there was a clear project leader and that this leader was one of their own, a nurse or senior nurse. For the managers it was important to have someone in the lead at the ward and for the nurses one person arranging it in the hospital. Being in the lead for the PREDOCS give nurses the feeling of ownership, also when communicating with other departments and other hospitals. To create the feeling of nursing ownership regular feedback about the results of the PREDOCS in team meetings helps this. Implementing this bottom up helps the nursing ownership. Nurses and managers were aware of the intervention functions used in the behaviour change wheel and were visible in their plans. Enablement and persuasion were deliberately used interventions to persuade colleagues or support services. As one manager said: “I try to give her [project leader PREDOCS] the feeling that she has the skills to pull this [implementation] of, and that I will be there if she needs help”. Third ring policies were less visible and explicit, so were all the meetings organized focused on education and training, but were equally important for the policy of communication and marketing.

<b>Theme: Training</b>	<b>Second Ring</b>	<b>Third Ring</b>
Interview training	training	guidelines
Feedback on interviews	education	
Education from experts	education	guidelines
Peer feedback, first interviews together with college	training, education	
Practice with a patient	training	

Respondents said training and education for the PREDOCS was essential during the implementation of the PREDOCS. Having good guidelines for the consults, and feedback in the first period were called fundamental for having the right skills. Also peer feedback and taping the consult were necessary during the implementation phase. To start with training for the national project leaders was an important start. One nurse said: “Having been able to see the national project leader perform a consult with a patient has helped me put together a topic list and guideline for my own hospital”. Clear guidelines for the interviews with patients and sufficient training and education help the nurse overcome their primary insecurity. In all the interviews, plans for training and education were most explicit. This is due to the fact that it is most practical and visible for the consult that must be done.

<b>Theme: Support by Management</b>	<b>Second Ring</b>	<b>Third Ring</b>
Time available for PREDOCS nurses, work schedule		environmental/social planning
Room available for PREDOCS consults		environmental/social planning
Management of the secretariat		guidelines, communication, service provision
Positive stimulus development nurse	incentivisation	service provision
	training, education	
Start small, then expand	modelling	guidelines
Assistance with plan of action + follow-up	education, training	
Standard letters for patients	incentivisation	
Organize ICT support in EPD	persuasion, enablement, environmental restructuring	regulation
returning topic in team meetings	enablement, education, persuasion	communication
Assistance in mapping patient flow	education, training	social planning, regulation

During the interviews the support of management was called essential. All nurses said that they got time from their manager for executing the implementation. Also the positive stimulation for being able to develop themselves, was an incentive for working on PREDOCS. Some nurses struggled with the plan of action and the ones who got help from their manager said it had helped them developing these skills. Some managers also helped with mapping the patients flow, where in another hospital this was done by the planning department. Management helped the nurses decide the scale in which the PREDOCS was started and backed the up when there were problems with the secretariat or IT. All four managers were aware of their role between the second and the third ring. Being supportive to the nurses and putting the policies in place so the nurses can function in PREDOCS. Because of the bottom-up structure of PREDOCS, 3 out of the four managers were reactive instead of proactive when problems encountered. Because of this they did not have the third ring conscience in scope, but acted unconscious.

<b>Themes: Support from medical staff</b>	<b>Second Ring</b>	<b>Third Ring</b>
Support mandate for PREDOCS nurses	enablement	
Support nurses in PREDOCS conversations	enablement	
Support from department in spaces and support services	enablement	environmental planning
One contact in the department, 1 PREDOCS surgeon	enablement	guidelines
Support communication periphery	enablement	

Three hospitals appointed one surgeon as responsible for the PREDOCS consult. These hospitals all considered this a big benefit in structuring the new process their hospital. Primary goal for having a appointed surgeon was enablement of the tasks the nurses were doing. These surgeons helped also with contact with referring cardiologist from other hospitals and with the contact of the secretariat. Nurses said it helped them to have one surgeon they could turn to for questions or support.

<b>Themes: Support by secretariat</b>	<b>Second Ring</b>	<b>Third Ring</b>
Already full schedule, press	persuasion, incentivisation, coercion, enablement	
Need to show added value for patient	persuasion, education	
Attend information meetings	persuasion, education	
Focus on role in care	incentivisation, persuasion	
Make involved through input	incentivisation	
Clear role and direction	coercion, persuasion	
Criteria list with workflow	environmental restructuring, training, education, persuasion	

The secretariat was named in three hospitals as a bottleneck. They were already packed and did not always want to take on extra work. Support from management and medical staff was essential in these area's for convincing them to put effort in selecting the patients. Nurses and managers said that well informing and letting the secretariat participate in meetings and writing letters aided to the willingness to participate with the PREDOCS. One nurse said: "They [the secretariat] wanted to be involved in patient care ... and now they can answer patient questions and they really like doing some patient education". The PREDOCS nurse got very consciences in reinforcing the secretariat, along the way. They understood the significant role of the secretariat for selecting and inviting their patients. They therefor adjusted their plans on how to approach the secretariat and very consciously used incentivisation, persuasion, enablement and sometimes coercion. One nurse said: "They [secretariat] suddenly stopped inviting TAVI patients, because these patients already had so many appointments (...) I asked them to call me before making such a decision, because I lead this project. This was one of the few times coercion was used to make supportive staff follow the stage plan. Three of the nurses said: "With the knowledge of today, I would have put more effort in the secretariat from day one. They are essential in the process".

<b>Themes: Plan of Action</b>	<b>Second Ring</b>	<b>Third Ring</b>
Order of consults		environmental/ social planning
Separate day for PREDOCS		environmental/ social planning
First PREDOCS, than the other outpatient clinic appointments		environmental/ social planning
Define bottlenecks		environmental/ social planning

The plan of action was mentioned in all the interviews as a difficult part of the implementation process. Nurses stated that they miss the training to write a good solid plan. One nurse stated: "I had to figure that out all by myself, so I used Google to look for a format that suited me. After that I just try to fill it in and speak about it with my manager". Another senior nurse said about the action plan: "I did the HBO-V, so I know about little implementations, but this is so big, I am not trained for that". When managers were asked to help them, they got all the support they needed they stated. Three of the four hospitals plan the patient on a separate day before they see the surgeon. The nurses and managers all said this was a good choice, for the patient was not overfilled with information. Surgeons were all call if the patient had questions they were unable to answer, this felt as an important back-up.

<b>Themes: Enthusiasm</b>	<b>Second Ring</b>	<b>Third Ring</b>
Information meetings	persuasion, incentivisation, enablement, training, education	
Case discussions	persuasion, incentivisation, enablement, training, education	
Positive feedback from patients in the department	persuasion, incentivisation, enablement, training, education	
Get the whole team involved	persuasion, incentivisation, enablement, training, education	
Celebrate victories	persuasion, incentivisation, enablement, training, education	

The last theme in the interviews was enthusiasm. All the respondents named the important effect of being enthusiastic about the PREDOCS. Managers stated that they asked the enthusiastic (and competent) nurses for being project leaders and PREDOCS nurses. The nurses all stated that conveying their enthusiasm to the nurses on the ward and support services formed the basis for feeling ownership and using it as a tool to educate, train and

enable their colleagues to work for the PREDOCS patients. The national project leader stated: "When a patient with increased risk did well, celebrate the success with the whole team".

Due to the phases the hospital were in, baseline data from before the PREDOCS implementation were available in only two hospitals and data of patients that have prepared themselves according to the PREDOCS-consult was not available in any of the four hospitals.

## **DISCUSSION**

This study provides insights in the interventions and policies used by managers and nurses to change behaviour during implementing of the PREDOCS, a complex nursing intervention. From the second ring of the Behaviour Change Wheel, all the intervention functions are used during the implementation phase. Most interventions are used explicitly are training and education, the others are used more implicitly. All the intervention functions were used for specific targets of enabling the implementation. Coercion was used as well, but only when supporting services were not cooperating. Project leaders were very hesitant in using such measures. From the third ring only legislation and fiscal measures are not applicable for this implementation. The rest is used mostly implicit in the hospitals due to the lack of a thorough action plan. Achterberg et al. also see this in their study: " Various examples of persisting ineffective practices show the importance of the development of nursing implementation science (18). Most striking in the interviews is the necessity of nursing ownership of the intervention. Also Klehr et al. state that : "one of the success of the project included nursing ownership of the project" (19). Another conclusion from that study (19) was that close collaboration among staff nurses and information technology staff, ongoing support and encouragement from management and staff contributed greatly for the implementation success. This confirms the result from this study that solid support of one surgeon and mandate from management are essential.

Primarily this was set up as an mixed method study. The quantitative data would have been used to compare the effectivity of the implementation through the outcome of patients after PREDOCS. Hospitals have not yet been able to generate this data, due to the phase of implementation there are in now. Because this data is missing, it is not possible at this point to draw conclusions on how the hospitals preliminary compare to each other on supporting intervention functions, supporting policy categories and secondary on incidence of postoperative delirium, depression, pressure ulcers and infections after implementing the nursing intervention PREDOCS. This is a severe limitation of this study. When outcome data would have been available the comparison between the success of behavioural change and

implementation success could have been made. A recommendation for further research would be to make this comparison if the data comes available. Another limitation is that not all the interviews are coded by two researchers. Other studies found, used the Behaviour Change Wheel for creating an implementation strategy (18,19,20,21) instead of using it to evaluate and improve the strategies used so far. Therefore it was difficult to compare to other studies. As stated by Craig et al: "We recognise that many issues surrounding evaluation of complex interventions are still debated (22), there is still more research needed for the evaluation of complex interventions, such as the PREDOCS.

## **Conclusion**

This study shows that to achieve the full potential of the PREDOCS that all intervention functions are necessary to change the behaviour of the team members in this complex intervention. Education, training and modelling for skill and knowledge. Incentivisation, persuasion and coercion to get everybody in the same direction. Enablement to empower individuals in what they are doing and environmental restructuring to make the physical context suitable. Policy functions must be chosen to fit the right purpose, but should be used far more explicit, conscious and visible. Making guidelines, regulation and accommodate environmental change are indispensable for the implementation. From policy perspective communication and marketing seem the most important for successful implementation of PREDOCS. Enthusiastic managers, doctors and supporting staff, but above all the nurses is an essential condition for the successful behaviour change.

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