

Improving productivity for outpatient clinics using task-shifting

A case study at the IBD clinic at the UMCG

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Trefw task-shifting, task analysis, productivity, outpatient clinic, nurse practitioner

PREFACE

This Master thesis is the final project for my Master of Science in Technology and Operations Management at the University of Groningen. Performing this research in collaboration with the UMCG has been a pleasant experience for me. Therefore I would like to thank Mr. Borgers for his valuable insights on the complexity of hospital practice and the physicians and nurses of the IBD clinic for their time, insights and cooperation.

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ABSTRACT

Purpose: The objective of this research is to identify and assess opportunities for reallocating tasks from physicians to non-physicians in order to improve an outpatient clinic's productivity. With constraints on budgets and the scarce availability of resources like physicians and a growing number of patients, outpatient clinics face serious capacity problems. Therefore a challenge for the clinic manager is to improve the productivity of the outpatient clinic. In this research we consider the possibility to increase productivity by shifting workload from physicians to non-physicians

Method: To achieve the research objective, a design approach is used for the Inflammatory bowel disease (IBD) clinic at the University Medical Center in Groningen, which serves as a case example. Findings from literature, observations, interviews with managers, physicians and nurses and company data are used to set up the system description, analysis and task redesign.

Findings: IBD patients can experience a disease in different phases. The main part of these patients experience a disease in remission. Consults are relatively standardized and performed by physicians. Part of these consults may also be performed by a nurse practitioner. During the analysis of the tasks performed in consulting an IBD patient, we found that the task of explaining the effects or use of medicine may be shifted from physician to nurse.

We found that 229 out of 1521 consults with patients in remission, on a yearly basis, can be shifted to a nurse practitioner. This comes down to 15% of the workload spent on IBD consults. Shifting the task of explaining the effects or use of medicine to a nurse results in decreasing the physicians' workload by 8,1%.

Conclusion: Concluding, task-shifting may be a beneficial solution for the capacity problem IBD clinics face. A large part of IBD patients experience a disease in remission and standard procedures, fitting the competences of nurse practitioners are available. This creates opportunities for task-shifting from physicians to non-physicians. The most important barrier for implementing task-shifting may be the acceptability of patients. Ultimately, patients

have to accept that they may have less contact with highly specialized personal.

Recommendations: We recommend IBD clinics to seriously consider the involvement of a NP in the process of consulting IBD patients. While nurses may also be helpful to the outpatient clinic process, there are not a lot of tasks that may be shifted to nurse without creating duplicated work.

1 INTRODUCTION

'Hospitals are faced with a growing demand for care and higher expectations for improved service delivery, but equally with tighter budgets and constraints on the availability of resources' (Visser, 2001: 591). With regard to this issue, the focus of this research is on outpatient clinics in which patients suffering from the inflammatory bowel disease (IBD) are being treated. Patients (chronically ill) of these clinics visit the clinic for diagnosis or treatment on a regular basis.

With the constraints on budgets and the availability of resources like physicians and a growing number of patients, outpatient clinics face serious capacity problems. Therefore a challenge for the clinic manager is to improve the productivity of the outpatient clinic. In this research we consider the possibility to increase productivity by shifting workload from limited available (and more expensive) staff, i.e. the physicians, to more available (and less expensive) staff compared to physicians, i.e. nurse practitioners or nurses. Some research on productivity and task-shifting is done at HIV clinics in Africa, where physicians are struggling to meet the demand of high patient volumes. Task-shifting has been used to address various types of health worker shortages for the benefit of these HIV clinics (Dolvo, 2004; Lehmann et al., 2009). O'Brien (2008) stated that task shifting, from physicians to nurses and other non-physician clinicians, has been proposed to address capacity problems. 'Task-shifting has the potential to substantially reduce the demand on physicians for HIV services, freeing up capacity to treat more patients, focus on more complex cases, or provide more non-HIV services' (O'Brien, 2008: 2). Furthermore, multiple studies in HIV settings show huge reductions of clinic waiting time when tasks were shifted from physicians to nurses (Ngozi Iwu and Holzemer, 2014; Castelnuovo et al., 2009).

Zachariah et al. (2008) mention various types of task-shifting, i.e. from physicians to non-physician clinicians or from nurses to community health workers. Shifting tasks from a physician to a nurse practitioner (NP), a function which is in terms of qualification between physician and nurse, can also be seen as a type of task-shifting. Hereby the shifting of tasks created a new function in health care. This

type of task-shifting will get more attention in the remainder of this research.

Research on task-shifting is mostly done in Africa, where HIV clinics face a capacity problem. However, very little is known about task-shifting in other outpatient clinics, such as IBD clinics. This suggests the existence of a gap in literature, as IBD clinics are different from HIV clinics in terms of patient population and the nature of care services. Therefore tasks and allocation of tasks are different from HIV clinics. The IBD clinic at the University Medical Center Groningen (UMCG) also faces a capacity problem. In this research we will use the IBD clinic as a case study. In the next chapter this problem will be further elaborated.

2 PROBLEM STATEMENT AND RESEARCH DESIGN

The aim of this chapter is to create an overview of the content and the scope of the study, what problems IBD clinics face in the current situation and the objective and design of this study. Section 2.1 provides background information on the problem. Section 2.2 defines the research objective, followed by the research questions arising from the objective. In section 2.3 is explained how and why a focus group is selected for this research. Section 2.4 discusses the research design.

2.1 PROBLEM BACKGROUND

The problem that IBD clinics face, is that the growing number of patients has caused outpatient clinics to reach its maximum capacity. The bottlenecks in the current process are the physicians of the outpatient clinic. Due to the increasing number of patients, their workloads are very high. Consequently, admission times for patients are often not met. Constraints on the outpatient clinics budget, as determined by health insurance companies, cause that hiring an extra physician is not possible. Therefore a reallocation of tasks from physicians to non-physicians is suggested as one of the solutions to increase the physician's productivity. If due to this reallocation the time spent by a physician on a patient is decreased, a physician will be able to treat more patients and therefore his productivity will increase. Because the physicians are the bottleneck of the process, an increase in physician's productivity will cause an increase in outpatient clinic productivity. This increase in productivity will increase the maximum capacity and may therefore (partially) solve the problem.

2.2 RESEARCH OBJECTIVE

The objective of this research is to **Identify and assess opportunities for reallocating tasks from physicians to non-physicians in order to improve the outpatient clinics productivity.** 'Productivity is defined as the ratio of outputs to inputs' (Nayeri et al., 2005: 2), such as patients seen per worker.

Therefore the focus will only be on outpatient clinic consults and not on supportive activities. Other tasks performed in the IBD clinics relate to patient planning, telephone consults, research and activities supporting the process of treating IBD patients. Also within these tasks there may be opportunities for improving productivity, but they are not covered by the scope of this research and therefore future research may have to be performed on these tasks.

To achieve this research objective, a design approach is used (see section 2.4) and the following questions are answered.

- How is the process of consulting IBD patients set up?
- To whom are tasks within the process assigned?
- Which tasks may be shifted from physicians to non-physicians?
- What are estimated gains in productivity for the suggested shift of tasks?
- What are possible barriers to a task reallocation?

2.3 FOCUS GROUP

The purpose of selecting a focus group is to ensure the research is applied to a select group of patients that represents a large and relevant part of the IBD patient population. Within this group the focus remains on identifying and assessing opportunities for reallocating tasks. A focus group must be well understood, representative, have data available and must have influence on clinic productivity. Therefore in this section the IBD patient population will be analysed so that a focus group can be selected. Data on the patient population will be selected using the IBD patient data based called Cognos-Businesssview-Contacten. Patients treated in an IBD clinic can be distinguished into four different types. In table 2.1 these types are mentioned. Within the types a distinction is made between the conditions of the patient.

Patient type	Condition	Specifics
New	Active	Patient is referred by other care clinic
	Unknown	Patient is just diagnosed with IBD
Regular	Remission	Disease is in remission, no need for treatment
	Active	Disease is active, need for treatment
	Urgent	Patient experiences sudden exacerbation, immediate treatment
Trial	Depends	Patients in difficult condition that test new medications
Written verification	Remission	Disease is in remission, no need for treatment

Table 2.1 Patient types

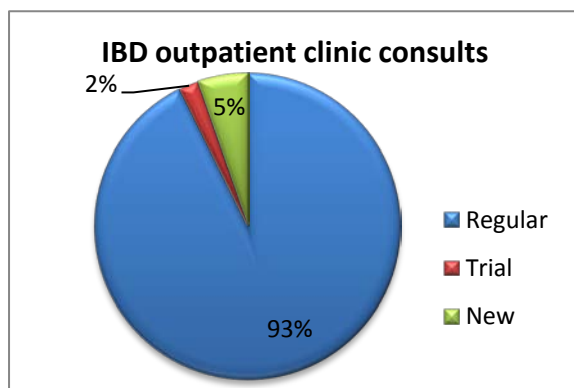


Figure 2.1 (data over 2013, source: Cognos-Businessview-Contacten)

Only new, regular and trial patients actually visit the outpatient clinic for their consult. Written verification patients inform the clinic on their condition by (e-)mail. As shown in figure 2.1, 93% of all outpatient clinic consults are used for

regular patients. The conditions of these regular patients are not registered. Because most outpatient clinic consults are with regular patient and therefore have the most influence on the clinic's productivity, the focus of this research will be on regular patients.

2.4 RESEARCH DESIGN

In order to address the main research objective, a case study will be performed. The unit of analysis will be the IBD clinic at the UMCG. Within this clinic a pilot group (see section 2.3) of patients will be studied. The reason to choose a case study is because 'the case can be studied in its natural setting and relevant theory can be generated from the understanding gained through observing actual practice' (Karlsson, 2009: Chap.5). The data that will be used to answer these questions will be collected using interviews, direct observations, measurements and using the patient database. To provide more detail on the research design, all steps will be explained.

Before explaining the steps in detail, definitions of the most important concepts and the relation between these concepts (see figure 2.2) will be given, starting with a business process. A business process is a set of logically related tasks performed to achieve a defined business outcome (Davenport and Short, 1990). In this research the business process is treating regular IBD patients. These patients are treated by means of an outpatient clinic consult. Within this consult certain tasks are performed. A task is a series of actions or behaviors which accomplishes a goal (Rothwell & Kazanas, 1998). These series of actions are also known as operations and are currently performed by highly skilled staff members (physicians) and less skilled staff members (nurses). Single operations may be shifted from one staff member to another. The focus of this research is on the shifting of tasks from physicians to nurses. The shifting of tasks from physicians to a nurse practitioner, who is also a less skilled staff member, may also be beneficial in this case. Therefore the focus is also on this type of task-shifting. The concepts of tasks and task-shifting are further elaborated in chapter 3.

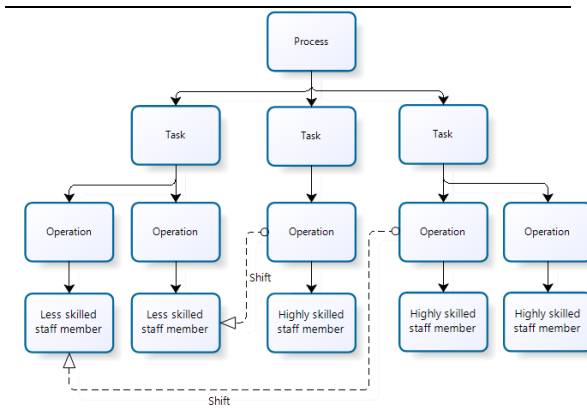


Figure 2.2 conceptual model

When operations are shifted from highly skilled to less skilled staff members, it means that highly skilled staff members, physicians in this case, experience a decrease in workload. Which means physicians can increase their productivity, and therefore the outpatient clinic productivity increases.

Step 1, theoretical framework

By means of a literature study, relevant theories on tasks, task analysis and task-shifting will be reviewed. These theories form the basis of the study. Later on they will be used to perform an analysis, identify opportunities for task-shifting, design task reallocation and calculate the productivity gain.

Step 2, system description

In order to identify all tasks performed in the process of treating the focus group, the current process must be described. This will be done using direct observations and consulting experts at the IBD clinic. Patients will be observed during their visit to the clinic and physician and nurses will describe from an expert approach the patient flow through the clinic. This will be visualized using the Business Process Model and Notation (BPMN) tool (<http://www.bpmn.org/>).

Step 3, analysis

The focus group in this research will be regular IBD patients. Within this group, a small representative group will

be chosen to be observed and analysed in this research. This group of patients are well understood, have data available and influence physicians workload and therefore their productivity. This group will serve as pilot group. Tasks will be analysed using the Hierarchical Task Analysis (Stanton et al., 2005), which is explained in chapter 3.1. This will be done to identify all operations needed to perform the tasks. After the tasks are analysed, opportunities for reallocating tasks are identified. Therefore there must be clarified which tasks can and cannot be performed by physicians, nurse practitioners and nurses. This will be done by interviewing employees involved in the outpatient clinic (e.g. the manager, a physician and a nurse) and based on insights from literature related to HIV clinics, where task-shifting already has been used. For clarifying possible tasks of a nurse practitioner in the Department of Gastroenterology and Hepatology. The IBD clinic is part of this department, therefore this job description is very similar to an IBD nurse practitioners job description, and also this nurse practitioner is available for interviews.

Step 4, task redesign

When every possible role in the IBD clinic is clear, we can determine which tasks candidate for being shifted to which person and profession. This will be done in consultation with experts involved in the process and using insights from previous studies in literature on task-shifting. The aim of the process of task-shifting is to improve overall productivity. Therefore time measurements on tasks that may be shifted are performed and calculations will be done in order to provide insight on the optimal task reallocation and productivity gains. This will be done using the turftool, which is available at the UMCG. This tool uses a digital pen to measure the length of a task.

3 TASK-SHIFTING: A THEORETICAL FRAMEWORK

This chapter reviews literature that is considered relevant in this research. All literature is found while making use of the following databases: Google scholar, PubMed and Web of Science. Using keywords like: task, task-shifting, task analysis, productivity, chronic disease, outpatient clinic and nurse practitioner. In the collection of relevant literature, the following question has been taken into account: What do we need to know before we can reallocate tasks? Therefore in section 3.1 the definition of a task is given. Section 3.2 focuses on task analysis. Section 3.3 elaborates the concept of task-shifting and section 3.4 provides examples of task-shifting in other professions. The chapter ends with a summary.

3.1 TASK

'A task is a series of actions or behaviors which accomplish a goal' (Rothwell & Kazanas, 1998: 125). Tasks are divided into two major types: Cognitive tasks and action tasks (Rothwell & Kazanas, 1998). 'Cognitive tasks are performed mentally; a cognitive behavior such as evaluating, deciding, or discriminating is not observable. These mental processes do not have a set of steps which follow a precise order. They are difficult to define and difficult to teach' (Rothwell & Kazanas, 1998: 125). 'Action tasks have a set of clearly defined steps that are observable. Action tasks have a performer and another person who is changed by the actions of the performer. Sometimes an object may be changed by the action' (Rothwell & Kazanas, 1998: 126).

Definition

An action task, then, is a series of actions or behaviours which:

- Involves interaction between a person (the performer) and an object or another person
- Changes the object or person in some way
- Accomplishes a goal

Criteria

An action task:

- Has a definite beginning and end

- Is performed in relatively short periods of time
- Can be observed
- Can be measured
- Is independent of other actions

(Rothwell & Kazanas, 1998: 126).

In this research, when the term task is used, it refers to action tasks. Although we do not consider cognitive tasks, it must be mentioned that also these tasks are part of treatment process. The tasks performed in an IBD outpatient clinic should be analyzed before they can be reallocated. This can be done using several methods which are explained in the next section.

3.2 TASK ANALYSIS

Task analysis involves identifying tasks, collecting task data, analysing the data so that tasks are understood, and then producing a documented representation of the analysed tasks (Annett et al., 1971). It is therefore necessary to analyse the task performed in the IBD outpatient clinic before an advice for a reallocation is given. The task analysis process is widely used in the health professions as a tool to define the scope of practice for various cadres of health workers (Pascual-Leone et al., (2009). 'There are a number of different approaches to task analysis available, including hierarchical task analysis (HTA), tabular task analysis (TTA), verbal protocol analysis (VPA), goals, operators, methods and selection rules (GOMS) and the sub-goal template (SGT) method' (Stanton et al., 2005: Chap.3). For this research the HTA is used because this method is particularly relevant because of its application in workload assessment and allocation of functions (Stanton et al., 2005: Chap.3). 'HTA is the most popular task analysis method and has become perhaps the most widely used of all human factor (HF) methods available' (Stanton et al., 2005: Chap.3). 'HTA involves describing the activity under analysis in terms of a hierarchy of goals, sub-goals, operations and plans. The end result is an exhaustive description of task activity' (Stanton et al., 2005). 'HTA acts as an input into numerous HF analyses methods, such as human error identification, allocation of function, workload assessment, interface design and

evaluation and many more' (Stanton et al., 2005: Chap.3). In a review of ergonomics texts, Stanton (2004) highlights at least twelve additional applications to which HTA has been put, including interface design and evaluation, training, allocation of functions, job description, work organisation, manual design, job aid design, error prediction and analysis, team task analysis, workload assessment and procedure design. HTA includes the following steps:

Step 1: Define task under analysis

The first step in conducting a HTA is to clearly define the task(s) under analysis. As well as identifying the task under analysis, the purpose of the task analysis effort should also be defined.

Step 2: Data collection process

Once the task under analysis is clearly defined, specific data regarding the task should be collected. The data collected during this process is used to inform the development of the HTA. Data regarding the task steps involved, the technology used, interaction between man and machine and team members, decision making and task constraints should be collected.

Step 3: Determine the overall goal of the task

The overall goal of the task under analysis should first be specified at the top of the hierarchy.

Step 4: Determine task sub-goals

Once the overall task goal has been specified, the next step is to break this overall goal down into meaningful sub-goals (usually four or five but this is not rigid), which together form the tasks required to achieve the overall goal.

Step 5: Sub-goal decomposition

Next, the analyst should break down the sub-goals identified during step four into further sub-goals and operations, according to the task step in question. This process should go on until an appropriate operation is reached. The bottom level of any branch in a HTA should always be an operation. Whilst everything above an operation specifies goals, operations actually say what needs to be done. Therefore operations are actions to be made by an agent in order to achieve the associated goal.

Step 6: Plans analysis

Once all of the sub-goals and operations have been fully described, the plans need to be added. Plans dictate how the goals are achieved. A simple plan would say Do 1, then 2, and then 3. Once the plan is completed, the agent returns to the super-ordinate level. Plans do not have to be linear and exist in many forms, such as Do 1, or 2 and 3. The output of a HTA can either be a tree diagram or a tabular diagram (Stanton et al., 2005: Chap.3).

'HTA can be carried out using pencil and paper only. The HTA output can be developed and presented in a number of software applications, such as Microsoft Visio, Microsoft Word and Microsoft Excel' (Stanton et al., 2005: Chap.3). When the HTA is performed, it is exactly clear which sub-tasks have to be done to complete the task. It is possible to verify who performs these sub-tasks and identify and assess opportunities for task-shifting, which is explained in the next section.

3.3 TASK-SHIFTING

Societal and demographic changes have presented numerous healthcare challenges that demand innovative solutions (WHO, 2008). Task shifting, a process whereby specific tasks are transferred to health workers with shorter training and fewer qualifications, is expected to make more efficient use of existing human resources and ease bottlenecks in service delivery (WHO, 2008). By reorganizing tasks and responsibilities more efficiently and effectively within the health workforce, policymakers hope to make better use of existing human resources and expand and strengthen coverage of key health interventions (WHO, 2008). According to Zachariah et al. (2008), who describe task-shifting as the delegation of medical and health service duties from higher to lower cadres or new cadres, the task-shifting process requires the development of standardized protocols, including simplified clinical guidelines, simplified recording and reporting systems and simplified monitoring and evaluation. 'These measures facilitate the decentralisation of interventions to lower levels of the health system' (Zachariah et al., 2008: 55). Table 3.1 provides some examples of types of task-shifting commonly seen in Africa.

Type of task shifting	Definition	Example
Type I	The extension of the scope of practice of <i>non-physician clinicians</i> in order to enable them to assume some tasks previously undertaken by more senior cadres, e.g. doctors	Clinical officers deciding eligibility and prescribing ART (Malawi)
Type II	The extension of the scope of practice of <i>nurses</i> and <i>midwives</i> in order to enable them to assume some tasks previously undertaken by senior cadres	Nurses treating opportunistic infections and prescribing ART (Botswana, Ethiopia, Uganda, Malawi)
Type III	The extension of the scope of practice of <i>community health workers</i> or <i>lay providers</i> in order to enable them to assume some tasks previously undertaken by more senior cadres, e.g. nurses and midwives, non-physician clinicians or doctors	Community health workers providing ART counseling and HIV testing (Uganda, Rwanda, Malawi)
Type IV	<i>People living with HIV/AIDS</i> , trained in self-management to assume some tasks related to their own care that would previously have been undertaken by health workers	Provision of basic HIV support, treatment adherence and psychosocial support (Botswana, Kenya, Nigeria, South Africa)
Type V	The extension of the scope of practice of other cadres that do not traditionally have a clinical function, e.g. <i>pharmacists</i> , <i>laboratory technicians</i> , <i>administrators</i> , <i>record clerks</i>	Record clerks filling in basic patient information and measuring body weight at HIV clinics (Malawi)

Table 3.1 Types of task-shifting (Zachariah et al., 2008).

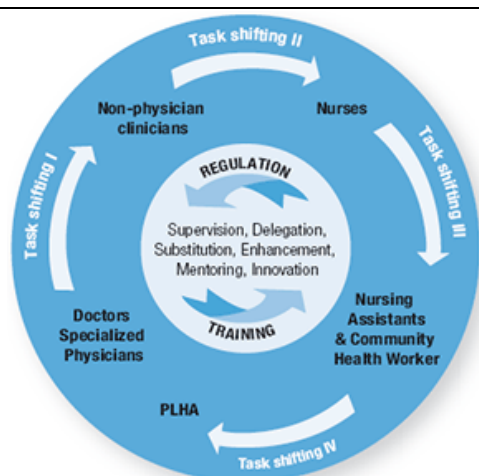


Figure 3.1 (<http://www.who.int/workforcealliance/en/>)

Recently, task shifting has gained considerable momentum, with the World Health Organization (WHO) releasing specific guidelines (see figure 3.1) and recommendations on task shifting (WHO, 2008). The global recommendations and guidelines on task shifting propose the adoption or expansion of a task shifting approach as one method of strengthening and expanding the health workforce to rapidly increase access to HIV and other health services (WHO, 2008).

A special type of task-shifting is the shifting of task from physicians to nurse practitioners. A nurse practitioner is more educated than regular nurses and allowed to prescribe medicine. Therefore a nurse practitioner may be able to take over more tasks from physician than regular nurses. 'Nurse practitioner programs have existed since the 1960s. The neonatal specialty was the first acute care nurse practitioner role to be developed' (Cusson and Viggiano, 2002: 22).

Advanced practice nursing combines the following roles:

- Expert clinician
- Educator
- Researcher
- Consultant
- Leader
- Manager

(Cusson and Viggiano, 2002: 23).

Nurse practitioners obtain histories and perform physical examinations; formulate appropriate diagnoses; develop treatment plans incorporating education, pharmacologic and non-pharmacologic agents, and diagnostic tests; and implement and evaluate the plan of care (Pastorino, 1998). While the transition from nurse to nurse practitioner may be difficult and a lot of training and skills are needed, outpatient clinics may profit from this transition. The role of the nurse practitioner may be of significant value when tasks are reallocated to increase physician's productivity and therefore clinics productivity, which is the objective of this research.

3.4 TASK-SHIFTING IN OTHER PROFESSIONS

Although task-shifting has not been studied in IBD clinics, it has been in other profession like HIV clinics and eye surgery. Before studying IBD clinics, it is important to know what type of lessons can be learned from previous studies. Therefore this section provides examples of research on task-shifting in less developed areas like Africa and India, where a capacity problem forced clinics to work more productive.

'Initial research and evaluations of task-shifting focused on feasibility and acceptability but current evidence shows that task-shifting from physicians to nurses in Africa in HIV clinics, is viable, safe, cost-effective, widely accepted, and sometimes preferred by patients' (Ngozi Iwu and Holzemer, 2014: 43). O'Brien et al. (2008) measured the effect that task shifting has on physicians' workload in Rwanda on the assumption that a reduced workload would allow physicians to redirect their time to enrolling patients. They calculated that without task-shifting policies, Rwanda will need to increase their physician workforce by 52% to hit antiretroviral treatment (ART) enrolment targets. With task shifting policies, this increase is reduced to 11%. 'Several studies have quantified time saved by implementing task-shifting on the assumption that delegating tasks gives

senior clinical staff more time to deal with complicated patients' (Callaghan et al., 2010: 2). 'Although formal cost effectiveness studies have not been done, the available evidence for task-shifting in HIV care supports the conclusion that it is both effective and economical' (Callaghan et al., 2010: 2). 'Non-physician health care workers are able, with careful training and supervision, to deliver equal and sometimes better results than physicians' (Callaghan et al., 2010: 6).

'Indian hospitals have taken task- care workers are able, with careful fresh categories of low-cost health care workers at one end of the spectrum and highly focused specialists at the other' (Govindarajan and Ramamurti, 2013: 5). 'High-school graduates and village girls are trained to be vision technicians and ophthalmic paramedics, they perform task such as admitting patients, maintaining medical records, and assisting doctors. At the high-skills end of the spectrum, general physicians are encouraged to become specialists, nurses are trained to higher-skilled positions as nurse practitioner' (Govindarajan and Ramamurti, 2013: 5). Exemplar hospitals maximize their efficiency by increasing the number of staff supporting their most skilled surgeons and specialists. An example is given on eye surgery performed in Indian hospitals. 'The surgeon performs only the actual procedure. Often seen in U.S. hospitals, the elimination of low-skill staff jobs, which forces doctors to spend more time on routine tasks, resulting in the wrong kind of task-shifting' (Govindarajan and Ramamurti, 2013: 6). 'Indian hospitals, doctors and administrators have traditionally looked to the West for advances in medical knowledge, but it's time the West looked to India for innovations in health care delivery' (Govindarajan and Ramamurti, 2013: 7).

3.5 SUMMARY OF MAIN FINDINGS

Of the two major types of tasks: cognitive tasks and action tasks, this research focuses on action tasks. Action tasks have a set of clearly defined steps that are observable. Tasks can be analyses using the HTA. HTA involves describing the activity under analysis in terms of a hierarchy of goals, sub-goals, operations and plans. The end result is an exhaustive description of task activity.

'Increasing financial constraints within a context of increasing healthcare demand necessitate the introduction of

more efficient and productive models for delivering healthcare' (Cullen et al., 2012: 620). Task shifting is a process whereby specific tasks are transferred to health workers with shorter training and fewer qualifications (WHO, 2008). A special type of task-shifting is the shifting of task from physicians to nurse practitioners. A nurse practitioner is more educated than regular nurses and allowed to prescribe medicine.

There are several ways to deliver healthcare more productive. Of the ways to increase productivity in healthcare, the focus in this research is on task-shifting. The reason for this is because multiple studies in different profession have shown that task-shifting can be very successful (Zachariah et al., 2008; O'Brien et al., 2008; Callaghan et al., 2010; Govindarajan and Ramamurti, 2013; Ngozi Iwu and Holzemer, 2014). Also task-shifting may be relatively inexpensive and no extra personal is needed.

4 SYSTEM DESCRIPTION

This chapter explains the current organization regarding to the process of treating regular IBD patients. This system is shown in figure 4.1.

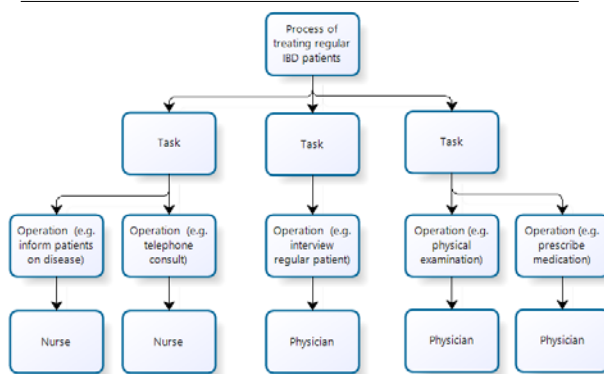


Figure 4.1 System

The system consist of the process of treating IBD patients. The characteristics of regular IBD patients are explained in section 4.1. In section 4.2 the process of treating regular patients is explained in more detail because, as explained in chapter 2, the focus in this research in on the process of treating regular patients. Within this process certain tasks are performed, these tasks consist of single operations which are performed by staff members. These tasks and operations are analysed in the next chapter. Section 4.3 provides information on the staff members of the outpatient clinic and section 4.4 provides information on the information support system at the IBD outpatient clinic.

4.1 PATIENTS CHARACTERISTICS

In chapter 2 (table 2.1) we distinguished 4 different types of IBD patients: Regular, new, trial and written verification patients. This distinction is made because the treatment, in the form of consultation, is slightly different. As mentioned, a large part of all patients belong to the category regular patients. Regular patients visit the outpatient clinic in the UMCG between 1 and

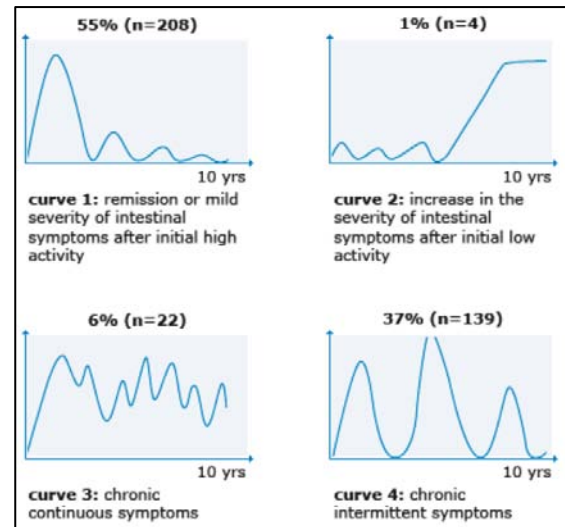


Figure 4.1 IBD development (Scheffer 2013)

6 times per year, dependent on the conditions of the disease. The condition of the disease of these patients can be in remission, active or urgent. This is because the symptoms of the disease can develop over a period of time. Figure 4.1 illustrates the development of the symptoms of the IBD over 10 years in 4 different curves. The figure shows that also in this hospital in Den Bosch, most patients (55%) experience the disease in remission.

Appendix A shows an example of the development of the disease of one IBD patient treated in the UMCG. This graph is produced using the ZIC system (see section 4.4). This patient experiences the disease like in curve 1 of figure 5. During the treatment the disease is tried to be suppressed with the use of different medicine. For every patient the effect of certain medicines may be different. By slowly adapting the dosage, the optimal use of medicine is determined. Once the disease is under control, it is relatively ease to keep it that way for remission patients.

4.2 PROCESS

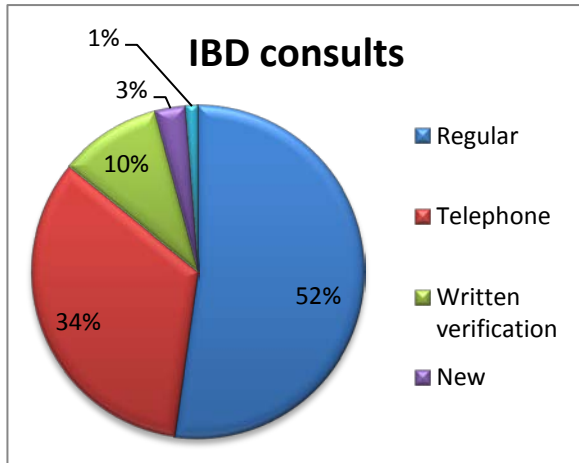


Figure 4.2 (data over 2013, source: Cognos-Businessview-Contacten)

As explained in the previous section and chapter 2 the IBD clinic faces 4 different types of patients.

These patients are treated by means of different consults. Figure 4.2 illustrates the distribution of the number of IBD related consults over 2013. Of all IBD consults, 10% consists of written consults. These consults do not take much time from a physician, but are dealt by nurses. The disease of written verification patients is in remission, so there is no need for treatment or change in medicine. New patients can come to the IBD clinic through referral by their General Practitioner (GP) or through tertiary referral by regional hospitals, this happens in case the disease is too complex for these hospitals. A small group of patients participate in a trial for new medicine. Although this group is very small (5 patients in 2013), because of their complex condition and the use of new medicine, they have to be monitored closely. Therefore these patients visit the outpatient clinic 7 to 13 times a year (in 2013). All patients may also be consulted by telephone. This happens when the patient has short questions or results of tests need to be discussed. Telephone consults are performed after all outpatient clinic consults. By far the largest part of the consults is with regular patients. The flow of regular patients through the clinic is in rough detail illustrated in figure 4.3.

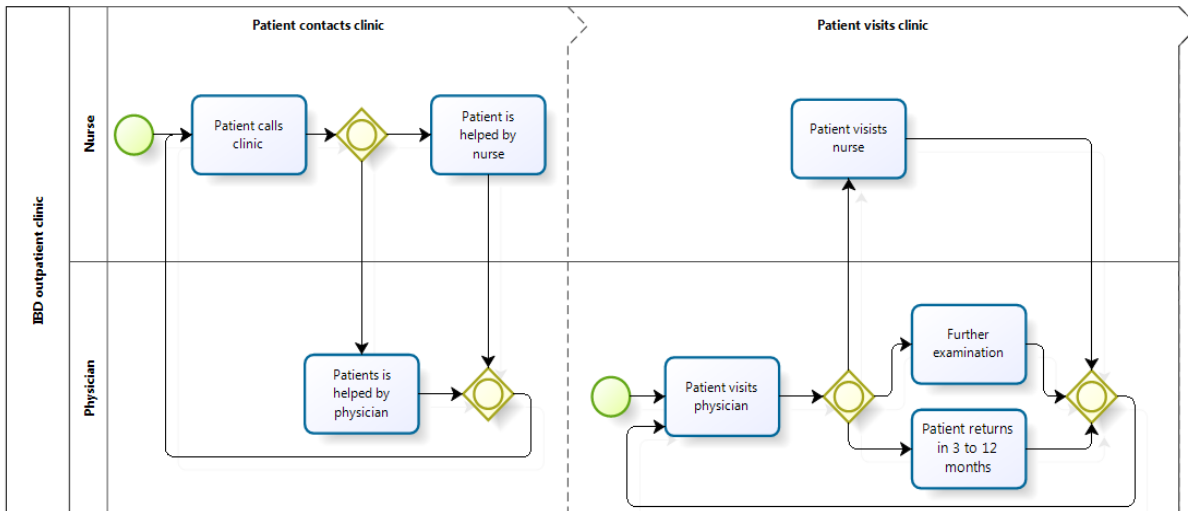


Figure 4.3 Patient process flow

A regular patient visits or calls the clinic to get in contact with a nurse or physician. A patient calls a clinic for short question on medications, appointments or when the patient is feeling ill. The patient can call the IBD clinic during a daily consultation hour. Although, patients are able to reach the clinic daily during working hours. First a nurse tries to answer the question, if this is not possible, the patient will be called back by a physician. The regular patient visits the outpatient clinic on appointment. After seeing a physician a patient could be experiencing progress and returns in 3 to 12 months. It is also possible that a patient will need to have their blood and/or stool examined, or is referred to the endoscopic or radiology ward. Dependent on the results a physician will determine that a patient will need to alter medication, or no direct action needs to be taken. When a patient will be prescribed to a new form of medication, he or she will visit a nurse to be informed on the new medication. It is also possible to visit a nurse after a consult for further question on medication, treatment or the disease.

As explained in section 4.1, a regular patient can be in three different kinds of conditions. Active patients and patients in remission will normally visit the outpatient clinic on the arranged time and follow the process as explained above. Patients in need of urgent care contact the clinic during the daily telephone consultation hour and are called back by a physician. These patients, dependent on the judgment of the physician are then scheduled for a physical consult within one week. It could also be the case that a patient is suffering from severe exacerbation and needs to be admitted right away. The tasks that need to be performed during a consult for regular patients, are analysed in the next chapter.

4.3 STAFF

In the IBD outpatient clinic both nurses and physicians are actively working with patients and a staff member of the planning department is supporting the process. A nurse and a physician both make use of a separate room to see a patient. Trial and new patients visit both nurse and physician, regular patients only see the physician. Although the nurse is available for regular patients for questions on medication and treatment.

New patients are interviewed by a nurse when they visit the clinic for the first time, after that a new patient becomes a regular patient. Trial patients see a nurse during every visit to fill in questionnaires and to tests. Furthermore, a nurse is available to regular patients to explain the use and effect of certain medicines and to answer practical questions.

A physician is performing consults at the outpatient clinic. This can be with regular, new or trial patients. The consults are face-to-face and by telephone. Consults with regular patients are performed by using the ZIC system, which is explained in the next section.

4.4 INFORMATION SYSTEMS

Administration and processing of patient data is currently done with the PoliPlus and ZIC systems. 'The PoliPlus and ZIC back-office systems are electronic patient record systems and contribute to digitalization. The PoliPlus system is UMCG wide, and ZIC is Department of Gastroenterology and Hepatology specific' (Van Pel, 2013: 18). Currently a transition takes place to insert all patient data into the ZIC system because this system is specially designed for performing IBD consults. The IBD clinic aims to insert all patients into the ZIC system in the near future.

A consult with the ZIC system consist of certain steps (See appendix B) that need to be followed to complete the consult. Within these steps certain questions need to be answered and there is room for important notes. Some steps only need to be done once (when inserting the patient into the system) and some steps are automatically completed with data of previous consults. This way the ZIC system is used as a guideline to perform a consult. Not all steps in the ZIC system are performed every consult and some steps are jointly addressed. In the next chapter, a consult for treating regular patients using the ZIC system will be analyzed.

5 ANALYSIS

This chapter will give an analysis on the tasks performed within the process of consulting a regular patient using the HTA tool. After these tasks are analyzed, opportunities for task reallocations are given based on previous studies, by considering the competences of NPs and nurses and the task analysis. A distinction is made between tasks that may be shifted from physician to NP and from physician to nurse.

We chose to focus on the analysis of consulting a regular patient, because this is the main activity in the outpatient clinic and responsible for a large part of the physicians workload (52% of all consults, see figure 4.2). Therefore it has the most influence on the clinic's productivity. The HTA is executed by observing a pilot group of 15 regular patients. These patients were observed during their outpatient clinic consult. All six steps of the HTA were conducted in consultation with physicians and nurses, since they are the experts in the field. All tasks are decomposed until one single operation, performed by one person, is left. (see appendix C).

5.1 HIERARCHICAL TASK ANALYSIS IBD CLINIC

By observing the process of treating regular patients and consulting physicians and nurses, as experts on the process, on the tasks of treating these patients, the HTA is performed by following the 6 steps named in chapter 3. The task under analysis is the consult of a regular IBD patient. The reason for this task to be analyzed is to isolate individual operations and next consider opportunities to reallocate operations in order to increase outpatient clinic productivity. The output of the analysis is shown in figure 5.1.

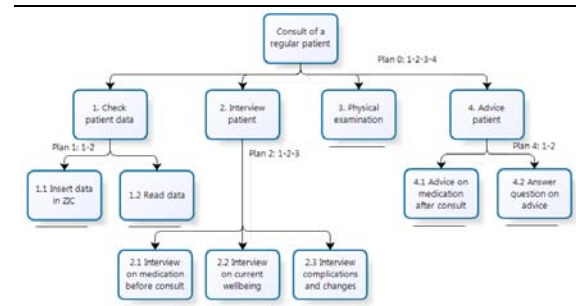


Figure 5.1 HTA outcome

A consult starts with a physician reading patient data like medical history (the patient is not present yet). Therefore this data must be inserted into the ZIC system. This is mostly done automatically once the patient is inserted in the system. Sometimes new data on endoscopic result etc. are to be found in the PoliPlus system. When the physician has checked all data, the patient has to be interviewed on his or her condition. Therefore questions on three different topics are asked: medication, current wellbeing and extra complications. After interviewing the patient, if needed, a physical examination is performed. Then an advice is given with regard to medication after the consult and question on further use of medicine and treatment are answered. All of these tasks are performed by a physician.

5.2 OPPORTUNITIES FOR TASK REALLOCATION

Referring to the literature reviewed chapter 3, task-shifting is basically meant for shifting workload from highly specialized workers to less specialized workers. By shifting tasks, 'the best Indian hospitals match the skill levels of their people with the basic requirements of tasks' (Govindarajan and Ramamurti, 2013: 5). Letting surgeons perform only the actual procedure. Other studies related to HIV clinics show that nurses were trained to do consults and rotating physicians visit clinics to supervise and support the nurses and to see complicated cases (Callaghan et al., 2010; O'Brien, 2008).

Now we have analyzed the task of consulting a regular patient, opportunities for task reallocation can be identified. Therefore the competences of a NP and a nurse need to be acknowledged. A job description of a NP and a nurse was analysed and employees in these professions where consulted as experts in this field. The descriptions are obtained with the Fuwavas job evaluation system that is available on the UMCG internal network (intranet.umcg.nl). The descriptions are not IBD specific and written in Dutch, therefore essential points are summarized in this section. Based on these descriptions, the HTA and an analysis of the IBD patient population, opportunities for task reallocation are identified.

5.2.1 PHYSICIAN TO NURSE PRACTITIONER

Based on the Fuwavas job evaluation system and interviews with NPs of the Department of Gastroenterology and Hepatology, we describe the competences of a NP as follows: The activities of a NP involve limited risks, limited dependent consultation hours and provides supervised clinical care. A NP checks patient history, conducts physical and psychosocial examination, interprets observations and diagnostic results and sets up the treatment, medication and care needs and prescribes medication according to the applicable agreements. This means that a NP is able to perform a consult of a regular patient independently, as long as there is a protocol for doing the consult and prescribing medication, and the condition of the patient is not complex. The complexity of the patient must be determined in agreement with the involved personal. During consultation session these patients will be discussed. Also hospital regulations require that a physician must be nearby to supervise the NP if a consult turns out to be more complex than expected.

Van Pel (2013) studied the frequency of consults of regular patients in the different conditions at the IBD clinic in the UMCG (see appendix D). He found that patients in remission visit the outpatient clinic every 6 months. Figure 5.2 shows the visit frequency of the IBD patients in 2013.

Therefore we can assume that almost 85% of the outpatient

**Visit frequency regular patients
(visits per year)**

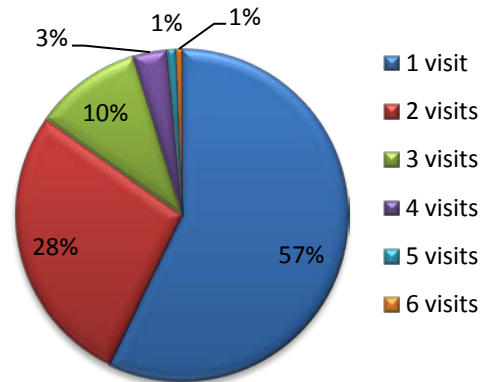


Figure 5.2 (data over 2013, source: Cognos-Businessview-Contacten)

clinic consults in 2013, where conducted with patients in remission. Note that almost 85% is in remission, because it could be the case that a patient only visits the clinic twice a year, but also receives telephone consultation when the disease is active.

At the IBD clinic currently five physicians are performing consults. Two of the five physicians only treat a small part of the IBD population and are not working with the ZIC system jet. They also do not take new patients in treatment. Therefore only the consults of the three physicians, actively involved in the IBD clinic, are taken into account. Table 5.1 provides information on the number of different consults performed by these physicians over 2013.

Patient type	# of consults	%
Regular	1366	73
<i>Remission*</i>	(932)*	(50)*
<i>Active or Urgent*</i>	(434)*	(23)*
New	111	6
Trial	44	2
Written verification	344	19
Total	1865	100

Table 5.1 Number of consults

Source: Cognos-Businessview-Contacten,

*Part of regular patients. These numbers are estimates; there is no record of the condition of patients.

Approximately 50% (932) of the consults performed in the IBD outpatient clinic are outpatient clinic consults with patients in remission. After validation with physicians and by looking at a NPs competences we can conclude that, because a patient in remission is often not complex, a NP may perform all tasks mentioned in the HTA. Because there is a standard procedure for performing the consults (ZIC), a NP can perform a consult with a regular patient in remission independently. This type of shift has also been proposed in previous studies (Callaghan et al., 2010; O'Brien, 2008). Therefore it could theoretically be possible to shift all consults with patients in remission from the physicians to a NP. Note that a physician must be nearby to supervise the NP. Also when including a NP to the clinic's staff, extra coordination and training is needed. Not only patients in difficult condition need to be discussed, also patients in remission need to be discussed and distributed over physicians and NPs.

5.2.2 PHYSICIAN TO NURSE

Based on the Fuwavas job evaluation system and interviews with nurse of the IBD clinic, we describe the job of a nurse as follows: Activities of a nurse involve composing a nurse plan, including medical history, diagnosis, actions and goals.

A nurse carries out the nurse plan on the basis of combinations of standard procedures, informs patients and their relatives on the diagnosis and treatment, registers securities of interventions and updates the nursing plan. A nurse possesses relevant knowledge and understanding of diseases and disease processes, studies, diagnostic methods and (medical) treatment methods, possesses knowledge and understanding of the nature, causes and consequences of somatic, psychological and psychiatric and behavior disorders and applies these insights into specific nursing care situations.

The outcome of the HTA shows that physicians use considerable time during a consult, on entering patient data into the system, interviewing the patient on complications and medicines and answering questions on medication and treatment. Since a nurse should be able to perform a large part of these tasks, there are opportunities for the shifting of tasks like: interview patient, inserting patient data into ZIC and answer question on medication. Previous studies show that shifting tasks like this can decrease a physician's workload (Callaghan et al., 2010; O'Brien, 2008). Based on the opportunities identified in this chapter, in the next chapter a redesign of tasks is given.

6 TASK REDESIGN

This chapter provides a redesign on the allocation of tasks in section 6.1 and 6.2. Again a distinction is made between tasks shifted from physician to NP and from physician to nurse. Section 6.3 given an indication on the productivity gain, while section 6.4 provides insights on possible barriers.

Munga et al. (2012) summarized preconditions that need to be adapted, depending on countries' specific circumstances, when implementing task-shifting. These preconditions are determined by the WHO (2008):

- Task shifting must be implemented in such a manner that it will improve the overall quality of care. It should not, and must not, be associated with second rate health care services.
- Task shifting must be implemented with systems which contain checks and balances that are sufficient to protect both health workers and patients. This will involve both the presence of effective regulatory mechanisms, certification and remuneration of health workers who assumes new/delegated tasks.
- Regulation and certification must neither decelerate the speed at which action is already taking place nor usher in restrictions that may have a constraining effect on other or on future public health service delivery effort (Munga et al., 2012).

Note that these preconditions may not be relevant to IBD clinics, because the WHO focuses mainly on HIV clinics. Up to the time of writing this thesis there were no rigorous criteria for reallocating task in clinics similar to IBD clinics. As a result, to come to a redesign, the opportunities of the previous chapter are analysed. We checked

- whether the shifting of certain tasks actual improved clinic productivity.
- if duplication of work occurs.
- if regulations with regard to insurance companies would form problems.

- if the preconditions determined by the WHO (2008) can be complied.

6.1 PHYSICIAN TO NURSE PRACTITIONER

As mentioned in the previous chapter, approximately 932 of the consults performed by three physicians, may also be performed by a nurse practitioner. Although this may be true in theory, in practice this may not be wise. Although this shift would improve clinic productivity and no duplication of work would occur, insurance companies may not approve this shift. Due to regulations, some IBD patients need to see a physician once a year, in order to receive payment for treating those patients. Also shifting all these patients at once to a nurse practitioner could cause problems within the quality of care (precondition 1 of the WHO), as these patient would not have contact with a physician anymore. Therefore the following is proposed: 229 of this group of patients did visit the outpatient clinic two times in 2013. Assuming that the disease for most of these patients is in remission, a NP should be able to perform one of the two consults of these patients. So the first step after education a NP would be to shift half of the consults of this group of patients, to the NP. These consults are performed using standard procedures, like the steps in the ZIC system and the conditions of the patient have limited complexity. The NP would act under supervision of a physician, which is attainable if a consult is found to be too complex.

6.2 PHYSICIAN TO NURSE

In the previous chapter opportunities for the shifting of tasks like interview patient, inserting patient data into ZIC and answer question on medication were identified. If tasks like interviewing a patient on medication or complications and inserting these data are to be shifted to nurses, it means that nurses need to see or call every patient before they visit a physician. While this may improve physician's productivity, the effect on clinic efficiency would be negative because a duplication of work occurs. Therefore it

would decelerate the speed at which action is already taking place (precondition 3). It may cost some time for a physician to insert interview data into the ZIC, physicians need this information to give an appropriate advice and therefore have to read this data anyway. Therefore the following is proposed:

During a consult, physicians spend time on explaining the effect of medicine and how to use them. Currently if a patient uses medicine like Imuran for the first time, a nurse will explain the effect and use of the medicine after the consult. We propose to do this more often with other medication and mental issues of the patients. Currently a nurse is already available for further questions during consults.

6.3 PRODUCTIVITY GAINS

This section will provide an estimation of the productivity gain, by calculating the time saved by physicians, if previous proposed shifts were implemented. Therefore we used data over 2013.

If 229 consults of patients in remission are to be shifted to a NP, it would mean that 229 of the 1521 outpatient clinic consults were taken away from the three physicians. This comes down to 15% of the workload spend on IBD consults.

For calculating the productivity gain if a nurse would be used for explaining the effect and use of medicine we used the turftool. This is a digital pen that calculates the time interval between setting two lines, whereby the average duration of operations performed in a consult is measured. 12 consults with regular patients were attended to calculate the duration of several tasks. Note that not every task in the table is performed during every consult, because this will not always be necessary. No large outliers were measured. The results are shown in table 6.1.

Operation	Average duration (min)
Reading medical history	2,66
Check medical history	1,41
Medication history	0,84
Present wellbeing	3,46
Test results	2,46
Advice	3,93
Errors	1,45
Explanation medication	1,62
Updating ZIC	1,52
Physical examination	0,64
Total	19,99

Table 6.1 Task durations

On average, a physician is spending 1,62 minutes per regular consult on explaining the effects or use of medicine. If this operation would be shifted to a nurse, a regular consult should be on average 1,62 shorter, thus decreasing the physicians' workload by 8,1%.

6.4 POSSIBLE BARRIERS

'If viable policy options are not properly implemented they are unlikely to be effective. It is therefore important to consider what potential barriers there may be to the implementation of policy options and how to address these' (SURE, 2011: Chap.5). 'Published lists of barriers for implementing changes in healthcare often show a high degree of overlap' (SURE, 2011: Chap.5). 'A framework for identifying barriers to implementing a policy option which is adapted to focus on barriers to implementing health systems changes is made available by SURE' (Colvin et al., 2013: 3).

'This SURE framework includes the following factors: (a) knowledge and skills; attitudes regarding programme acceptability, appropriateness and credibility; and motivation to change or adopt new behaviours among recipients of care, providers of care, and other stakeholders; (b) health system constraints (including accessibility of care, financial resources, human resources, educational system, clinical supervision, internal communication, external communication, allocation of authority, accountability, management or leadership (or both), information systems, facilities, patient flow processes, procurement and distribution systems, incentives, bureaucracy, and relationship with norms and standards); and (c) social and political constraints (including ideology, short-term thinking, contracts, legislation or regulations, donor policies, influential people, corruption, and political stability)' (Colvin et al., 2013: 3).

Based on the factors of this framework, interviews with employees of the Department of Gastroenterology and Hepatology (DGH) and literature on task-shifting, possible barriers are identified. These barriers are categorized in abovementioned factors and based on interviews and observations there will be determined which barriers are applicable for IBD clinics.

(a) knowledge and skills

The importance of ongoing training has been highlighted by qualitative interviews (Callaghan et al., 2010). Therefore IBD clinics must realize it takes more than just shifting tasks. Workers need to be educated, which is an ongoing process and costs money. This may not be a great barrier, but is relevant for IBD clinics and must be kept in mind by the management.

(b) health system constraints

Perhaps the greatest barrier may be formed by the patients. Ultimately, the patients have to accept that they may have less contact with highly specialized personal. Ngozi Iwu and Holzemer (2014) reviewed five studies assessing patient acceptance of task-shifting in Africa. Although patients found task-shifting acceptable, some patients had mixed reactions due to concerns with HIV service integration at primary care centers (Ngozi Iwu and Holzemer, 2014). Other patients reported they preferred physician care because only physicians could "medically certify social grants"

at that setting (Ngozi Iwu and Holzemer, 2014). IBD patients may resist to task-shifting, but the care for these patients possible will improve. Non-physician health care workers are able, with careful training and supervision, to deliver equal and sometimes better results than physicians (Callaghan et al., 2010). Also NPs of the DGH at the UMCG stated that some patients may also form a barrier for task-shifting in IBD clinics. But once the patients see that the quality of care remains the same or even improves, most patients accept the shifts.

NPs of the DGH pointed out the importance of gaining physicians trust. This requires communication and coordination among staff members, which is another common challenge reported (Colvin et al., 2013). According to Zachariah et al. (2008), the task-shifting process requires the development of standardized protocols, including simplified clinical guidelines, simplified recording and reporting systems and simplified monitoring and evaluation (see section 3.3). 'These measures facilitate the decentralisation of interventions to lower levels of the health system' (Zachariah et al., 2008: 55).

(c) social and political constraints

'The process of task shifting can influence the social dynamics within clinics. An ethnographic study of a task shifted ART scale-up program in Cameroon found a pervasive tension between nurses and community health workers, and ambiguity around the definitions of roles and hierarchies within the clinic. It concluded that task shifting policies must anticipate this problem and clearly delineate processes and responsibilities for existing and newly-created health cadres' (Callaghan et al., 2010: 6). This barrier may not be relevant for IBD clinics because no community health workers are involved. Therefore this must be further explored.

Another issue to keep in mind is previous mentioned regulations with regard to insurance companies. These companies may not accept a non-physician consulting an IBD patient. This means agreements must be made between hospital and insurance companies, because task-shifting may be beneficial for both.

7 CONCLUSIONS

Concluding, task-shifting may be a beneficial solution for the capacity problem at IBD clinics. A large part of IBD patients experience a disease in remission and are therefore relatively easy to consult. Standard procedures are available, which creates opportunities for task-shifting from physicians to non-physicians.

The objective of this research was to identify and assess opportunities for reallocating tasks from physicians to non-physicians in order to improve the outpatient clinics productivity. To achieve this research objective, a design approach is used and the following questions are answered.

- How is the process of consulting IBD patients described?

IBD clinics face different types of patients. Patients can be new to the clinic or participate in a trial programme. But most of them are regular patient who can experience the disease in remission, active or urgent state. These patients are consulted face-to-face between 1 and 6 times a year. Patients may also be consulted by telephone.

- To whom are tasks within the process assigned?

In the IBD outpatient clinic both nurses and physicians are actively working with patients and a staff member of the planning department is supporting the process. New patients are interviewed by a nurse when they visit the clinic for the first time. Trial patients see a nurse during every visit to fill in questionnaires and to tests. Furthermore, a nurse is available to regular patients to explain the use and effect of certain medicines and to answer practical questions. A physician is performing consults at the outpatient clinic. This can be with regular, new or trial patients. The consults are face-to-face and by telephone.

- Which tasks may be shifted from physician to non-physicians?

229 of the consults of the group of regular patients that visit the outpatient clinic two times a year can be shifted to a NP. The task of explaining the effect and use of the medicine after the consult can be shifted to a nurse.

- What are estimated gains in productivity for the suggested shift of tasks?

This comes down to a saving of 15% of physicians workload spend on IBD consults if 229 consult are shifted to a NP. 8,1% of physicians' workload will be saved if a nurse takes over the task of explaining the effect and use of medicine.

- What are possible barriers to a task reallocation?

Possible barriers may be: acceptability and trust at the side of physicians, need for ongoing training, acceptability of patients, communication and co-ordination among staff members, social and political constraints or regulations with regard to insurance companies.

7.1 RECOMMENDATIONS

We recommend IBD clinics to seriously consider the involvement of a NP in the process of consulting IBD patients. While nurses may also be helpful to the outpatient clinic process, there are not a lot of task that may be shifted to nurse without created duplicated work. Nurse may play a bigger role in assisting physicians performing outpatient clinic consults. Physicians may refer patients more often to see a nurse after their consult, to ask question on medication are talk about their wellbeing.

Although trial patients were not part of the scope of this research. During observations of the process, trial consults seemed to be performed standardized. There are protocols for these consults and they are already performed by a nurse for a large part. A physician is needed in these consult for physical checks and questionnaires. This may also be performed by a NP. Although there were just 44 trial consults in 2013, these consults influence the flexibility of physicians. Trial patients need to be seen at specified intervals and have to be taken into account. Therefore a shift of trial patient consults from physician to a NP would also be recommendable, if agreed by the sponsor.

Something else to consider is starting negotiations with insurance companies. The monitoring of patients using e-mail and questionnaires can save both the clinic and insur-

ance company time and money. Therefore regulations on the frequency of face-to-face consults must be changed.

7.2 LIMITATIONS

Task-shifting alone will not solve the capacity problem in IBD clinics. With a growing patient base task-shifting is only a temporarily solution. Nor should task shifting be considered simply as a means of saving money: while it makes for more efficient uses of clinical resources, in contexts of worker shortages task shifting is primarily a means of extending access to quality care to a greater number of people (Callaghan et al., 2010: 7). Therefore task-shifting may only partially solve the problem.

Another limitation may be the way in which consults are analyzed for calculating the productivity gain if a nurse would be used for explaining the effect and use of medicine. 12 consults of a physician and a physician in training were observed while measuring the duration of tasks. 12 consults may not be sufficient to calculate a representative average. Also observing all IBD physicians would make the average more reliable.

7.3 FUTURE RESEARCH

While previous research on task-shifting is mostly about how task-shifting is used to increase productivity, more efficient use of resources or decreasing workload, future research should include how social dynamics in health care might be affected. Social dynamics relates to the behaviour of employees within the team. Task-shifting may change the hierarchy and way of collaborating within a team and therefore influence the behaviour of employees. Another opportunity for future research may be in the field of barriers in task-shifting, specifically in health care clinics like the IBD clinic in this research.

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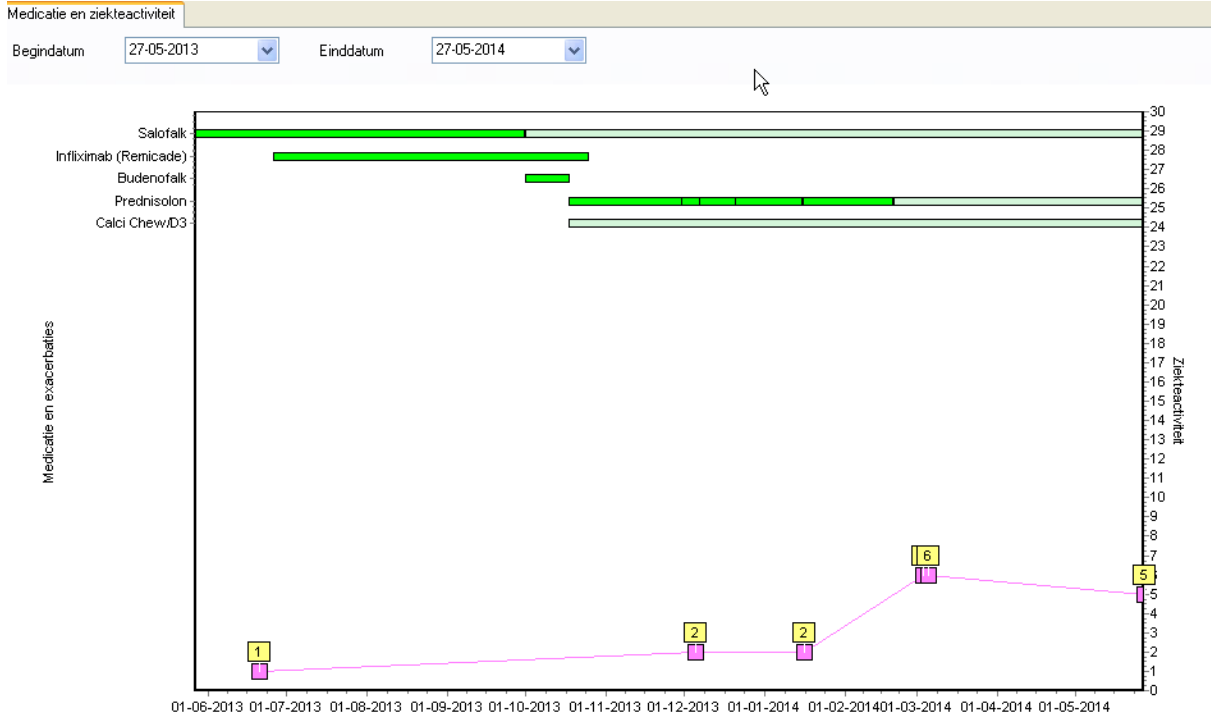
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APPENDIX

APPENDIX A, IBD DISEASE



Explanation: The green bars show the use of medicine. The pink line corresponds with the number on the right. 0-3 indicates a disease in remission and 4 and above means the disease is active.

APPENDIX B, ZIC

Reason for visit

Medical history general

Medical history IBD

Medication history

Sensitivities

Medication before consult

Present wellbeing

Extra complications (once)

Tract medical history (once)

Intoxications (once)

Social medical history (once)

Family medical history (once)

Physical examination (only if needed)

Laboratory research (only for research)

Additional research (only for research)

Conclusion

Medication after consult

Revision

Letter

Reading/check patient data

Check medication

Check current wellbeing

Extra complications, only when changes

Check physical wellbeing

Advice patient

APPENDIX C, HTA

Step 1: Define task under analysis

Consulting a regular IBD patient in order to reallocate operations to increase productivity.

Step 2: Data collection process

Data is collected by observations and interviews. Findings are validated with nurses and physicians.

Step 3: Determine the overall goal of the task

Treatment of a regular IBD patient.

Step 4: Determine task sub-goals

1. Check patient data
2. Interview patient
3. Physical examination
4. Advice patient

Step 5: Sub-goal decomposition

- 1.1 Insert data into ZIC
- 1.2 Read data
- 2.1 Interview on medication before consult
- 2.2 Interview on current wellbeing
- 2.3 Interview on complications and changes
- 4.1 Advice on medication after consult
- 4.2 Answer questions on advise

Step 6: Plans analysis

Do 1, then 2 and then 3 etc.

APPENDIX D, FREQUENCY OF CONSULTS OF IBD PATIENTS
(VAN PEL, 2013)

State of disease	Research/measurement	Adult	Child
Active	Consult (physical)	Every 6 weeks	Every 4 weeks
	Blood	4 x year	4 x year
	Weight	During consult	During consult
	Length		During consult
	Colonoscopy	Indicated by physician	Indicated by physician
Urgent	Consult (physical)	Every 6 weeks	Every 4 weeks
	Blood	4 x year	4 x year
	Weight	During consult	During consult
	Length		During consult
	Colonoscopy	Indicated by physician	Indicated by physician
Remission	Consult (physical)	Every 6 months	Every 3 months
	Blood	2 x year	4 x year
	Weight	During consult	During consult
	Length		During consult
	Colonoscopy	Indicated by physician	Indicated by physician