



CHALMERS
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A present state analysis of a cancer diagnosing process

A case study as a preparation for the
implementation of *Standardiserat
vårdförlopp*

Master's thesis in Quality and Operations Management

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To Frank and Henrik

Abstract

Introduction – The current situation in Swedish healthcare implies that there is room for improvements. One initiative is to increase the efficiency and conformity in cancer care through implementing a standardized diagnosing process, named *Standardiserat vårdförlopp*, throughout the country. For such an initiative it is helpful to know the present state of each process in order to understand what needs to be done to reach the wanted state. The purpose of the thesis is to perform a present state mapping of the diagnosing phase at the Department of Otorhinolaryngology - Head and Neck surgery at Sahlgrenska University Hospital to create a baseline for the upcoming changes and surface key factors that eases the implementation. . The focus will primarily be to consider the lead times for the process and the sub-processes. The used method will also be evaluated to see if it is useful for mapping cancer diagnosing processes at other sites

Method – The method used in this research is a mixed method containing interviews, observations, secondary data and data from medical records.

Results – Regarding the process at the department of Otorhinolaryngology - Head and Neck surgery, we found that most activities explained in *Standardiserat vårdförlopp* are already performed and the implementation is more of a calibration to reach the tight visionary targets presented in *Standardiserat vårdförlopp*. The result shows that the lead times are varying in each part of the cancer diagnosing process. The medical records data gave answer to some of the root causes to variation and long lead times, while the interviews and observations gave other useful insights to what could cause deviations and longer lead times. The medical records show cases where long lead times depend on personal matters of the patients. The interviews and observations provided information about the complexity of the diagnostics and highlighted information about each sub-process, showing which processes that could be ineffective. The role of the coordinator and contact nurse should be performed by the same person to provide a better control and overview of the diagnosing process.

Discussion – The research shows that performing a present state mapping will provide valuable information, highlighting what needs to be improved in the holistic process. The used method could be generalized for other cancer processes within Sahlgrenska University Hospital, but it is uncertain whether or not it could be used at other hospitals due to that different IT systems are used.

Keywords – *Otorhinolaryngology, Head and Neck, Standardiserat vårdförlopp, Process mapping, Cancer, Diagnosing, Healthcare, Value based, Variation, lead time, Present state*

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Glossary/Abbreviations

Ambulatory surgical procedures	Translation of the Swedish term dagkirurgi, meaning that the patient undertakes surgery in and out during one day
Assisting nurse	Translation of the Swedish term undersköterska
Cancer Barn (CB)	Priority level when assessing referrals of children with suspected cancer
Cancer Vuxen (CV)	Priority level when assessing referrals of adult with suspected cancer
Clinical guidelines	Translation of the Swedish term vårdprogram
COGNOS	IT system used at SU to handle data statistically
Computed tomography (CT)	Radiological method where layer-by-layer images show three-dimensional anatomical structures in the body
Contact nurse	Translation of the Swedish term kontaktsjuksköterska
Coordinator	Translation of the in position or function called coordinator in SVF
Centrala remiss och bokningsenheten (CROB)	Sub-section at O/H&N clinic handling referrals
E-arkiv	Application in MELIOR containing scanned documents
ELVIS	Digital administrative system used in VGR for tracking visits to hospitals
Department of Otorhinolaryngology - Head and Neck Surgery (O/H&N clinic)	Öron-, näsa-, halssjukvårdsklinik
Jubileumskliniken	Clinic at SU, handling radiation of cancer patients
Magnetic resonance (MR)	Radiological imaging of organs or tissues (hydrogen ions in the body's tissues to oscillate by a strong magnetic field, after which the energy is recorded and converted to images).
MELIOR	Digital medical record system used at SU
Multidisciplinary conference (MDK)	Conference where diagnosis are set and treatments are decided

OPERÄTT	IT system for coordinating and booking of surgery at SU
Pakkeforløb	Danish implementation of a fast track system for diagnosing patients showing alarm symptoms in the primary care
Pathologic anatomic diagnosis (PAD)	The evaluating diagnosis that a pathologist sets after examination of tissue specimens or cytology specimens
Positron Emission Tomography - Computed Tomography (PET-CT)	Method to investigate the metabolic and physiological functions using radioactively labeled biochemical substances whose turnover is recorded and converted into a CT scan image
Sahlgrenska University Hospital (SU)	Sahlgrenska Universitetssjukhuset
Surgery coordinator	Translation of the Swedish term operationskoordinator
Sveriges Kommuner och Landsting (SKL)	Democratic organization that coordinates Sweden's municipalities and counties
Standardiserat vårdförlopp (SVF)	A standardized cancer treatment process or the document describing the same process.
Södra Älvsborgs Hospital (SÄS)	The hospital in Borås
Tumor team	Medical team that handles the processes regarding cancer care
VAS	Digital medical record system used in Region Halland
VGR	The region of Västra Götaland
Välgrundad misstanke (VM)	Profound suspicions. A flag or trigger that the medical personnel attach to a patients' health status. Will act as start of a SVF

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1. Introduction

The Swedish healthcare system is primarily funded by taxes and administrated within the public sector. In 2012 the cost to cover this was 10% of Sweden's gross domestic product and that number had risen by 1,1% since 2001 (Socialstyrelsen, 2012). Poor efficiency and productivity has been identified as a shortcoming for the Swedish healthcare system (Lifvergren, 2013). At the same time the number of new cancer patient in Sweden is about 50000 each year and that number is prognosticated to increase (Hellström, et al., 2013).

The facts presented above incline that there is a potential for improvement initiative within the Swedish healthcare system. One such initiative is the national cancer strategy for the future established by the Swedish government in 2009 (Statens Offentliga Utredningar, 2009). Based on this strategy, Regional Cancer Centre West (RCC Väst) has been established in Gothenburg as a knowledge creating and sharing organization. RCC Väst covers the area of Västra Götalandsregionen and Halland, an area populated by almost 2 million inhabitants (Hellström, et al., 2013).

Within RCC there are about 20 different cancer processes, with nine different support processes that have been identified and mapped (Allander, 2014). Process thinking is beneficial when dealing with complex and differentiated establishments and when linking activities that span functional departments (Hellström, et al., 2013). Each process is owned by a process owner who are 20% hired by RCC. According to Lifvergren, variation both within and between the processes have been identified. Leveling the variation between the processes by applying knowledge of variation is of great interest (Lifvergren, 2014).

1.1 Background

The Swedish government declared in 2014 increased efforts within the cancer area. During a four year period, from 2015 to 2018, 500 million SEK will annually be budgeted in order to reduce the regional differences and reduce waiting time in Swedish cancer care. The decision conforms to the national cancer strategy mentioned above. In addition to reduced waiting times, a goal for the development of standardized processes is to have more satisfied patients that experiences a better quality of life (Regionala cancercentrum i samverkan, 2014). Each RCC will together with an overhead group, called RCC I samverkan, be responsible to carry out these tasks. (Socialdepartementet, 2014)

During 2014 five processes were chosen to act as pilots for the development and implementation of what is to be called a *Standardiserat vårdförlopp (SVF)* (Regionala cancercentrum i samverkan, 2014). One of these processes was the one concerning head and neck (H&N) cancer. A SVF shall basically cover three areas; symptoms that should lead to suspicion of cancer, which examinations that should be carried out in order to deliver a diagnosis and maximum lead times for each of the process steps (Regionalt cancercentrum i samverkan, 2014). The SVF should not be limited by today's organization, situation or resources. A SVF starts with *välgrundad misstanke (VM)* that each process must define. All

SVF should be based on multidisciplinary team efforts and presupposes contact and coordination with both the patient and relatives. (Regeringskansliet och Sveriges kommuner och landsting, 2015)

The SVF for H&N cancer is created by approximately 30 senior physicians from around the country. It is based on the national *clinical guidelines* and no conflicts exist between the two documents. The SVF states that there should be a coordinating function, which is not necessarily performed by the same individual during the whole process. This *coordinator* should have access to preplanned, earmarked examination slots in order to facilitate the coordination. Each new case where cancer is discovered should be discussed at a *multidisciplinary conference* (MDK), where diagnoses are set and treatments are decided.

Figure 1 shows a process map of the H&N process described in the SVF. One special incident with the SVF for H&N is that they have introduced a filter function present at an H&N

1.6 Flödesschema för vårdförloppet

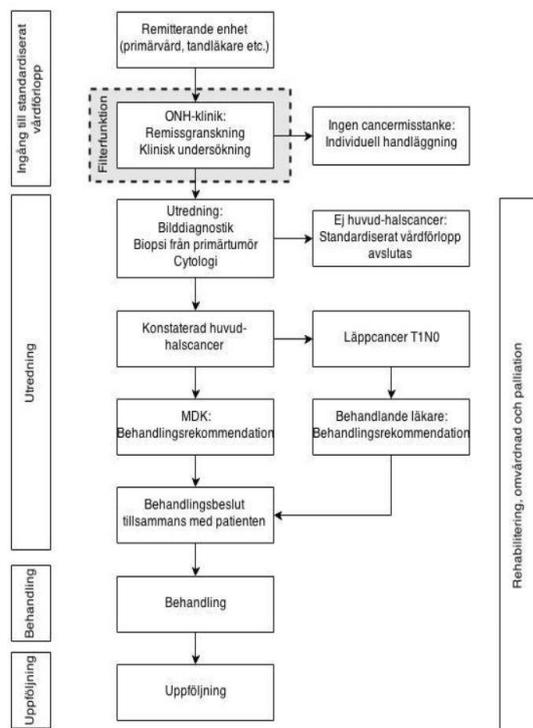


Figure 1: The process according to SVF (Regionalt cancercentrum i samverkan, 2014)

specialty clinic. According to Beran (2015) this is due to the complexity of these types of cancer and the primary care should not be responsible for attaching the VM flag on any patient. The different maximum lead times stated in the SVF are set according to what they could be in a visionary scenario, and is presented in **Table 1**.

Table 1: Lead times presented according to SVF (Regionalt cancercentrum i samverkan, 2014)

From	To	Lead time (days)
Decision to write a referral due to suspected cancer	Arrival of referral	0
Arrival of referral	First appointment at the clinic	5
First appointment at the clinic	Biopsy (if surgery is not needed)	0
First appointment at the clinic	CT (head-neck-thorax)	6
First appointment at the clinic	MR	6
First appointment at the clinic	PET-CT	6
First appointment at the clinic	Cytology	0
First appointment at the clinic	Surgical examination	7
Cytology or biopsy	PAD	3
Arrival of referral	MDK	23
MDK	Surgical treatment	12
MDK	Oncological treatment	20
Arrival of referral	Surgical treatment	35
Arrival of referral	Oncological treatment	43

The H&N cancer is a collection of cancers located in nine different areas (Holmberg & Samuelsson, 2011). The areas are; nose & sinus, lip, oral cavity, salivary glands, nasopharynx, oropharynx, hypopharynx and in the lymph nodes. The lymph node location differs from the other as cancers in those are metastasis of another unknown primary tumor. The locations can be seen in **Figure 2**.

The H&N cancer is a relatively small group of cancer that represents approximately 2,5% of all cases of cancer in Sweden (Holmberg & Samuelsson, 2011). The mean age of getting diagnosed with H&N cancer in Sweden is 66 years for men and 68 years for women. The most common area to contract it is in the oral cavity which corresponds to about 1/3 of the H&N cancers (Holmberg & Samuelsson, 2011).

The survival prognosis differs depending on location but the overall survival prognosis for H&N cancer is approximately 60% (measured 5 years after the diagnosis), where lip

cancer has the best prognosis and hypopharynx the worst. Most of the cases of H&N cancer are diagnosed when the tumor has been present for a while and grown into an advanced stage. This could be explained by a combination of the rarity of the tumors and the vague symptoms

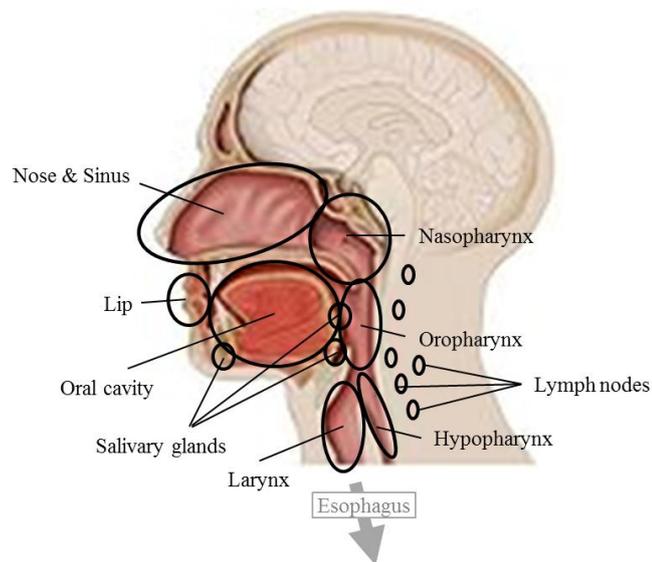


Figure 2: Head & Neck cancer locations (Lynch, 2006) (modified by authors)

they show, making the disease hard to find in the primary care. Factors that could cause cancer in the oral cavity, oropharynx, hypopharynx and larynx are overconsumption of alcohol and smoking. Nasopharynx cancer could be caused by an unhealthy diet and smoking. Lip cancer could be caused by sun exposure and smoking pipe. The cases of salivary gland cancer are often caused by benign tumors turning malignant. Smoking could cause cancer in the nose & sinus region, where exposure to unhealthy substances is affecting as well. (Holmberg & Samuelsson, 2011)

At the Department of Otorhinolaryngology - Head and Neck Surgery (O/H&N clinic) at *Sahlgrenska University Hospital* (SU) they also perform diagnostics of skin tumors in the head and neck region and partly diagnostics of esophagus cancer (MDK).

1.2 Problem analysis and purpose

The concept of creating and implementing SVF is a top down improvement initiative by the Swedish Government. In a way one can consider SVF as a description of the future state of cancer diagnosis in Swedish healthcare. However, the actual road to reach the lead times is up to each county/region/hospital/clinic. The national quality registers of H&N cancer patients track the most important lead times as well as all examinations carried out on each individual. However, some of the lead times expressed in SVF are not currently tracked.

In order to know what to change we believe one should first describe the present state of operations. Since no cancer is the same and no clinic, county or region works exactly the same there are many current state descriptions to be made within the next four years of SVF implementation in Swedish healthcare.

Since there are many different ongoing activities related to the introduction and implementation of SVF we believe it is important to thoroughly investigate present research and work done in the area and find a unique approach. During the first defining phase of this thesis work we spent much time to understand what other research that was going on at the moment. We took part in a conference, had meetings both in personal and by phone contact with different stakeholders and shadowed a consultant firm employed by RCC Väst. We also investigated and interviewed key personnel regarding the different administrative IT-systems from where we could retrieve the necessary data. The outcome of this define phase was that we understood that a thorough investigation of the present state for one of the five pilot processes at one specific location could act as a role model for future present state analysis and in the same time identify key factors for a smooth implementation of SVF. For a detailed description of the outline of the study see the method chapter, but the choice fell on the H&N cancer process at SU and lead to the following purpose:

- 1) Describe, map and analyze the present cancer diagnosis process at the O/H&N clinic at SU in order to identify key factors for a smooth implementation of SVF.

As the SVF is about to be implemented at many other hospitals and for several additional cancer diagnosing processes a secondary purpose became:

2) Evaluate the method of conducting the process description, mapping and analysis, to investigate the applicability to use it for the similar studies that needs to be done at other clinics in the near future.

To thoroughly describe the process it was decided to both focus on the actual lead time between activities as well as to understand the staff's perception of the process. The angle of attack is visually shown in **Figure 3**

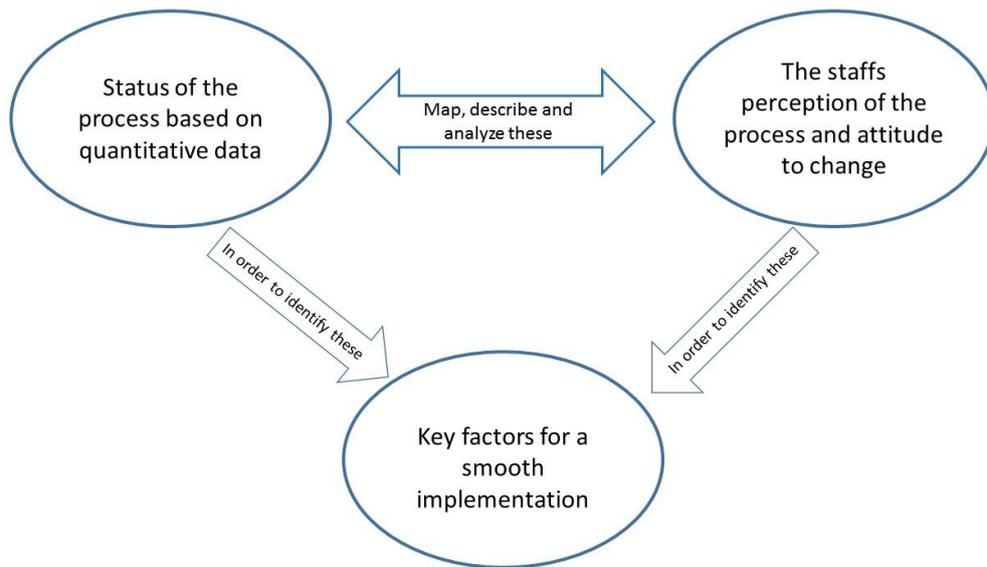


Figure 3: The purpose of the thesis

1.3 Delimitations

The O/H&N clinic at SU operates from three different locations in the Gothenburg area, Sahlgrenska hospital, Mölndal hospital and Östra hospital. The observation and interviews have only been conducted at the Sahlgrenska Hospital. Further on when references are made to SU this means throughout this text the Sahlgrenska hospital site.

Since there are many initiatives ongoing at RCC and several individual are working with the patient perspective in cancer diagnosis and care, that part has been left out of our scope. The patient side of this process map is strictly based on observations and interviews with staff.

Even though interviews have been conducted with different kind of personnel involved in the process it must be emphasized that this process map and perception of the staff relates to ideas expressed by some, not all interviewees.

The payment structure process will also be left out in the thesis and focus is instead on process steps concerning the diagnostics of the patients.

The first stage of a process mapping concerns defining what to be mapped, and for further limitation to this thesis see that section.

1.4 Chapter summary

- There is potential for improvements in Swedish healthcare
- An initiative to improve the cancer healthcare is the implementation of SVF
- SVF is a project to reduce the differences in cancer diagnostics and improve the efficiency of diagnosing cancer, initiated by the Swedish government
- The implementation is performed by RCC
- The study will be performed as a case study at the O/H&N clinic at SU
- The O/H&N clinic handles diagnostics of H&N cancers (9 different types), skin cancers in the H&N region and parts of the esophagus process
- The purpose of the research is to:
 - Describe, map and analyze the present cancer diagnosis process at the O/H&N clinic at SU in order to identify key factors for a smooth implementation of SVF.
 - Evaluate the method of conducting the process description, mapping and analysis, to investigate the applicability to use it for the similar studies that needs to be done at other clinics in the near future.
- The research will have a process perspective

2. Frame of reference

In this chapter relevant theory are presented to the reader. The selection of reference material is described in the chapter concerning research strategy. The theory presented in the two first sections of this chapter will act as a base for the analysis of the empirical findings, while the third section will primarily be connected to the discussion regarding the second purpose of this thesis stated above.

The first section covers an area that lies in the frontline of medical management research concerning overall strategy to create a more efficient healthcare system. It is also an area that SU presently emphasizes so it has a logic connection to this particular case.

The second section is an organizational oriented part covering organizational management within the four areas Culture, Change, Learnings and Development. The culture is important to address as it sets the foundation for how willing the organization is to change. The organizational change concerns the environment of change that Swedish healthcare is facing within its cancer diagnosing section. Learnings and Development are important to address in order to understand the prerequisites for learning and how to deal with it in an environment that promotes continuous development. The concepts will be explained as of what they mean and how they can be managed.

The last section of this chapter will present theory of what processes are in order to gain a basic understanding of what the main part of the project contains. It will further present why process mapping should be used in an organization and at the end there will be an explanation of how the process mapping could be performed and what pitfalls you should be aware of when making a process map.

2.1 A value based health care

In an article called Redefining Competition in Health care from 2004 Michael Porter and Elizabeth Teisberg first published their thoughts regarding the concept of Value based health care that has later evolved and been heavily followed in research (as of the 25 February 2015, the article had 886 citations) (Google, 2015). Value is usually defined in management literature as what the company intends to provide to its customers, while strategy is defined around how this value will be produced (Modig & Åhlström, 2011). According to Slack et al (2010) strategy deals with long term questions, and it should reflect the total picture of the issue, give broad objectives and plan for a general path much more than a specific. This stringent management definition between value and strategy is however not clearly present in the medical management literature that has been studied in this project and the expressions are often used in combination.

In its simplest form value is defined as the relationship equation between outcomes and cost, where outcomes works as a numerator and cost as the denominator (Porter, 2010). Such a simple equation will consist of many dimensions that must be specific to the area of interest in order to be useful. When reading healthcare management literature it is clear that no omnipresent understanding exist about exact what dimensions that should be included in the concept of value in healthcare. To define value around the patient or from the patient

perspective is however a dimension that everyone agrees upon (Porter, 2010). Together with the overall goal that every dimension should be present to enhance perceived health and experience of care (Nordenström, 2014) these two statements act as the base line. One reason why so many dimensions can coexist is the vast number of stakeholders in healthcare. Even if all can agree to put the patient first it is reasonable to accept that different stakeholders have different goals, such as access to service, quality or minimized cost, and in order to reach these goals one chooses suitable dimensions for the factors in the value equation (Porter, 2010).

It is by no mean the intention with this chapter to give a complete picture of the dimensions but instead focus on presenting the most relevant ones to the project. Nordenström (2014) choose in his book to present two perspectives to look at all ingredients, one centered round the patient and the other around the system. Around the patient are the dimensions structured processes, best practice or evidence based medicine, coordinate the care and finally the use of measures as a base for improvement changing activities. Around the system perspective Nordenström puts the dimensions of payment for care and IT-system to support of the processes. This section will basically follow Nordenström’s structure with the adaptation that patient pathway and coordination is incorporated under the system perspective since we believe that is a better categorization. This research has no purpose of investigating the payment structure, delimiting that part.

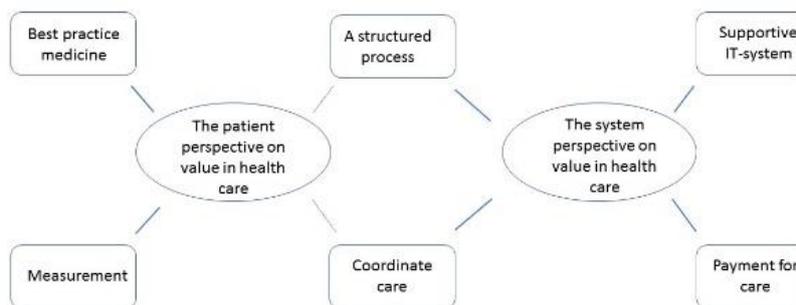


Figure 4: The perspectives of value based healthcare according to Nordenström (modified by authors)

Even though the rest of the chapter will introduce many different aspects one should not forget that it is only by a holistic view one can grasp the idea of how value should be considered when dealing with healthcare. Porter and Lee (2013) describe how reconstruction or transformation of the whole system is needed and that it is important to understand that the components are interdependent.

2.1.1 The patient perspective on value in healthcare

Stating that the patient should be centered implies that one should always try to understand how the activity, situation and decision would look from the patient point-of-view. Quality literature mentions that situations should be viewed through the lens of the customer (Grenmyr,

2013). In addition to follow that rule, there are some points more directly related to the actual interaction with the patient. These points are so strong that they are regulated in Swedish law. The patient should always be treated with respect and all persons should be treated equally. This means medical personnel must adapt their approach to each specific patient social context. The healthcare should be based on the patient's specific needs and her own expectations should be considered. As long as possible the patient should be informed and involved in decisions regarding their care. In order to manage these prerequisites, contact between patient and personnel/system must be continuous and if possible be conducted by the same instances so the daily life of the patient can be as normal as possible. (Socialstyrelsen, 2009)

2.1.1.1 Best practice medicine

All healthcare practice should have its roots in best practice or evidence based medicine. This means that when choosing between different alternatives for methods of care one should choose the one that is best according to scientific foundations. Only by using healthcare that is proved effective by experience and/or research the path for creating value is followed. Only by the use of best available knowledge and technology it is possible to maximize the value from a patient perspective. In order to be familiar with what is evidence based at each moment, strong connections to research should be a part of every healthcare organization. By interacting with colleagues from around the globe and by being willing to share ideas and lessons learned, best practice approaches could be used as a way of improving by benchmarking. (Nordenström, 2014)

2.1.1.2 Measurement

“Rigorous, disciplined measurement and improvement of value is the best way to drive system progress” (Porter, 2010, p. 2477). The logical implication is that it is of vital importance that the correct measurements are used (Höglund, et al., 2012). Measurements must naturally cover both the outcomes and the costs side of the value equation and it must do so for individual patients (Porter & Lee, 2013).

Measurement of outcomes is the most important of the measurement since these are the measurements that deal with the output of the care and not with input. From a patient perspective the level of input is not at all as interesting and important as what is delivered (Nordenström, 2014). In order to achieve highest possible value for the patient the outcome measures must be linked to quality and not process measures and should be found at all the tiers (explained below) (Porter & Lee, 2013).

Outcomes in healthcare can be divided into three levels or tiers. The first or highest, tier one, covers aspects of the health status achieved, where the most important aspect is survival. Tier two handles the process of recovery and deals with measurements of time to recover and the disutility of the process (error rate, ineffective care etc.). The third tier covers aspects of sustainability of health, recovery from the original disease and/or complications created as a consequence by the treatment for the first care episode. (Porter, 2010) Outcome measurement should cover aspects directly connected to the patient health conditions and satisfaction during, but also after the treatment is finished (Nordenström, 2014).

Outcome measurements are beneficial to use when benchmarking, which was mentioned as a good way to introduce best practice care. The outcome measurements are often well indicated in the quality register, indicating that Sweden is well equipped for these types of benchmarking improvements, since Sweden is in the front line regarding many national quality registers (Höglund, et al., 2012). It is important that different measures cover all tiers. However one must qualitatively analyze the outcome numbers since in some conditions, such as incurable cancer, all treatments will have limited effect on the survival rate but they might very well show results regarding tier 2 and 3 measurement numbers. Also, patients with multiple diseases will gain different numbers than patients with only the regarded disease and mixing these numbers will blur the outcome statistic. One way to deal with the multiple sick individual is to make a risk assessment and to use multiple measures (Porter, 2010).

Cycle time, including waiting time is commonly used as a process measurement and indeed it is very useful for improving the process. Regarding value in healthcare, cycle time or waiting time should be interpreted as an outcome. This is because once again, when looking through the lens of the patient, shorter time will usually reduce the patient anxiety (Porter, 2010). However, for very rapid processes optimal time might not equal possible shortest time. As an example, in the examination and diagnosis of acute myeloma cancer, it is important to understand that some patient will not be able to grasp the situation because it is too overwhelming. (Garelius, 2015). In such cases it once again proves the importance of using measurements at different tiers, in this example high output of the tier one (survival) will probably lower output number of tier three (involvement and satisfaction)

Nevertheless, process measurers are also interesting and should be tracked in order to improve the system. Process measures in value based healthcare literature are much about effectiveness and coherence to guidelines/regulations such as the Swedish clinical guidelines. These measurements act as a direct link between the process and quality (Nordenström, 2014). Other type of process measurements are connected to special departments (Höglund, et al., 2012). According to Porter (2010), these measurements are mostly important for improvement work and should not be regarded as substitutes for measurements of outcomes.

As costs act as the denominator in the value equation and minimizing cost is certainly a goal for some stakeholders it is natural to think that decreased cost will per se increase the value. Usually this thinking is “self-defeating, leading to false savings and potentially limiting effective care” (Porter, 2010, p. 2477). This is even more apparent when the cost is decreased all over the line. When doing that, a holistic view is lost and it is shown in research that spending more on some parts often reduce the total cost (Porter, 2010). Research also back the fact that higher quality leads to overall cost reduction which is shown in a relationship model called the productivity frontier (Porter & Teisberg, 2006).

2.1.2 The system perspective value in healthcare

2.1.2.1 Patient pathway and coordination

Nordenström (2014) states that approximately 50% of all the cost in healthcare are used for running hospitals. Good coordination between departments that creates a highly functional hospital is then per se good for the complete care structure. Nordenström further exemplifies

that 1% of the patients in Stockholms county use 1/3 of all monetary resources. By coordination and segmenting different user groups much value could be created. As an example Nordenström (2014) uses how the major airline uses their membership relationship programs to grant frequent travelers special check in cashiers, special waiting lounges and so on. A similar approach in healthcare is only possible if one really admits that the patient is the customer and matching the patients' needs to create value. One must rely on the fact that it is by increasing the numerator (outcome) and not by reducing the denominator (cost) that creates true value (Porter, 2010).

The Healthcare system consists of a vast number of actors. The currently most used structure in care is based around departments. The departments are given a budget to dispose at their own responsibility. The departments are usually structured around a specific medical specialty such as oncology or radiology. When a department needs services from another department, requests are sent and then it is up to the other department to accept, schedule and send invoices for the services. This system can be seen as horizontal and built up around the offered services. This means that the patient in his journey through the system visit many different departments and coordination becomes a vital aspect of the value dimensions (Nordenström, 2014). To ease the pressure on coordination and at the same help the patient, Stabell and Fjelstad (1998) introduced thoughts that have recently been elaborated by Höglund et al (2015). In this strategy they formulate three different options or units to organize the care depending on what to offer the patient in need.

The first unit is called a shop and it has similarities to the integrated practice unit proclaimed by Porter and Lee (2013). A shop exist for solving or resolving customers or in this case patients problems. The shop has a problem solving attitude and a cyclic approach. Completely in line with Deming's PDCA cycle medical staff in a shop reiterate until they find the correct solution. (Stabell & Fjelstad, 1998). A diagnostic center, like the breast cancer center in Malmö (Boklund, 2012), as well as an episode of the television series House is a good example of a shop in medical care. This facility has the idea that all parts of the examination should be able to be conducted in the same center and all resources have the same owner. The value for the patient is created when the correct diagnosis is decided (Höglund, et al., 2015).

The second unit is called a chain and it shows much resemblance to classical process models. In a chain unit inputs are transformed into outputs by a standardized way of working. A chain unit works sequentially and is longitudinally linked. (Stabell & Fjelstad, 1998) Any standardized process in manufacturing is a good example of a chain unit. In order for the chain to be efficient the content must be predictable. Value in a chain unit is created and added during and after the process (Höglund, et al., 2012).

The last unit is actually not a single unit but a network. It is the linkage of all possible contributors that could increase the value for the patient. It is supportive and service providing in nature and may act simultaneously or parallel. A network may exist in different sizes but usually larger networks increases both the value and the cost. (Stabell & Fjelstad, 1998) An example of actors in a network other than the patient can be a Facebook community, a *contact nurse* at the hospital, a curator, patient support organizations etc. A network is beneficial

when there are no clearly defined problems, especially no time-based problems. Value is created by supporting the patients' health to avoid care at the hospital as much as possible. (Höglund, et al., 2012)

We believe that the strategy of chains, shops and network is best understood by the different efficiency paradigm between the resource and the entity. By choosing what to optimize, a business intentionally or unintentionally decides what kind of strategy that is suitable. If focus is on high resource efficiency, there should be a high amount of value added time per time unit. The resource should add value as much as possible. (Modig & Åhlström, 2011).

Examples of very successful companies are Ryanair and Southwest Airline, who are focusing on having the highest possible usage of their aircrafts. They provide the lowest fare for a safe flight but nothing else (Slack, et al., 2010). The other choice is to optimize towards the flow of entities through the system. The key is to have high amount of value receiving time per total time in the process. The clothing company Zara is a successful example. They focus on creating high speed throughout their system. The whole company is sticking to a rhythm. Trucks leave on timetable even half full, warehouses are spacious and designers create new collections at a tremendous pace that reaches the stores within weeks. (Ferdows, et al., 2004).

2.1.2.2 A supportive IT-platform

In order to have the slightest chance of good coordination in the complexity described above, Nordenström (2014) points out the importance of an IT system that supports the process and not the departments. Healthcare in complex environments are to a high extent based on good contact and information. This contact must be able to connect the patient with the regarded healthcare department, personnel or section. The contact must be made at the right time and the patient must be handed correct information. In order to do this an IT-platform enabling easy access for all parties involved in the care, involving templates of the medical conditions as well as all possible information regarding individual patients is important (Porter & Lee, 2013). Since the value based healthcare should be based on evidence based medicine and best practice as stated above, this information must also be accessible to researchers. (Porter & Teisberg, 2006). According to Höglund et al (2012) Sweden has an extended structure for digital storage of medical records but lacks a technical solution to retrieve information easily from them. Maybe not a drawback but something utterly important that must be carefully analyzed when hoping for a complete IT-system with easy access and massive information is the ethical aspects of storing much classified personal data in one place. (Nordenström, 2014)

2.2 Organizational management

2.2.1 Organizational Culture

Organizational culture is explained by Schein (1990) as a pattern of simple assumptions into an organizational foundation that new members of the organization will be taught on arrival. Schein state that the organizational culture is developed within organizations over time from solving external problems and through internal collaboration. Schein organizes the nature of organizational culture in three levels.

- Observable artifacts – These are setups that are both internally and externally visual including: structure, processes, dress code, contact channels, reports etc.
- Values, norms, philosophy & ideology – Created by the organization and shared to reach a common understanding of how to operate.
- Underlying assumptions – More unconscious and taken for granted foundation including: how the organization relates to its environment, human relationships, reality & human nature.

According to Shani et al (2009), the culture is critical for organizational performance and binds the organization together.

According to Argyris (2012) there are some crucial factors leading to productive organizational cultures. The employees of the organization need to actively seek feedback on their work from multiple sources and accept it even if it is not individually favorable. There also needs to be commitment to continuous change and openness to continuously learn. The implementation of policies and developments needs to be flexible and the culture has to promote this flexibility. Productive cultures are also in most cases the ones promoting and rewarding risk-taking in projects. Fostering a culture that strengthens trust and internal collaboration is also important to create an environment of long-term operational efficiency.

2.2.2 Organizational Change

A change in an organization is, according to Nadler & Tushman (1997), defined as moving from one state to another, the current state to the future state. The future state consists of all the changes that are planned and the goal is to implement the changes successfully and reach the addressed future state.

According to Lewis (2011), a major factor affecting the success of organizational change is the uncertainty for different stakeholders of what is going on within the project. In order to reduce this uncertainty, sharing of information becomes crucial for making a successful transition to the future state. McPhee & Zaug (2001) discusses the importance of clarity when communicating to several stakeholders in the change project and addresses the problem of ambiguous interpretations where different members of the project have different views on key aspects of the project. A common problem is that too much information from too many sources are communicated and McPhee & Zaug (2001) argues that core information including values, priorities and preferences need to primarily be shared and made clear among members of the project..

2.2.3 Organizational Learnings

Argote (2012) explains that organizational learning is change in the organizations knowledge. Knowledge is created from experiences and captured through organizational learning processes where the experiences connect with the business context. The context is expanded beyond the organization where, according to Glynn et al (1994), the organization interacts with other businesses and units where an exchange of experience can be made through having different conditions. In healthcare, the different contexts could be other hospitals or private practitioners.

Shani et al (2009) surfaces an obstacle for people to learn called Pygmalion effect meaning that individuals only learn according to what is expected of them and adapts to the level of expectations that are set.

Coutu (2002) discusses the concepts of learning anxiety and survival anxiety. Learning anxiety means the anxiety for an individual to learn something new, and survival anxiety means that the individual is anxious about having a place within the organization if not learning. The issue can be dealt with through either raising the survival anxiety or reducing the learning anxiety. From the earlier we could see that a factor for ineffective cultures is when individuals are not willing to take risks and the culture inhibits it. In the same way for learning to prosper, the organization needs to support their staff to explore unexplored territory.

2.2.4 Organizational Development

Beckhard (1969) explain organizational development as an organizationally spread effort from top management to increase the effectiveness and performance of the organization through planned activities in the organizations processes by applying knowledge.

Shani et al (2009) states that the prerequisites for a development program in an organization is to have mapped the problems and needs of the system the program is performed for. Based on those prerequisites, Shani et al (2009) argues that the extent and quality of the information input sets the quality of the development program.

There are certain factors affecting the development and performance within an organization. The leadership is one factor where task orientation, interpersonal skills and maintenance are important. The context and organizational culture also affect the effectiveness of development as previously mentioned. A clear purpose is another key to foster a developing organization. Other factors are the organizational structure, how processes are formulated and also organizational composition where diversity is beneficial to drive development. (Shani, et al., 2009)

2.3 Process and process mapping

Jacka & Keller (2002) define processes as a three-step action. First there is an input, followed by a transformation of the input, leading to an output. All processes contain these elements whether they are simple or complex. Each process could be broken down into smaller processes that can be broken down into smaller processes and so on. This enables evaluation on different levels of abstraction from a holistic process to the most detailed steps of a sub-

process. Jacka & Keller (2002) states that processes make the difference between success and failure in an organization, where each sub-process contributes towards achieving the objectives that are set.

2.3.1 The reasons to conduct process mapping

As the processes are crucial to the success of the operation, the organization needs to be aware of how their processes work. According to Jacka & Keller (2002), process mapping is an effective way of making the process more visual for the reviewer. Jacka & Keller (2002) further elaborates that the process mapping will raise the understanding of the process, provide an effective approach to potential improvements of the process and highlight the essence of the process that creates value for the customer.

According to Jacka & Keller (2002), one of the most common issues that an organization needs to deal with is that different departments or employees have objectives that conflict with each other, where a typical example is management cost control vs. quality objectives for practitioners. In this setup the management is trying to keep the costs down while the practitioners work towards an objective to provide the best quality that is possible. In this situation it is common that at least one of the parties are unaware of what the other is doing to reach their objective, and decisions are taken based on what is best for the related department. This causes sub-optimizations where developments are made department by department for temporary solutions. Process mapping provides a holistic approach to developments where solutions can be created towards an optimized process for all participants, where each development strives to obtain a greater, overall, objective (Jacka & Keller, 2002).

Another benefit presented by Jacka & Keller (2002) is that each employee will get more involved in the process and understand other employees work within the process. Making the process visual for the employees will highlight each person's role. This increases the sense of participation and gives each employee a print of what they perform in the process and what is monitored by management to raise the clarity of what is expected of them to perform. Using process mapping will also establish a higher need for continuous gathering of information and ideas from each employee in the process, making everyone more involved in the organization and creating a tighter team where everyone have a sense of owning the process to some extent.

Jacka & Keller (2002) states that another valuable benefit from performing a process map is that it is customer driven. The process map surfaces the sub-processes of the holistic process and from this you can visually follow where and what creates value for the customer. The customer can also be an internal customer, meaning that the related process can help improving another process, earlier or later, in the value chain. Making the detailed process map makes it possible to evaluate the input, transformation and output of each sub-process. This enables an analysis of where in the holistic process improvements can be made to match the wanted objectives.

The potential improvements that arise with the analysis of the process map could, according to Langabeer (2008), be grouped into three major areas:

- Increasing the capacity of the process - This is performed by addressing bottlenecks of the process and allocating resources to perform a better flow through the holistic process.
- Reducing the resources used of the process - Unnecessary parts of the process are identified and remade or eliminated to create a more effective process with less cost.
- Reducing variation of the process - The process could be stabilized to make it easier to plan and have smoother resource utilization.

2.3.2 How to make a process map

The effectiveness of the process mapping is highly determined by how the mapping is performed to reflect the real situation (Jacka & Keller, 2002). According to Trebble et al (2010), process mapping requires thorough planning as the patients journey through the process could be complex, including sub-processes that are managed independent of each other. Another implication that requires planning is that each step of the process could be managed differently depending on the patient. Hall & Johnson (2009) presents that a process that can deliver different outputs depending on the demands of the customer should be considered differently and could potentially harden the process mapping. Trebble et al (2010) states that the process map should never harm any of the individuals contributing to performing the process map, as they put it you should never: “-Name, Shame and, Blame”(p.394).

The stages of making a process map could be grouped into five, presented in **Figure 5**

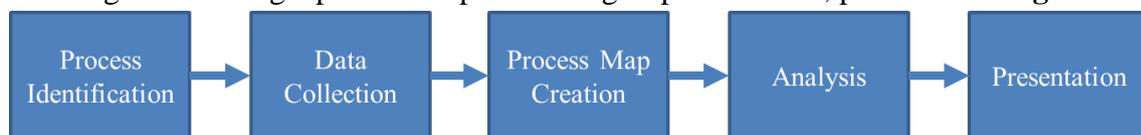


Figure 5: The five phases of process mapping according to Jacka and Keller

The first step in performing a process map is, according to Jacka & Keller (2002), to identify the process that is going to be mapped. Jackson (2013) explains this identification as “choosing a service family”. This means that when choosing an operation to map, one should choose a group of services that is provided from a common pool of resources. Given this prerequisite, the mapping should be narrowed to a common group that the finalized process map is relevant for. As Treble et al (2010) mentions that the patient journey could be complex and that preparations and planning is needed, the researchers should be updated in how the organization operate and what is needed before continuing the process mapping. At this stage it is helpful to create a premature, overhead process map to get a hint of how to proceed (Trebbe, et al., 2010). In this stage of the process mapping it should be determined what metrics to follow. Jacka & Keller (2002) argues that the metrics that are used in the process mapping should be based on customer needs and not internal organizational interests. Jackson (2013) states that in the beginning of a process mapping, the patient should be identified. This means that the patient that the process map is created for should be defined and separated from the rest. When this part of the process mapping is performed, the researchers should

have made it clear what part of the organization that is going to be mapped, what is going to be measured and who is the regarded customer/patient in this process.

The next step in the process of process mapping is to gather data about the organization and observe the process (Jackson, 2013). Jacka & Keller (2002) presents a procedure where the first activities of data gathering are to describe the decided process and then identify the regarded process owners. This is followed by interviewing the owners of the process to verify the chosen process and to gain information about the organizations objectives, risks, key controls and measures of success. This means that that the researchers needs information on what the organization is trying to achieve, what risks are identified that could implicate the achievement, what is done to mitigate those risks and finally how the process owner is performing follow ups on the performance. Both Trebble et al (2010) and Jackson (2013) presents walking the process as a suitable way of gathering data, meaning that observations are made at the clinic from when the patient enters to the patient leaves. Jacka & Keller (2002) presents interviewing as the major source of information to the process map. Before contacting interviewees it is important to anchor the idea of interviewing with the management. This helps in getting contact with the interviewees and shows that your project is important. The opinion of the interviewees builds the foundation of how the process map is designed. Jacka & Keller (2002) states that in order to understand the process, the reviewer needs someone that can tell how it works. As the interviewees know the process, it could be beneficial to ask them what they think is a good way to improve the process according to Jacka & Keller (2002). The different ideas that each of them have can be evaluated to test as potential solutions with a feasibility analysis. Jackson (2013) shows that sequential sub-processes needs to be identified to see what the patient need in order to progress through the process. Jackson (2013) states that abnormalities to the common process should be treated differently than the common process that fits in a majority of the cases and be put aside to the process map creation. Tracking waiting time is next in the process mapping according to Jackson (2013). The patient waiting time is a part that patients and practitioners are often unaware of and have limited knowledge about, leaving great uncertainties. The flow of information is important to identify according to Jackson (2013), who argues that the flow of information could be complex and made in many different ways. Jackson (2013) also states that the researchers need to keep track of the external patient flow, where patients can enter the process from different sources and into different stages of the process.

When all information is gathered about the process it is time to generate the process map. According to Jacka & Keller (2002), creating maps that follows a chronological order will surface actions in the process that causes trouble in an easy way. Jacka & Keller (2002) states that the process map could be presented on different levels of abstraction with an overview map recommended for each project. From this overview map the researchers can create more detailed process maps for each sub-process to gain a deeper understanding for each process. As mentioned earlier, it is important to determine what metrics to track in the process mapping. The chosen metrics should be visualized in the process map in a way that serves the purpose of the process map.

The fourth step is to start analyzing the process map (Jacka & Keller, 2002). The analysis is based on the basic definition of what a process is; input, transformation and output. The analysis is directed towards improvements previously presented and grouped by Langabeer (2008). The first and second point, to increase the capacity or reduce resource utilization, can be analyzed from a value based healthcare point-of-view, which is explained more detailed in that chapter. Jacka & Keller (2002) presents the idea of finding consequences that are invisible for those working in the process. Those consequences are only found by an outsider to the process due to the reason that the outsider asks questions that internal worker thinks that they already know the answer to. However, each employee has their own perception of how things work within the organization and this perceived image could differ from person to person. Thus a fresh pair of eyes could see the organization in a different way than the internal employees. In order to make a holistic analysis of the process map, the third group that Langabeer (2008) presented, variation also needs to be analyzed. Stapenhurst (2005) presents that sources to variations could be divided into noise and signals. Cooper & Moore (2013) addresses the noise factors to the process as uncontrolled inputs to the system. These factors are often the least understood according to Cooper & Moore (2013), who further states that in order explain the process one needs to address as many influencers to the process as possible. Stapenhurst (2005) states that noise is a common cause variation and that signals are special cause variation. The noise repeats itself and could be seen as predictable if mapped properly while the signals are more unpredictable. Stapenhurst (2005) argues that deviant measure points might indicate a signal. Dealing with noise is made by improving the process to be more stable against predictable variation, while dealing with signals must be done by seeking the root cause to the variation and solve it or if not possible try to mitigate the effects of the signal (Stapenhurst, 2005).

The final step in the process mapping process is to present it. When sharing the finalized version of the process mapping it is important to share the results with all participants and not only the manager. It is common that the employees are left out of the sharing of the results and the map is used solely as a decision-making tool for the manager. Not sharing the process map with the employees will make the organization lose the full benefits stated earlier about making everyone more involved and owning the process. (Jacka & Keller, 2002)

2.3.3 Pitfalls of process mapping

Jacka & Keller (2002) states that the map is not the goal, but a tool to help improving towards the goals. Sometimes this is forgotten and there is too much focus on the map itself, leading to a scenario where you have all the information but have not used it to achieve the objectives.

Another trap is to get too focused on some details according to Jacka & Keller (2002). It is the researchers' responsibility to filter what is critical to the process and what is not.

Hall & Johnson (2009) sees the danger in standardizing processes that should not be standardized. Process mapping visualizes operations in a clear way that in many cases lead to standardizations. When doing this in an operation that should be more artistic, the standardization could according to Hall & Johnson (2009) make the practitioners operate on autopilot which could decrease the quality of work.

Jacka & Keller (2002) shows a common mistake that the process map at all cost should be presented in one page and in some cases is presented in a way that is not logical, with process steps in illogical places to save place on the chart.

Using false information is also a trap presented by Jacka & Keller (2002). In order to mitigate this potential problem it is beneficial to gather information from different sources.

Alford & Yates (2014) states that when analyzing how processes relate to each other, it could be hard to evaluate what causes what. It is also easy to miss out on roots to the actual problems.

2.4 Chapter summary

- Value based healthcare states that the focus should be on the patient perspective to surface what in the process is creating value for the regarded patient
- The concept of Value based healthcare strives to highlight the health care as a system with interrelations between different parts of the system
- Measurements are important to track and use to control the healthcare process, for improvements and to create an overview of the situation
- The organizational management aspect is important to consider regarding culture, change, learnings and development. This is crucial to create a sense of how the organization is, and should be prepared to face upcoming changes
- Performing a process mapping is a beneficial approach to use in order to gain an overview of the current situation
- The process mapping will increase the awareness of the staff regarding the holistic picture of the process and increase the sense of contributing to the value creation for the patients
- An analysis of the current situation through the process mapping will lead to potential improvements regarding:
 - Process capacity
 - Resource utilization
 - Variation reduction
- It is important to be aware that the process map itself is not the goal, but a tool to achieve the goals

3. Method

This chapter will describe the chosen strategy for this study. It will also describe the design of the study and by what logic the design was chosen. Sections covering how and what data that has been collected and analyzed will then follow. The final part of this chapter will cover some reflections regarding ethical aspects.

3.1 Research Strategy

The Research strategy should explain the combined picture of how the research has been conducted. It should be an explanation of the general orientation of the research approach (Bryman & Bell, 2011). The foundation or source of the orientation for this work could be found in a concept introduced by Batalden and Stoltz (1993) in an article called “A Framework for the continual improvement of healthcare”. In this article the authors describe how improvements in healthcare have traditionally emerged from people within the discipline with great knowledge of the subject and professional values. This has indeed led to great achievement but according to Batalden and Stoltz the improvements of healthcare have even higher potential. This will be possible when increasing the understanding of the underlying aspects of improvements. By that they mean that improvements in healthcare must combine the professional knowledge of the medical disciplines together with the improvement knowledge. Since this research is done by students of quality sciences the notion of improvement knowledge is very familiar and it seemed as the approach suggested by Batalden and Stoltz could be a logical and interesting approach in order to contribute to the field of healthcare improvement.

The improvement knowledge has its foundation in Edward Deming’s profound knowledge system. According to Deming people must have knowledge about the theory of knowledge, look at an organization as a system and also have knowledge about variation and psychology (The W Edward Deming Institute, 2015). The areas around psychology, variation and system will all be covered in the theoretical frame of reference chapter, either under separate sections or as parts of others, and will be the foundation for the analysis of the empirical findings.

Regarding the theory of knowledge Deming (2015) states the importance of moving away from hunches and beliefs and instead thoroughly investigate data in order to understand the situation. By basing the decisions on fact sprung of data one can truly understand what is necessary to do in order to improve the situation. Bergman and Klefsjö (2010) state that in order to be truly effective improvement work should be continuous and not a single event. The Plan Do Study Act-cycle or Deming Cycle is a model for continuous improvement work that Deming made popular. It is an iterative process where problems are dissected in order to understand the principle causes, do something about them, study the results and act in order to learn and gain experience (Bergman & Klefsjö, 2010). This cycle may be a never-ending loop of improvements and valuable learnings (The W Edward Deming Institute, 2015).

A research strategy that lies well in line with the theory of knowledge is the inductive approach, which also has been the chosen strategy for this project. The inductive approach is a bottom-up approach, which starts with specific observations and measurements and tries to detect patterns and regularities (Trochim, 2006). Inductive research intends to draw general

conclusions that emerge from data (Bryman & Bell, 2011). The questions asked is often open ended and at least in the beginning of the research more exploratory (Trochim, 2006), something that suits this study well due to the researchers limited previous knowledge of healthcare management. In an inductive approach there are constant adjustments between the theory and the data and the researchers are allowed to slightly revise the direction of the research during the study (Bryman & Bell, 2011).

In the theory of research methods there are two paradigms, qualitative and quantitative research methods. Wallén (2011) describes the qualitative method as interpretations from different parts to create a complete picture. It uses more open ended questions and no measurements (Bryman & Bell, 2011). Qualitative methods are suitable when a researcher is interested in understanding people's experience or feelings. It is also useful when the data is vague and ambiguous (Wallén, 2011). Qualitative data is gathered through many methods and this study will use interviews and observations. Problems with this type of method are that it is often hard to replicate since two interviews will never be exactly the same, and there is a great risk of subjectivity (Wallén, 2011).

Quantitative methods on the other hand deals with more precise facts and numerical data. It investigates phenomena that can be observed and interpreted by mathematical and statistical computations. By asking specific narrow questions, quantitative methods can reveal fine differences that can be used as consistent yardsticks. Hard fact data can usually be replicated and by that it is possible to avoid or minimize bias and subjectivity that may ruin qualitative methods (Bryman & Bell, 2011). An important issue to consider when using quantitative methods is that it must be stable over time, meaning that observation made at one moment must be highly correlated with a second observation made at another occasion (Trochim, 2006). According to Harwell (2011), quantitative research should strive to have a high level of objectivity, replicability and generalizability. Objectivity is achieved when the researcher enters the research with an open mind liberated from prejudice, and eliminates bias. The research is replicable when any other researcher can perform the research that has been conducted. Achieving generalizability is done by using a sample that can represent the studied object without delivering a skewed version of the real situation.

In this study a mixed research strategy has been used, which is a combination of qualitative and quantitative methods. According to Bryman and Bell (2011) mixed approaches are more common now than earlier. In this study it is obvious that both methods are used since the examination of all medical records reveal very different kinds of data than the semi-structured interviews and observations. Mixed methods have the benefits that it supports triangulation of the data, which is the gathering of information from different sources. Triangulation is according to Bryman & Bell (2011), a profound way of conducting research with high credibility as it facilitates interpretation of relationships. Objections against using mixed research methods are for example that every study has limited resources something that has been obvious in this study. We strongly believe that our mixed approach have given the best overall picture of the process but also realize that if focusing on one approach, either deeper understanding may have evolved (due to that more interviews and visits to other clinics could have been made) or even more data could have been extracted from the medical records.

According to Bryman and Bell (2011) it is recommended to present the data combined and not separated in one qualitative and one quantitative part when conducting a mixed approach, and that recommendation is followed in this thesis.

3.2 Study design

Research design is according to Bryman and Bell (2011) considered as the framework for collection and analysis of data. It works as the structure of the research and the glue that holds the elements together (Trochim, 2006). There are different types of design, for example experimental design and social survey design, with different benefits and drawbacks and it seems logical to choose the most suitable approach, matching the scope and purpose of the research (Bryman & Bell, 2011). In this study we have chosen the case study design since “the basic case study entails the detailed and intensive analysis of a single case” (Bryman & Bell, 2011, p. 59) which is almost an exact match of our research scope. Case studies can be made at a single location or a special situation. The important part is that there are clear boundaries (Bryman & Bell, 2011).

Case studies are common in business research and it is important to choose the study object wisely (Wallén, 2011). When looking for a suitable object to be used in our case study, it became clear that the O/H&N clinic at SU would suit our purpose well. According to recently presented figures on lead times for H&N cancer diagnosis, SU showed the longest median times in the region (Beran & Nyman, 2015). The process at SU is also the most complicated in region since all decisions and treatment for all the patients in the region are made at that hospital. SU is also the largest hospital in the region and probably the most complex regarding processes and organizational system. The choice of SU as our case object in other words followed the idea that one should choose the case where the potential to learn is highest (Bryman & Bell, 2011).

A case study has some special characteristics that should be emphasized. When research is done at a location, the research itself may act as a catalyst and start change from within. Interviewing people about their ideas and situation may trigger them to think about improvements (Wallén, 2011). Wallén further points out that case studies usually provides deeper knowledge which is suitable for the study of processes. A final remark and objection is that by narrowing the study to one location nothing can be said about others, making the study harder to generalize (Bryman & Bell, 2011). But Wallén (2011) strongly points out that while generalization might be difficult the case study may act as a role model and is proved to be a good design when the purpose is to develop concepts and methods to be used at similar locations for similar studies, matching the second part of our scope.

3.3 Data collection

3.3.1 Interviewing

Interviewing is a mean of gaining information that according to Bryman & Bell (2011) is the most common method in performing research. The methodology of using interviews in research provide a flexible way of gaining information that is rich on content. Scheinberg (2014) states that interviewing is a suitable method to use when deep and direct information is needed and when the sample is small enough to perform the interviews in reasonable time.

Scheinberg (2014) further argues that interviewing is useful to gain a good overview and flexible to restructure when having learned more about the subject.

Interviewing has played an important role in our research. It has been used to gain information about the patient process as well as the employees' conceptions about their work tasks and their idea about the current and future state of the cancer diagnosing process at the H&N clinic at SU. Interviews have also been conducted to perform benchmarks at other hospitals in the region. All interviews have been conducted by both researchers with one person taking notes and the other leading the interview. By doing this we could keep a better flow of the interview and extract more information from each interview. All interviews were conducted in person, which made it easier for each interviewee to get a better connection with the researchers and made asking follow-up questions more natural.

Interviews have been conducted with process owners of the H&N cancer process within the region, a business developer at O/H&N clinic at SU and the operation manager at O/H&N clinic at SU. These interviews has been made to get an overview and better understanding of the process and what it means for the organization to implement SVF. It has also been an opportunity to validate our purpose and scope of the project to make sure the research is relevant. These interviews were organized in a semi-structured setup, explained by Scheinberg (2014), as when a set of questions are prepared but asked in a flexible way without expectations of getting an exact answer. The questions asked are mostly open ended which, according to Bryman & Bell (2011), is useful when exploring new areas and surfaces the knowledge of the interviewee to a higher extent than having questions that gives a straight answer. According to the flexibility that interviews offer, the template that has been used for the interview has been slightly modified to fit the purpose of each interview. The interview template used to conduct the interview can be seen in Appendix B.

The interviews held with the employees working in the cancer diagnosing process were also semi-structured. The interviewees were chosen based on a discussion with the operations manager at the O/H&N clinic, who gave us information of which persons that would be suitable to interview for the research. The interviewees were approached by asking them to participate, which was made possible through the access that the operations manager gave us to perform the study and informing the personnel before we approached them. Most of the interviewees were approached initially based on our knowledge and contacts provided from speaking to the operations manager and the information gathered from secondary sources, while some were contacted after gaining more knowledge about the process through interviews and reviewing medical records. The interviews have been chosen to provide a complete picture of the process of diagnosing the patient from when the patient referral is sent to the O/H&N clinic to when the patient starts treatment or exits the diagnosing phase.

Two benchmarking interviews were held at other hospitals to gain ideas on how they do and match the differences against the procedure at SU. The differences will hopefully generate ideas of how to pursue best practice care, by taking ideas of practice from different sites. The benchmark interviews were conducted at *Södra Älvsborgs Hospital (SÄS)* and at *Hallands Sjukhus Halmstad*. Unstructured, open-ended-question interviews were used and the main

question was for them to describe their entire operation for cancer diagnosing in their respective O/H&N clinics. The hospitals were chosen as they had recently shown significant improvements to their lead times in the diagnosing phase and thus gave reason to believe that there were some good ideas to extract from those sites.

The complete list of interviews can be seen in **Table 2**.

Table 2: List of interviews. 16 interviews of various length and locations were conducted

Role of interviewee	Date	Purpose
Operations Manager at O/H&N	2015-02-23	Validate project
Process owner in VGR	2015-02-25	Validate project, Process mapping
CROB nurse	2015-03-05	Process mapping, Conceptions
Contact Nurse	2015-03-06	Process mapping, Conceptions
Assisting Nurse	2015-03-06	Process mapping, Conceptions
Assisting Nurse	2015-03-06	Process mapping, Conceptions
Surgery coordinator	2015-03-09	Process mapping, Conceptions
Doctor	2015-03-09	Process mapping, Conceptions
Surgery coordinator	2015-03-09	Process mapping, Conceptions
Doctor	2015-03-10	Process mapping, Conceptions
Business Developer	2015-03-11	Conceptions
Process owner in VGR	2015-03-12	Validate project, Process mapping
Radiologist	2015-03-17	Process mapping, Conceptions
Head of tumor team and Contact nurse (SÄS)	2015-03-18	Benchmarking
Pathologist	2015-03-23	Process mapping, Conceptions
Process owner and doctor (Halmstad)	2015-03-25	Benchmarking

The conducted interviews transitioned into more unstructured interviews as the knowledge of the process became more apparent. Bryman & Bell (2011), argues that having an unstructured interview setup will bring forward a more genuine view of the interviewees' conceptions of the organization, bringing a deeper dimension to the research. This enables more surprising statements and further adds to a more realistic picture of the holistic process or organization.

Both researchers took notes from the interview and added extra notes during tape recording listening sessions for each interview. Notes were entered in the interview template which is matched to the research scope and theory to make it easier to analyze.

3.3.2 Observation

Bryman & Bell (2011) states that observations provide reliable information regarding events, and observing the actual process will provide a more precise picture of the researched event. Participant observations are beneficial to learn the spoken language in the organization and gain a deeper understanding about the culture in the researched environment (Bryman & Bell, 2011).

Observations have been made at SU to gain a more accurate view of the diagnosing process and to gain better information regarding the conceptions of the staff working in the process. The observations also increased the trustworthiness of the information gained through interviews by validating information through real observations, giving more credibility to the research. A disadvantage with participant observations is the ethical aspect of privacy

intrusion, where people might feel exposed when observed. The issue was resolved by introducing ourselves to the observed patients and by having the project introduced to the concerned staff. The observations were made as passive participation which, Spradley (1980) explains, is when the researcher participates by solely observing. This is suitable when the researchers should not intervene in the process and in the observed processes it was important to maintain the efficiency and professionalism of the performance of the practitioners. The performed observations are shown in **Table 3**, where most parts of the diagnosing process has been covered.

Table 3: List of observations. Observations at five different locations were conducted

Observation	Date
Multi Disciplinary Conference	2015-02-26
Ordinary clinic reception O/H&N	2015-03-02
CV reception O/H&N	2015-03-03
CROB	2015-03-05
Radiology	2015-03-17
Pathology	2015-04-24

The observations were chosen during our research as the knowledge about the process increased during the study, to provide a complete picture of the diagnosing process. Notes were taken during each observation to secure that all information that could be relevant to the research were captured and later screened to fit the research.

3.3.3 Medical records reviewing

When designing our quantitative research method, the first thought was that the information about each sub-process could be reached through existing IT-systems, and through them follow the path of each patient. However, after several meetings with person working in IT-systems containing patient information, we could determine that the content in those systems were difficult to access, analyze and insufficient regarding the details that we required for mapping the present state. It was then decided to conduct medical record reviews to follow each patient on a detailed level providing an accurate view of the actual situation.

The measurement points that were considered important for the study was to track the dates of each relevant sub-process that the diagnosing process contained from when a referral was sent to SU to when the patient exits the diagnosing process, following the patient from the beginning. The measurement points could be seen in Appendix A. The measures were decided to be followed patient-by-patient to measure the lead time between process steps and to enable count measures for each sub-process. By doing so it was possible to determine the number of patients entering each step of the process and provide a holistic chart of the patient paths through the diagnosing process. In order to track each patient's pathway, maps were drawn by hand for all individuals.

Patients were tracked in two ways:

1. The patient enters the diagnosing process from a health center or other practitioner and has a referral flagged with suspicion of cancer.
2. The patient enters the process externally or without a cancer priority and participates in a MDK at SU for final diagnosis.

Lists of patients were extracted from the IT system *COGNOS*, which in turn gets the information from *ELVIS*. The extraction was made by the business developer at the O/H&N clinic at SU. The *COGNOS* system was in this case used to extract lists based on search variables that matched our criteria. The first type of patient was extracted based on those who were tagged with the search variable *Cancer Vuxen (CV)*, meaning an adult with suspicion of cancer. The second patient group was tagged with the search variable MDK, which implies that they have been discussed at the MDK at SU. The sampling period was the four months from June 2014 to September 2014, giving a sample size of 237 medical records to investigate. In this setup, patients could enter before June and participate in a MDK in the chosen time frame. They could also be involved in activities in the process after September but enter in the chosen time frame.

The data collection was performed on site at SU in their medical record system *MELIOR*. Easy access to the system was crucial and at the same time great caution was needed to maintain the integrity of the research objects. This was solved through a clear and firm handling of secrecy papers and mandate to perform our research in the way that we presented it. The sub-processes that were considered relevant to track were chosen during the collection process. This means that the points of measure were revised and we had to go back and forth in the beginning of the process, making the collection iterative. The iterative process also provided an extra occasion to verify the data and make sure that it was correctly extracted. The extraction from *MELIOR* was made into Microsoft Excel, where each social security number was transformed into a code number to avoid unnecessary privacy intrusion and the risk of having the personal data ending up in the wrong hands.

The data was structured to make it easy to analyze and translate into visual graphs based on what was considered suitable to present as research. Lead time calculations were done in Microsoft Excel where also graphs were created to visualize lead times and patient flow over time to spot trends and show variance in the process.

3.3.4 Secondary Information Sources

Secondary data is explained by Bryman & Bell (2011) as data gathered by another person than the user of the data. An advantage of using secondary information sources is that it saves time, which can be used for other data collections or the analysis. However, the researcher relies on the data that someone else has collected and lacks control of the structure of the collection.

Secondary information sources have been used initially to create an understanding of the research area, where the written material about SVF and healthcare regarding cancer were reviewed to get a basic knowledge foundation to form our research upon. It has also been important in learning the technical language used in healthcare, to be able to participate in observations and understand how to set up interviews with the staff and interpret their answers correctly.

In our research, secondary information sources were used to perform a benchmark towards the Danish implementation of standardized cancer diagnostics. The benchmark of the Danish system was performed due to that it has inspired and influenced the implementation of a

standardized process in Sweden. The intention was to gain information of what has been crucial in the Danish standardization and what was problematic, to see what should be considered when implementing a standardized process in Sweden. The reason to using secondary sources instead of interviews was that there already existed videos containing interviews with the needed roles in the Danish healthcare system. The videos that were reviewed can be seen in Table 4

Table 4: Danish video interviews that can be accessed through RCC South's' homepage

Role	Interview Watched
Public Health Professor	2015-02-26
General Practitioner	2015-03-02
Aarhus University Hospital Professor	2015-03-03
Secretary/Cancer coordinator	2015-03-17

The information from the video interviews was transcribed by both researchers, reviewing each video twice.

3.4 Source Evaluation

Evaluation of the performed research can be made by analyzing the research through the concepts of Reliability and Validity. Reliability is about whether or not the data collection can be trusted, how solid it is and how it is structured to be able to perform similar research in the same kind of situations. The validity concerns the matter of how the conducted data collection matches the real situation and if the decided measures reflect the concepts that were chosen to be researched. (Bryman & Bell, 2011)

In the conducted interviews both researchers were always present to make sure that all important information were captured and stabilizing the interpretations of what each interviewee describes. The interviews were also processed an extra occasion through both of us listening to each interview recording. All interviews followed a certain course of action based on our created template, making the conducted interviews easy to imitate for similar research. Regarding the medical records data collection, the data harvesting was performed by both of us with initial discussions and revising to increase the conformity and robustness of the data. However, it is uncertain to what extent this data collection can be performed in the same way at all Swedish hospitals that has a cancer diagnosing responsibility due to the current situation where all counties use different IT systems to handle the digitalization of their medical records. The decided measurements have been discussed by concerned personnel, data processors and by attending meetings with the project leaders of the SVF implementation to make sure that the decided measurements reflects the situation that is researched. It turned out that a patient pathway including date of occurrence could almost completely be tracked through MELIOR and the incorporated application *e-arkiv*. As a final remark it could also be said that the exact date that oncological treatment started is also not marked in MELIOR. However this date could be tracked by ELVIS instead for those patients.

3.5 Research ethics

This case study has largely involved people, both through interviewing employees at the hospital and through mapping the patient journey by analyzing medical records. Considering that people will have a central role in the research, ethical aspects need to be kept top of mind to secure the integrity of the report and protect the people that the research is built upon.

Crandall & Diener (1978) presents four important ethical issues that need to be considered when performing research involving people. First there is Harm₂, which concerns whether the participant could get affected by the research in a negative way. This aspect is covered by treating each interviewee anonymously in our description of the current situation. By doing this, each participant could speak freely about their situation without risking getting exposed. The second ethical aspect that Crandall & Diener (1978) presents is the Lack of consent, meaning that each participant should get proper information about the research to make a rational decision whether to participate or not. When performing research it is important to have verbal or written approvals (Scheinberg, 2014). This has since we got access to performing our case study at SU worked impeccably. In the contact with all participants we have either sent a brief project description in our initial contact or given a short presentation to who we are and what our research contains. We have always been open about what the research will contain, which deals with the Deception issue presented by Crandall & Diener (1978). The fourth aspect is Invasion of Privacy₂, where the researcher should not violate the sources by harvesting personal information that does not contribute to the research. According to Scheinberg (2014), the researchers should always have informed consent and avoid privacy invasions. The privacy aspect is particularly present at SU regarding the patient information. This has been handled by always having written consent from the operations manager at the O/H&N clinic when visiting the different sites at SU and also by signing secrecy agreements that prohibits us from sharing sensitive information and using unsecure software when handling patient information. Bryman & Bell (2011) presents data protection as another important ethical aspect, which is covered by the actions mentioned. Also all information that is connected to personal information about the patient has been decrypted and each person has a code instead of a social security number or name when analyzing the patient information. As no contact with the patients has been made, except for the observations at the clinic, it has been straight forward to follow the ethical precautions needed for this research.

3.6 Chapter summary

- The foundation of the research will be based on Deming's' ideas of profound knowledge, involving; Theory of knowledge, System approach, Psychology and Variation
- The research is made through a mixed method approach containing several methods to gain a more complete picture of the current situation
- The methods used are:
 - 16 interviews – to gain information about the conceptions of the staff and to gain material for the process mapping
 - 6 observation sessions – to clarify the process and provide information to the process mapping
 - 4 video transcriptions – to benchmark towards the Danish implementation
 - 237 medical record reviews – track the lead times of the patients and map the process
- The ethical aspect is important to consider as the research is performed in a sensitive environment that regards patients. This has been clearly handled and the integrity of the patients has been kept through the study.

4. Empirical findings

In this chapter a detailed description of the collected data will be presented. This first section will present the process for the diagnosis of cancer at the O/H&N clinic at SU. It will be one combined picture of all the information gathered through observations, interviewing and medical record examinations. The second part will cover a description of the perception the staff have presented about the process, their work and the knowledge of SVF. The last part will present the three external cases to be used as benchmarks.

4.1 The process of diagnosing cancer at the O/H&N clinic at SU

As stated in the theoretical chapter regarding process mapping, one must define the process that is going to be mapped. We have defined our process to cover all the cancer diagnosing processes handled by the O/H&N clinic. This also includes examinations made by the pathology department and the radiology department regarding O/H&N clinic's patients. We define our process to begin with the trigger for a first appointment at the O/H&N clinic and ends when the patient is diagnosed and starts his/hers treatment, are sent to other departments/clinics or home. These start and stop activities are marked as bold ellipses in the pictures describing the process.

There are basically two types of activities, those that involve the patient in person (appointments, examinations) and those that involve information regarding the patient (referrals, specimens). **Figure 6** presents the activities covered in the defined process. Based on this picture one might think that it is a quite straight forward process where the patient enters at the left, take a straight route and exit at the right. The reality of our sample has thus proved that in many cases back loops are present which complicates the situation. One must emphasize that in some cases one activity may trigger none, one or several activities.

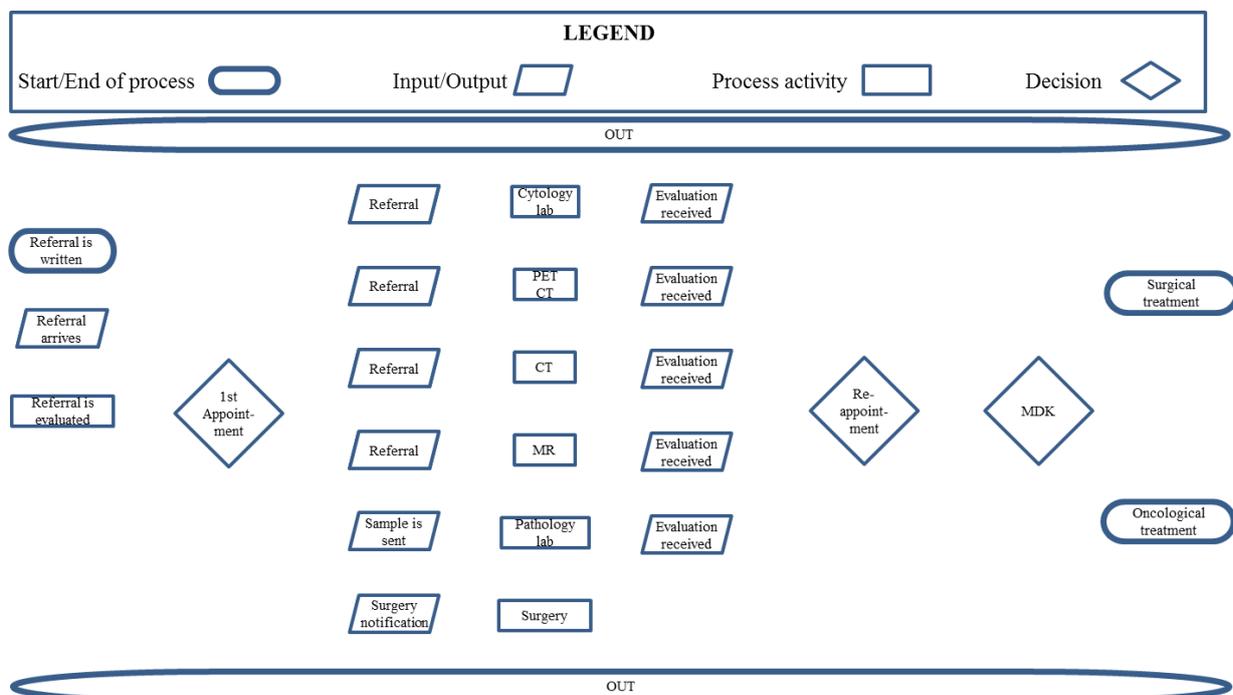


Figure 6: The activities of the process

The rest of this chapter will guide the reader through the process. There can be different reasons for conducting the same examination parts. In many of the cases the physician can already at the first appointment assess that this is most probably a cancer case. In that case the physician will register the patient for the MDK and the cytology/biopsy and x-rays are done to get data for a proper diagnosis and treatment decision at the MDK. If more vague symptoms are present, the physician may order the same examinations but wait with registering the patient for MDK until answers have arrived. In some cases examinations are performed sequentially, ordering more examinations based on the results of the conducted ones.

4.1.1 The notification that a patient is in need of care

Most of the medical letters of referrals arrive by mail, which is delivered four times a day, but it happens that some arrives by fax or the patient arrives at the clinic with a printed copy. A secretary is responsible for collecting the mail and attaches a stamp to every referral. During the studied period a total of 87 cancer related referrals arrived to the clinic and all of them have this stamp. The secretary also enters the information in ELVIS. In the e-arkiv in MELIOR a few odd looking papers are tagged as referral but lacking stamps. All of those came from patients arriving from the emergency department. Time between referrals are written and received at the clinic vary from immediately (when referrals are faxed) to several days. **Figure 7** shows how this time differs for the studied referrals. 65 of the referrals arrive within the first 3 days while the longest time found was 11 days. It is interesting to notice that 4 of 8 that were delayed for 7 days or more originate from private medical facilities, and 2 are internal referrals from within the SU and the last 2 are from primary care units in the region.

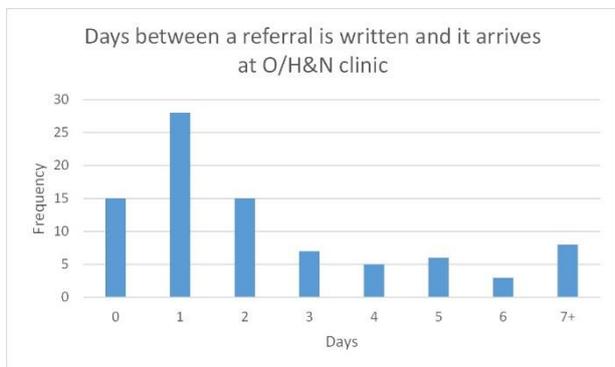


Figure 7: Days between a referral is written and it arrives at O/H&N Clinic. Most of the referrals arrive within the first 3 days but there are also many delays

A few of the interviewees express the notion that cancer patients often tend to arrive many at the same time. The variation of weekly received referrals can be seen in **Figure 8**. Since the studied period is limited in time it is natural that fewer referrals are found before week 25.

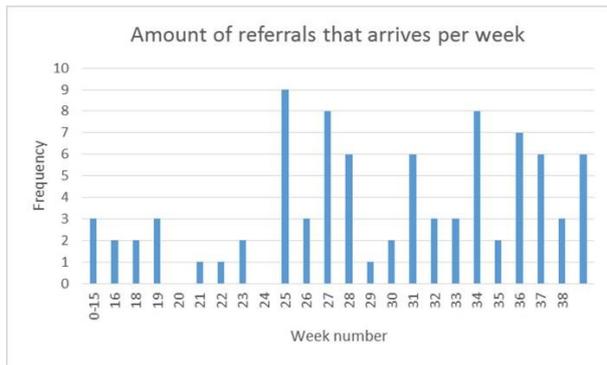


Figure 8: Amount of referrals that arrives per week. The differences in number of referrals before and after week 25 are explained by the studied sample

After registration, everybody with access to ELVIS can track the referral and identify that care is needed. At SU there are two nurses, working at a cell called *Centrala remiss och bokningsenheten* (CROB), who are tasked to collect the referrals several times per day and make a first screening. After the screening the nurse sorts all the referrals into the different care team’s document boxes. In the *tumor team*, two of the senior physicians are responsible for assessing and prioritizing the referrals at least once a day. There are five types of prioritizations grouping the patients based on which time interval they should be given a first appointment. The priorities and intervals are shown in **Table 5**.

Table 5: Priority assessment list. Maximum waiting time before a patient should be offered an appointment time based on priority

Priority level	Maximum time (days)
CB	2
CV	7
1	14
2	28
3(non-prioritized)	90

In order to standardize the assessment of a referral the clinic has reduced the number of physicians that performs this task. They are also more likely to assess the referral as a CV now than earlier since they are eager not to miss a possible cancer patient. This priority is made as a marking around a figure on the stamp, stamped by the secretary. The physician also makes a mark with date when the assessment was made. The duration between arrival and assessment of referrals can be seen in **Figure 9** and **Figure 10**. The majority of all referrals are assessed on the arrival day or the very next day, however there are occasional delays in this process step. Filtering the data and removing holidays and weekends yields even faster assessment time, and only five referrals have a time gap of 3 workdays or longer.

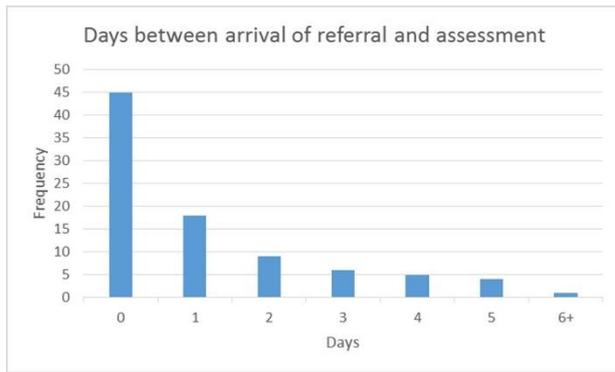


Figure 9: Days between arrival of referral and assessment. 72% of all referrals are assessed within 2 days

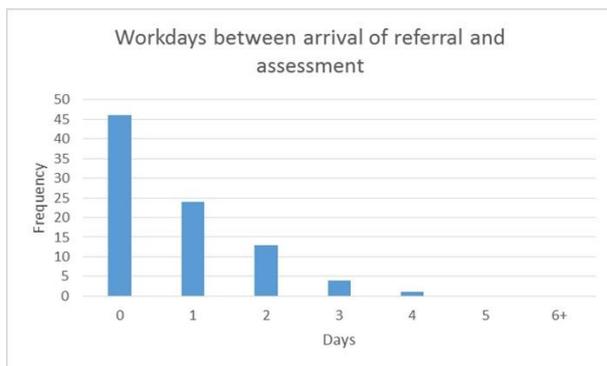


Figure 10: Workdays between arrival of referral and assessment. All referrals are assessed within four workdays

Of the 87 arriving referrals, none lack prioritization number. Only one has got priority 3, two priority 2 and 11 priority 1, the rest are marked with CV priority.

Referrals prioritized as a CV is put in a separate red document box. One of the nurses at CROB collects referrals from this red box several times a day. The nurse then books a first appointment and attaches the information in ELVIS. The clinic has two special appointment blocks every week for cancer examinations which makes it 8 occasions earmarked for this. These occasions have been introduced lately in order to speed up the process of handling possible cancer patients. The nurse makes a photo copy of the referral to be used during the appointment and store the original for securing the information. The nurse at CROB calls all the CV patients by telephone if possible, something the majority of patients seem very pleased with. Since it is a nurse that makes this call he/she can emphasize the importance of a quick appointment and it is very seldom a patient declines the proposed time. Since many patients can be offered an appointment time already the same or next few days this telephone call is needed even though all patient also receives a notification together with a health survey by mail.

4.1.2 The first appointment at the clinic

The patient arrives at the clinic and notifies their presence at a desk where a secretary logs the patient in a computer system. The *assisting nurse* has digital access to the same system and can observe when the patient has arrived. In very rare occasions the patient does not show up. It then falls on the physician to decide whether or not to reschedule the patient for a new appointment. 106 first appointments are present in the studied data which can be compared to

the 87 arrived referrals. These 19 cases that enter without a referral are distributed as follows. 8 appointments are with patients that are at the clinic for a reappointment from an earlier treatment. 9 patients arriving directly from the emergency department, that may or may not have a referral as noted above. Additionally 2 patients arrive from the oncological department and are probably referred only by phone. As stated above the goal is to grant a patient prioritized as CV a time within a week. **Figure 11** show the actual number of the sample, and it must be emphasized that 16 cases are not CV prioritized. 73% of the patients are attending a first appointment within 10 days of arrival of referral. However, in five cases it took between 21 and 31 days for this appointment to take place, and naturally 9 of the 11 longest lead time are represented by patients not prioritized as CV. In **Figure 11** one can see the distribution of appointments based on the sample. The fact that around 10 cases occur before June points to the fact that some cases are really tricky to diagnose.

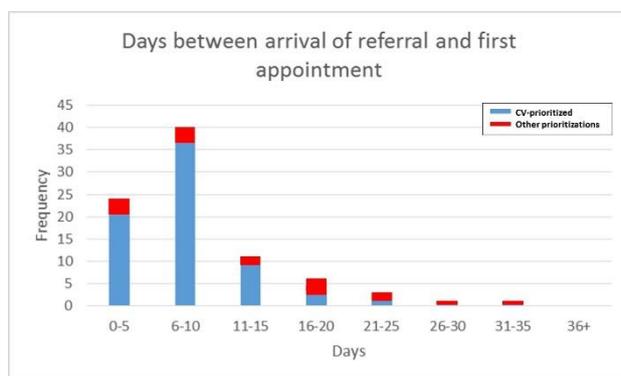


Figure 11: Days between arrival of referral and first appointment. The majority of the patients had a first appointment at the clinic within two weeks



Figure 12: Number of first appointments per month. Due to the time frame of the sampling in this study, there are naturally more appointments in June-September

The assisting nurse collect paper copies of the referral and together with the physician make a short briefing about the next patient. The nurse then collects and introduces the patient, who is pointed to an examination chair next to the physician. Relatives or assisting personnel are pointed to places at the other side of the physician’s desk. The patients are treated kindly and with respect. The physician and the patient have a small chat and the patient has in most cases filled in a declaration of their health status that is handed to the physician. The small chat ends when the physician describes what kind of examination to progress with. There are no actual differences at a CV appointment compared to a standard one and the physician does no

special arrangements. But some expresses that they might have a slightly different mindset. At a CV appointment they are prepared to find a tumor. A CV prioritized patient is given an extended appointment time and there are only four CV appointments scheduled each half day. The physicians and assisting nurses rotate in the team between appointments but they all express that the examinations are conducted in a homogenous way. An examination is usually done both by visual inspection and by palpation. Not uncommon is to use fiberscope through the nose something that some patients felt a bit unpleasant about. If something that might be a tumor is found in an accessible area (tongue, mouth, and upper part of pharynx) the physician usually performs a biopsy to extract a piece of tissue. If the examination is about a mass, for example at the neck, a fine needed punctuation can be made in order to extract liquid that contains cells for a cytology test. Not all physicians carry out these fine needle punctuations and SU has a cytology laboratory with drop-in times that the patient can be referred to.

When observing an appointment one gets the experience that it has a swift tempo, and one might wonder if the patient has the possibility to comprehend everything that happens. However the impression is that all patients are meticulously examined and everything is professionally managed. During the end of the examination the physician starts to introduce to the patient what will be the next step. No formal debriefing period was observed. Once the examination is done the nurse shows the patient out and the nurse repeats all vital information once more to the patient. The patient also receives a written note with the same information and a telephone number to a special nurse working with patient contact. This written note is a new activity and the impression is that the majority of patients are pleased with it and they feel that information becomes clearer.

In many cases the physician does not suspect cancer; then this is the end of the process. If examinations are ordered or biopsy taken, a reappointment are scheduled approximately 2 weeks later for delivering of results but schedules are often full and it is hard to find time. The physician usually asks if the patient is willing to receive the *Pathologic anatomic diagnosis* (PAD) by phone if nothing is found. Some patients think this is a good idea but not all. If x-rays are needed the patient are asked to call the O/H&N clinic once the radiology department has scheduled a time for the patient and a reappointment is not scheduled until then.

The assisting nurse takes the tissue specimen and put it in the outgoing mailbox where a runner collects it at the end of the day and delivers it to the pathology laboratory.

The physician dictates after each patient both what is done for entry in the patients' medical record as well as referrals to external examinations.

During the first appointment the physician decides what will happen next. **Figure 13** shows the activities triggered by the first appointment. After this session the patient may follow one or several of these paths. One should notice that many of the patients that arrive at the first appointment have already conducted some examinations, which are excluded from this process mapping. This will for example yield quite a big difference if comparing our data with the data in the national quality register which only tracks that a patient have done an

examination and not at what department or clinic. In two cases these external examinations are enough for a diagnosing decision and the next step of the process will be the MDK.

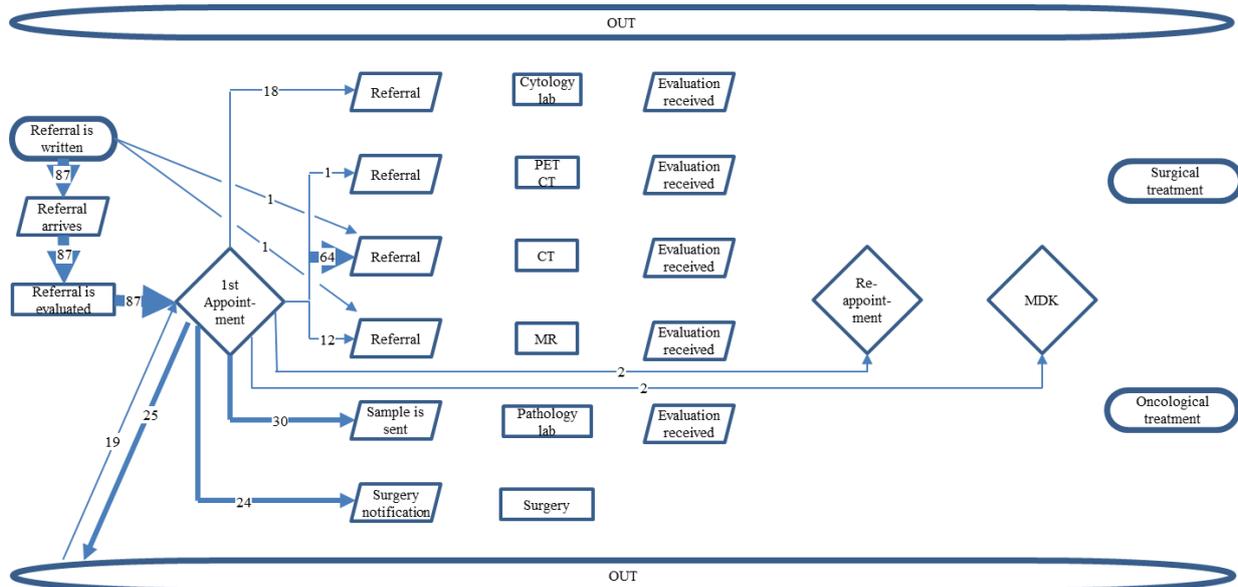


Figure 13: Activities after first appointment. Many different pathways starts with a first appointment

In ¼ of all cases the patients leave the process after this step. The majority of these are patients that are diagnosed with no cancer but this group also includes a few patients that are referred to SU from the regional clinics and are sent back home for conducting necessary examinations.

4.1.3 Surgery

Sometimes the patient does not feel comfortable with the physician performing a biopsy or the localization of the area is not directly accessible for the physician, then the biopsy must be done in narcosis and through surgery. It can also be that the physician is not really sure if a gland is malignant but it should be removed anyway for pathological examination. If surgery is needed the assisting nurse escorts the patient to a cell at the clinic working with surgery coordination. Some surgeries can be done through *ambulatory surgical procedures* but for most of the time the patient must be hospitalized. 44 surgeries were conducted during the studied period, and 24 of them were ordered at the first appointment. The other 20 cases are triggered by other activities.

At SU there are two nurses that operate the surgery coordination cell. This is a full time duty and they are constantly overloaded with work. When a surgery is needed the physician fills in a paper form (“operationsanmälan”) that the assisting nurse hands to the *surgery coordinators*. The surgery coordinators work in a computer system called *OPERÄTT* and many of the fields from the paper form are mandatory boxes in *OPERÄTT*. The routine around this paper form and the fields seems not fully understood at the clinic and the surgery coordinators uses a lot of their time tracking missing information. Patient in need of a surgery is escorted by the assisting nurse to the cell and introduced to the surgery coordinators. In an ideal situation the patient could be given a time for surgery right away. This is however very seldom since in most of the cases the surgery coordinators must reprioritize and move other preplanned surgeries in order to grant the suspected cancer patient a time in the near future.

The goal is to have a CV patient in surgery within 2 weeks something that is very hard to accomplish. In **Figure 14** the timings for the sample can be seen. In 29 of the 44 cases the two weeks goal was reached and in 3 extreme cases the lead time exceeded 7 weeks.

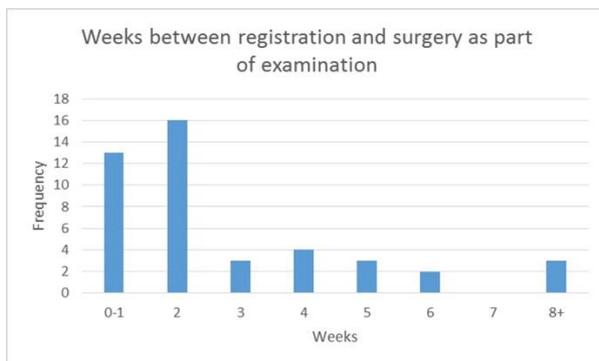


Figure 14: Weeks between registration and surgery as part of examination. 66% of the patients can be surgically examined within two weeks of registration

The facility for surgery is managed by a separate department and the physicians from the clinic conduct surgery Monday, Tuesday and Wednesday. Many patients are also in such overall poor medical condition that other examinations must be completed before surgery. *Computed Tomography (CT)* and/or *Magnetic resonance (MR)* must also all the time be done before surgery because the fresh wound will otherwise blur the picture. Usually the patient are summoned for surgery by mail, and sometimes also by a telephone call, and it is unheard of that a patient miss out of the offered occasion.

4.1.4 Offsite examinations

The contact nurse is responsible to follow up on every patient under examination for suspected cancer. In some cases the patients are introduced to the contact nurse at the first appointment but presently there is no standardized routine for this.

At SU there are two contact nurses and they express it as a positive thing that it is the same individual that coordinate with external examinations and communicate with the patients. But the two tasks are both very time consuming and more time is needed.

4.1.4.1 at the pathology department

All examinations of specimens (cells or tissue) are made at the pathology department. There are sub-specialists working with different types of specimens.

Overall it is easier to draw conclusions from a tissue specimen than from a cell specimen but if a cell specimen give results they are correct.

If a cytology test is needed there is, as mentioned above, a drop-in facility at SU open 10:00-11:15. The O/H&N physician writes a referral that the patient brings by hand and the assisting nurse then informs the patient about where to go. At the cytology drop-in a pathology physician performs the punctuation and prepares the specimen. According to the staff working at the pathology department, there are a lot of professional skills needed to get a specimen from where it is possible to draw conclusions so it is logical to use specialist for this type of examinations. At the same time, in order to reduce unnecessary waiting times it has been

discussed in the tumor team if more cytology tests should be carried out by the O/H&N specialist. The different time gaps can be seen in **Figure 15**, **Figure 16** and **Figure 17**

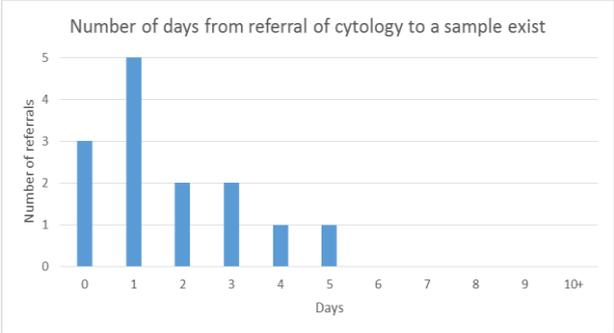


Figure 15: Number of days from referral of cytology to a sample exist. 1/3 of the patients wait more than one day before visiting the cytology drop-in facility

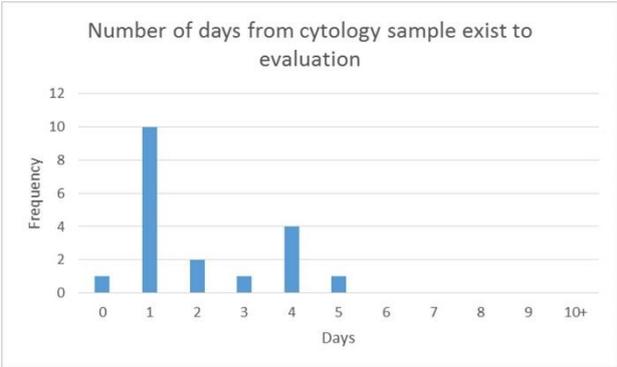


Figure 16: Number of days from cytology sample exist to evaluation. Some specimens seems harder to evaluate than others

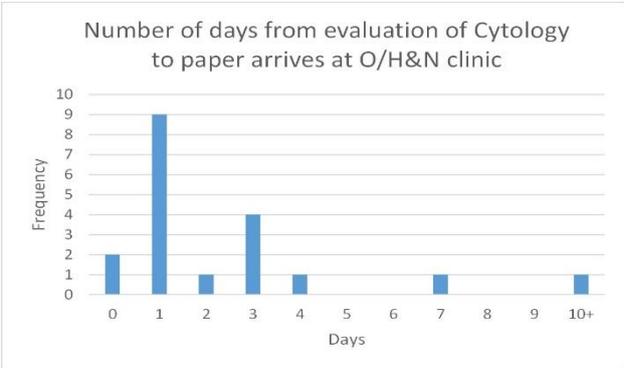


Figure 17: Number of days from evaluation of cytology to paper arrives at O/H&N clinic. Internal information handling delays many evaluations

19 cytology test were conducted during the studied period. We once again would like to remind that many patients arrive at the first appointment with at cytology result. Based on **Figure 18** one can observe that one result was of such a poor accuracy that the patient had to take a new test. In 11 of the cases the patient was informed at a reappointment, but in one case the patient agreed to have the result only by phone if nothing was found. In 6 of the 19 cases the result from the cytology evaluation is presented to the patient at the MDK, something that implies that these are cases where the physician are so sure that it is cancer that no reappointment is scheduled. One can also observe that in 6 of 19 cases the result from the

cytology test triggers the physician to write a referral for a CT.

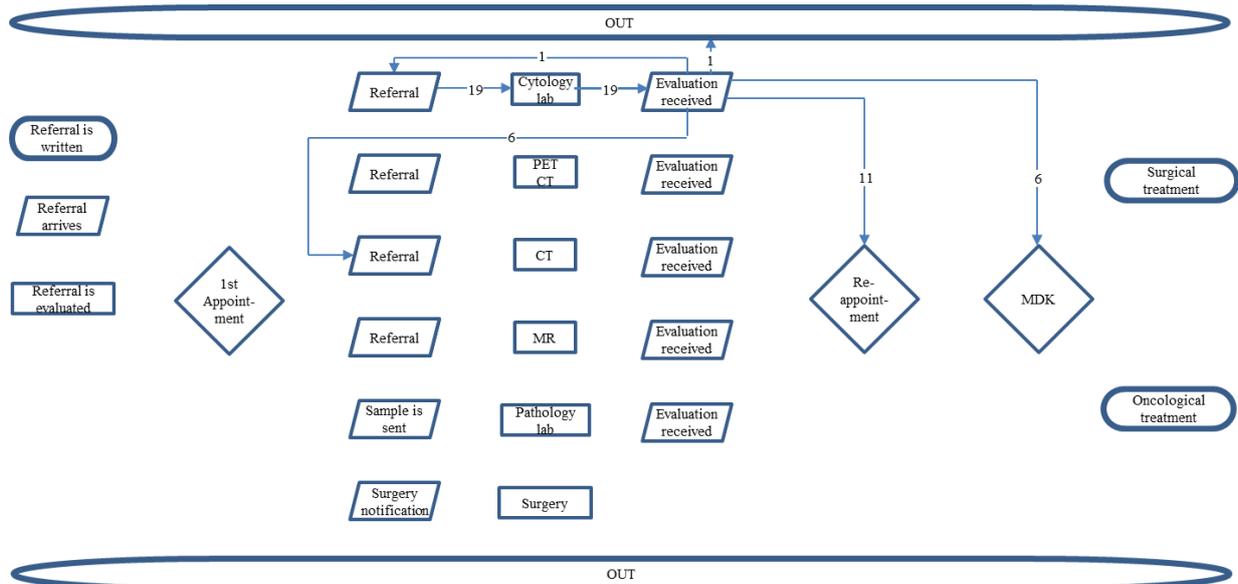


Figure 18: Activities after cytology. It seems quite common to order a CT based on the results from a cytology test

The tissue specimen delivered from the O/H&N clinic is prepared at the pathology laboratory. Cancer suspected tissues are marked with red, meaning that they should be prioritized and handled directly. The specimen is delivered to a reception by a runner. A secretary is taking care of the specimens and marks each one. The tissue is then embedded in paraffin, meaning that the tissue is put in liquid paraffin that solidifies. The next step is for a biomedical analyst to cut flakes of paraffin with tissue and prepare them for coloring. The coloring is made to make each specimen analyzable for the pathologist and the procedure for this takes 1-2 days. In some cases the specimens are too complicated to distinguish after the coloring and a second coloring is needed, which adds an extra 2 days to the process. When the cancer has spread to the bone a specimen including the bone is needed. The bone tissue needs to be softened, which is a 7 day process. After the coloring, the specimens are analyzed by a pathologist. The analysis could take up to 1 day to perform. All in all, a total of 81 specimens were collected of which 30 were collected during the first appointment, 44 during surgery, the few remaining were collected during reappointments or triggered since more information was needed at the MDK. The different time gap in the pathology process can be seen in **Figure 19** and **Figure 20**

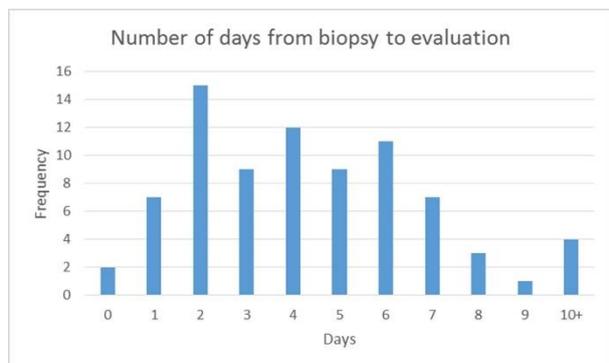


Figure 19: Number of days from biopsy to evaluation. The varying evaluation times for tissue specimens strengthens the notion that the pathology department is overloaded

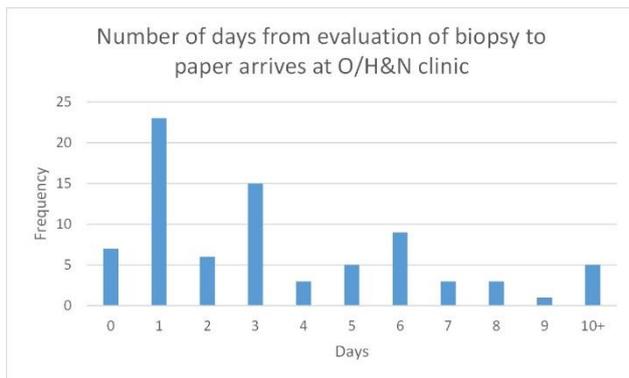


Figure 20: Number of days from evaluation of biopsy to paper arrives at O/H&N clinic. Once again the information handling sub-process shows many delays

When a quick evaluation is requested, this dying and evaluation can be performed in sequence and a first preliminary evaluation can be presented the next day at the afternoon. A complementary evaluation is then delivered 2-3 days later. Of the combined cytology and biopsies taken 18 cases resulted in a complementary evaluation.

The pathology physician responsible for O/H&N is usually overloaded with specimens to evaluate. Usually a PAD takes 2-5 days but sometimes much longer and in four cases the process actually took more than 10 days. It is therefore of great importance that referrals and specimens for patients already reported to the MDK are clearly marked so these can be prioritized and ready in time. Once the pathology has evaluated the specimen the result are dictated, a secretary prints it and the physician sign it. It is possible for the O/H&N physician to access the pathologist computer system but that is perceived as complicated. At the referral there is a box to tick if the O/H&N physician wants the answer by phone which is often the case. It has been found that the actual paper evaluation document arrives by mail at the O/H&N clinic many days after the information is used and presented at the MDK or a reappointment.

When a mass or a tumor is removed it is sent to the pathology department. The pathologist then evaluate if the tumor is malign or benign. They also evaluate if the entire tissue is removed. It is of great importance that fresh uninfected tissue surrounds the infected part, otherwise there is a big chance the surgery has to be remade. In our sample this happened in four cases where the PAD triggered a new surgery.

Just as with the cytology result above, the result from a tissue specimen may trigger many activities shown in **Figure 21**. In 31 cases the patient is informed about the result at a reappointment, but in 11 cases the patient have agreed to have the result only by phone if nothing was found. In 37 cases the result was presented to the patient at the MDK, something that implies that these are cases where the physician is so sure that it is cancer that no reappointment is scheduled. In two cases, shown by the arrows in **Figure 21** directly from pathology lab to MDK, the result may also be presented for the first time to the O/H&N physician at the MDK, or at least that the paper with the result arrived to the clinic after the

MDK. This implies that this is a case where MDK is scheduled before examinations are completed in order to speed up the process. In one event a reappointment was scheduled and executed but the PAD was not ready. In this specific case the PAD took 18 days. Lastly the PAD may also trigger the physician to write x-ray referrals, mostly CT but also MR and *Positron Emission Tomography – Computed Tomography* (PET-CT).

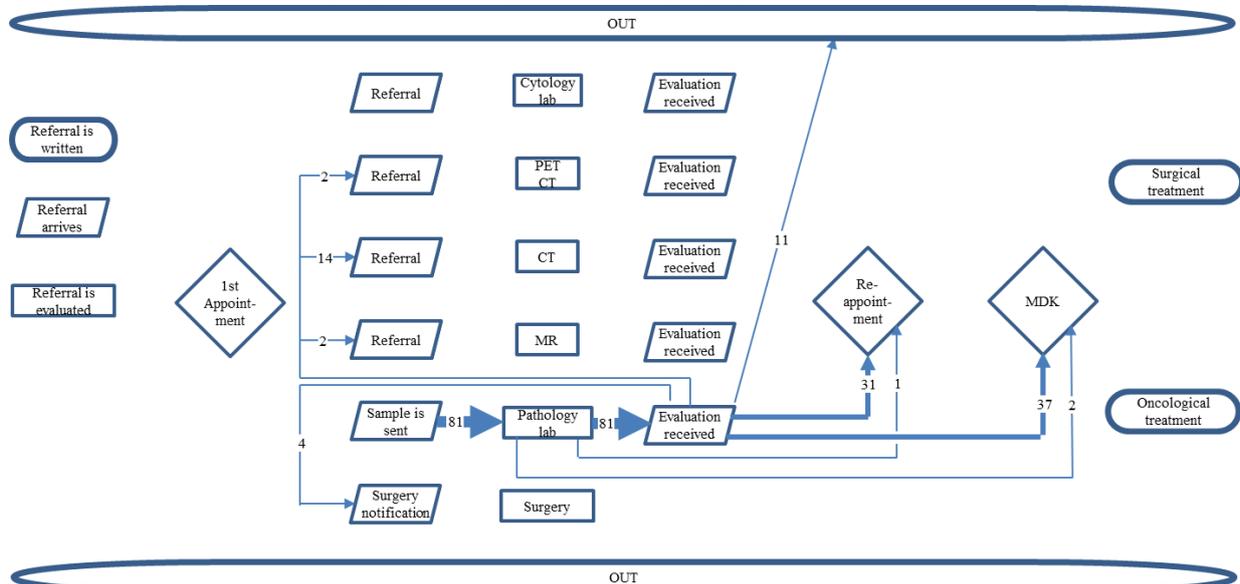


Figure 21: Activities after pathology. The pathology evaluation is a major part of the diagnosing process

4.1.4.2 at the Radiology department

If the physician decides that x-ray is needed he dictates or writes a referral. At SU they have a digital system to handle internal referrals, so prioritizing by a radiologist (it is done once a day) and time booking by a secretary is a paperless process. These referrals are treated in a similar way at the radiology department as the referrals at the O/H&N clinic described above. Cancer suspicion grants the highest priority. All departments act as their own entity and it does not matter if a request is sent from a department of SU or elsewhere. The radiology department has set aside two occasions weekly for CT and two for MR, for suspected cancer patients from the O/H&N clinic. The original idea was that the contact nurse at the O/H&N clinic could make the booking directly in the radiology departments system. This is however not the present routine and the contact nurse instead have daily contact with the person at the radiology department responsible for booking. The CT times are usually used for the O/H&N patients but when MR is needed, the patient is appointed a time at the first available occasion.

The radiology department does not have capacity to conduct all scans referred to the department, so referrals are forwarded to other hospitals in the region. However, suspected H&N cancer patients are all scanned and evaluated at SU. Evaluation of the H&N area is acknowledged to be a hard task and needs to be done by an experienced specialist. Even though highest priority should be proposed and result in a scan within a week, that often takes longer time. The machines that scans are operated by nurses and such qualified nurses are so short listed that at least one CT is not used during Friday afternoon as an example.

Basically there are two different scans that a patient can be referred to, CT and MR. A CT scan is very quick and a MR takes a bit longer, but a visit to the radiology department is usually a 20-45 minutes appointment for the patient. In order to gain maximum resolution the patient are often injected with a contrast solution which is specific for the type of scan. This makes it impossible to conduct a CT and MR the same day. The patients have only contact with nurses and results of the scans are presented to the patient by the O/H&N specialist at a reappointment meeting or at the MDK directly. 19 MR and 99 CT were conducted during the studied period. Time gaps for MR can be seen in **Figure 22**, **Figure 23** and **Figure 24**. The longest waiting time for MR was 47 days but that is caused by personal issues of the patient.

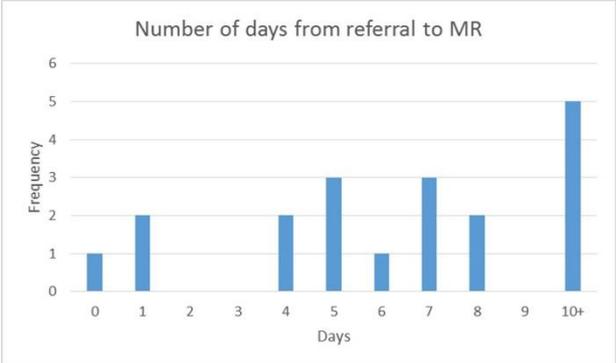


Figure 22: Number of days from referral to MR. Most of the patients do a MR within a week but there are also delays

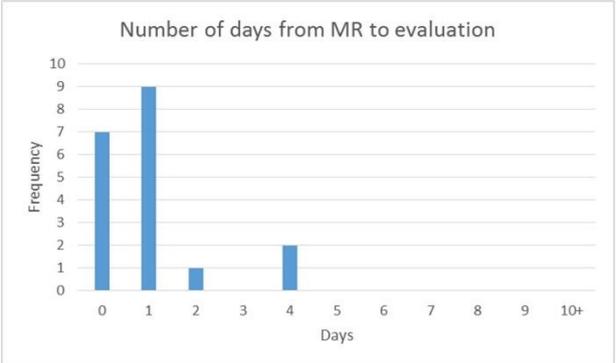


Figure 23: Number of days from MR to evaluation. Evaluation of MR is regularly done within a few days

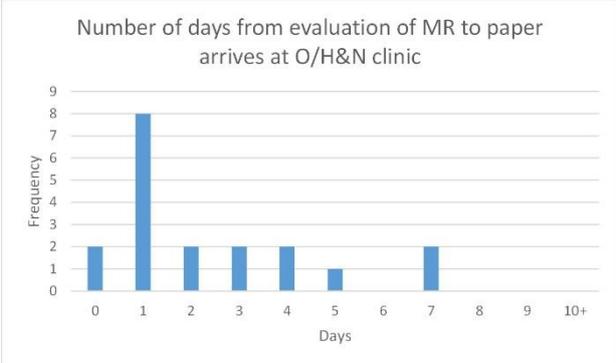


Figure 24: Number of days from evaluation to paper arrives at O/H&N clinic. Many MR evaluations are stuck within the internal information system

The activities triggered from MR results are shown in **Figure 25**. In four cases the patients are informed about the result at a reappointment, but in one case the patient have agreed to have the result only by phone if nothing was found. In 14 cases the result was presented to the patient at the MDK, something that implies that these are cases where the physician are so sure that it is cancer that no reappointment are scheduled. In five cases, shown by the arrows in **Figure 25** directly from MR to MDK, the result may also be presented for the first time to the O/H&N physician at the MDK, or at least that the paper with the result arrived to the clinic after the MDK. This implies that this is a case where MDK is scheduled before examinations are completed in order to speed up the process.

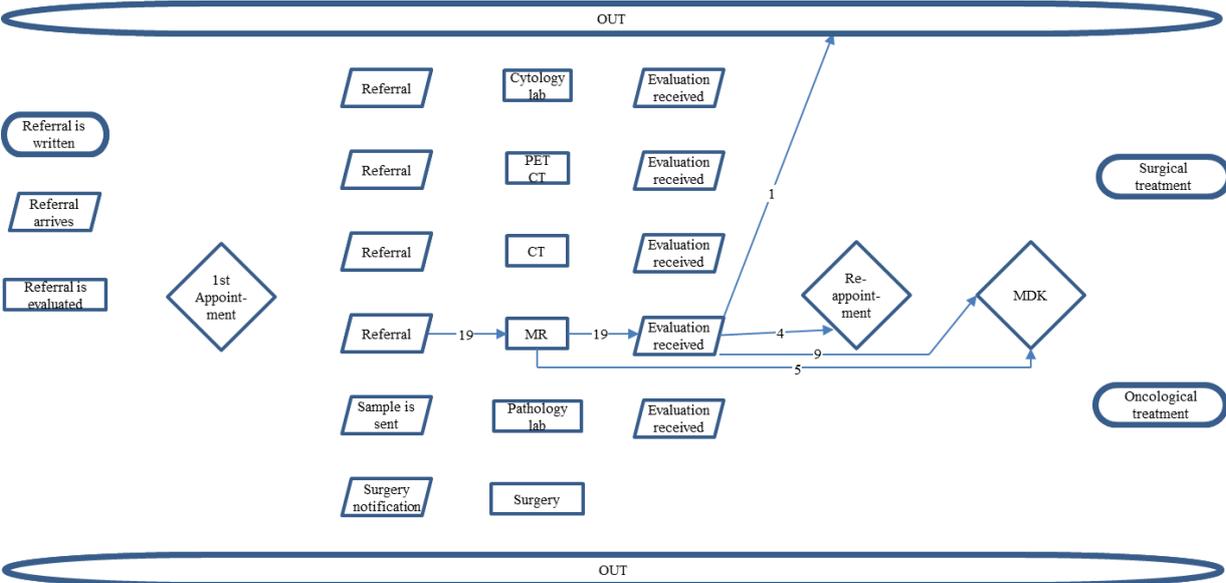


Figure 25: Activities after MR

The radiology department has sub-sections such as Neuro (brain, head, neck and back) and Thorax. Usually a O/H&N patient with suspected cancer is referred both head and thorax scans. The actual scan can be done during the same occasion if the referrals are properly marked, but the evaluation must then be made by different radiology specialist. 56 Neuro CT and 43 Thorax CT were conducted during the studied period. **Figure 26**, **Figure 27** and **Figure 28** shows the different time gaps for Neuro CT and Thorax CT. In six occasions the evaluation paper is lacking any date of arrival at the clinic so those cases are not measurable.

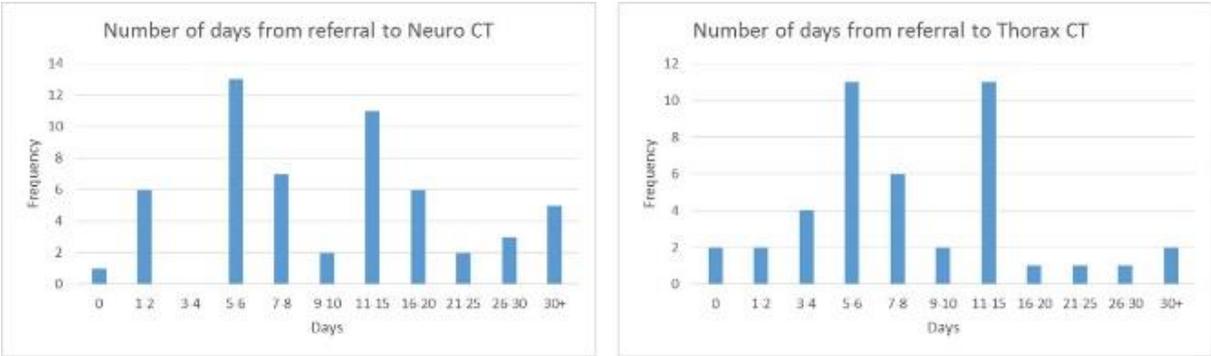


Figure 26: Number of days from referral to CT. Many of the CTs are conducted within 3 weeks

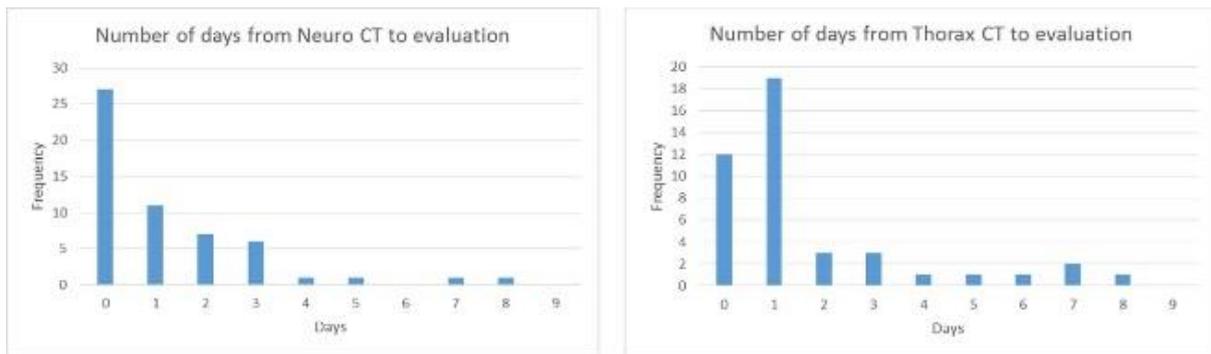


Figure 27: Number of days from CT to evaluation. The evaluation of a CT is usually done within the first few days

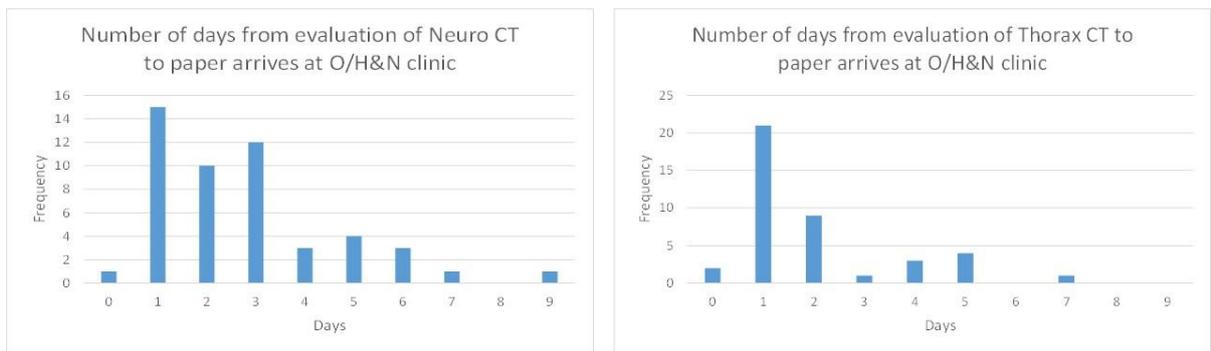


Figure 28: Number of days from evaluation of CT to paper arrives at O/H&N clinic. Internal information issues creates non value adding lead times

It is of great importance that the referral is marked if the patient is already reported for MDK. Without such marking there is an obvious risk that the scan and evaluation will not be made in time regardless of prioritization.

A radiologist evaluates all pictures direct in a computer. The system is advanced and each evaluation takes long time. In addition to their own scans the radiologist that should be present at the MDK reevaluates all external patient pictures, something that keeps her busy full time on Wednesdays. The workload is high but it is very uncommon that patients need to be postponed to the next week's MDK, but common that the first presentation of the picture for the O/H&N physician is done at the MDK. The radiologists' computer reporting system is however integrated in MELIOR and easier than the pathological to access for a concerned physician.

Figure 29 shows the activities that follow after a CT-scan at the radiology department. Six conducted scans have not resulted in a paper sent to the department. These cases are explained by the three arrows from the CT-box to the reappointment, the surgical treatment and the new referral to a CT boxes. Of the remaining 93 results, there are 23 cases where the patient is informed about the result at a reappointment, but in 3 cases the patient have agreed to have the result only by phone if nothing was found. In 67 cases the result was presented to the patient at the MDK, something that implies that these are cases where the physician is so sure that it is cancer that no reappointment is scheduled. In 39 cases, shown by the arrows in

Figure 29 directly from CT to MDK, the result maybe also be presented for the first time to the O/H&N physician at the MDK, or at least that the paper with the result arrived to the clinic after the MDK. This implies that this is a case where MDK is scheduled before examinations are complete in order to speed up the process.

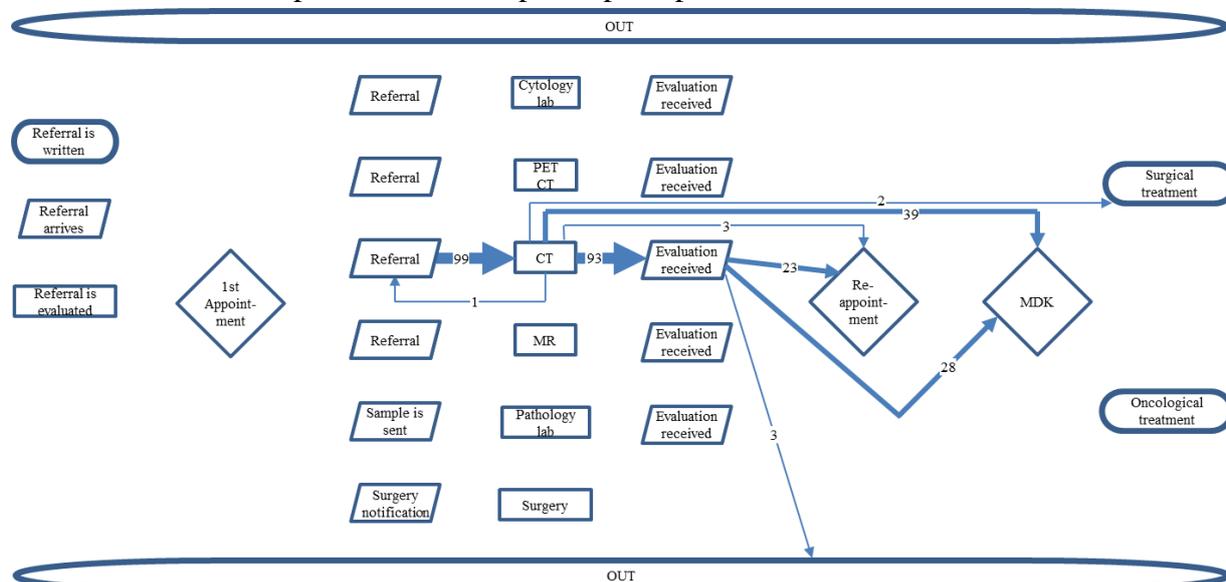


Figure 29: Activities after CT

There were only 5 cases where PET-CT was used in the diagnosing phase. All of those examinations were done to provide a better material to base decisions on in the MDK.

4.1.5 The reappointment

Many of the patients have one or more reappointments during the diagnosing phase. The purpose is to share results from examinations, to perform extra examinations on the patients or perform a check up on the patient condition. From **Figure 30** it can be seen what happens to the patient after having a reappointment. Interesting to notice is that 25 cases of extra examinations are done after the reappointment. 14 are sent to radiology and 11 extra biopsies are done, including 7 through surgery. In one case the evaluation from the pathology department was not ready when the patient arrived at the reappointment and an extra appointment was needed just days after first reappointment. In 4 cases the reappointment was

followed by another reappointment without any examination activity in between.

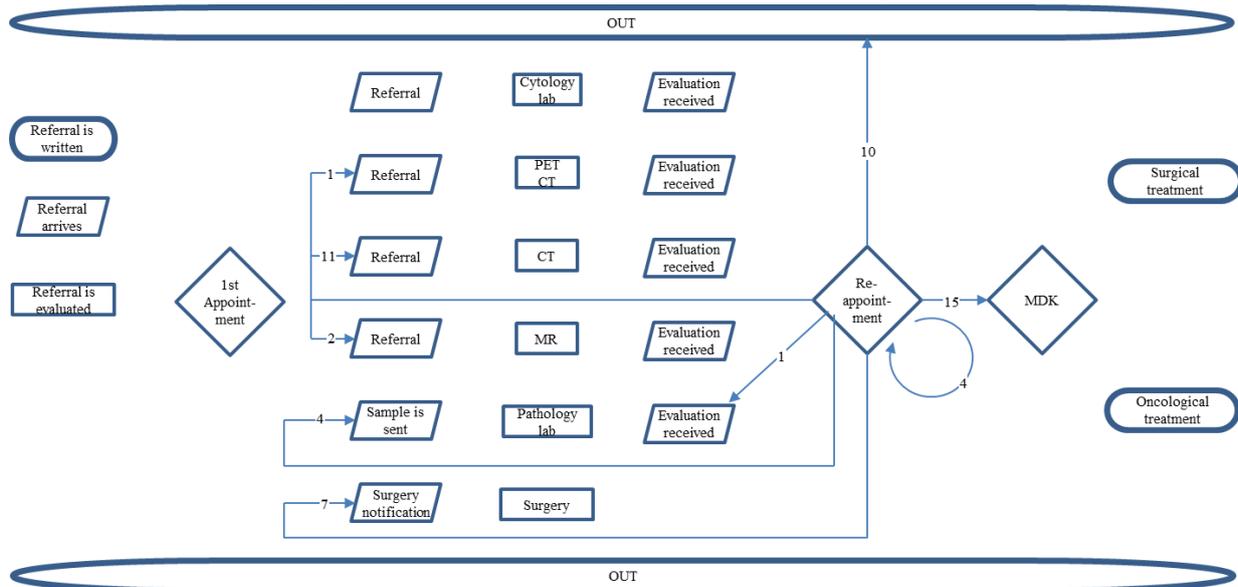


Figure 30: Activities after reappointment

4.1.6 The multidisciplinary conference

Thursday before lunch there is a MDK. All patients with a complete examination are discussed. The conferences are never full. Usually 15-20 patient are discussed. Patients with only a minor malign tumor at the lip are not considered at the MDK, such a tumor is routinely removed at the clinic. All patients are invited to be present together with a companion of choice at the conference and most of them attend. In addition to the patients under examination at SU, all external patients in the region with completed examinations are also summoned to this conference. From this stage all care is done at SU for all patients, except in those cases when the expertise at the conference decides that more examinations are needed before a proper diagnosis can be made. The hospitals in the region registers their patients to a contact nurse at SU no later than Friday lunch the week before the MDK, and the deadline for SU patients are Monday noon. This time gap of 3-4 days exists because the pathologists and radiologists at SU reevaluate all specimens and pictures to enhance the quality of the decision making material. The contact nurse calls every patient some days ahead of the conference to inform about routines and procedures during the day. The majority of the patients express positive feelings about this extra information opportunity. The contact nurse also checks with the pathologist and radiologist that all results are inspected and ready. In the sample there are 45 patients that have entered the process by referral and taken part at MDK. The data presented in **Figure 31** shows that the total time for diagnosing patients differs a lot. In four cases this time was eight days while the four patients with the longest time it varied from 111 to 141 days. At the extreme case of 141 days, the patient had been abroad and could not be reached for the necessary surgery.

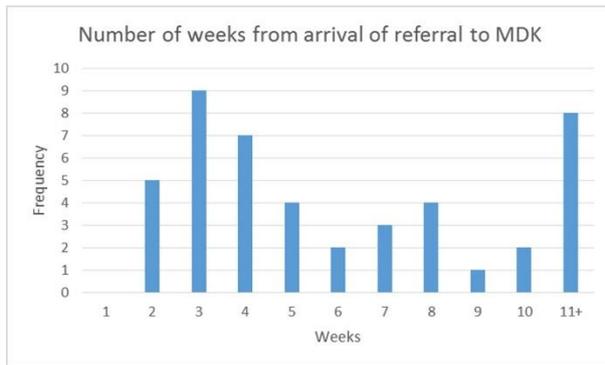


Figure 31: Number of days from arrival of referral to MDK. The total lead time for the diagnosing process varies from 2 weeks to more than 11 weeks.

At the conference physicians from the departments of O/H&N, oncology, radiology, pathology, and odontology participate. First the group of experts once again looks at all test results, reads the anamnesis and watch video documentations (if available). Then the patient enters the room and is asked to tell their story. Usually at least some of the physicians make a quick examination and then the patient is escorted out by the assisting nurse. The group of experts now classifies the tumor according to an international standard and discusses possible treatment scenarios. Research states that once metastases have occurred survival rate decreases by 50%, so one always try to cure the cancer once and for all. In quite a few cases the patients have no or very low prognosis of survival but care can still be offered in order to ease the situation and extend their lifetime so called palliative care. In 5-10% of the cases the patient is in such bad overall shape that it is decided that the patient will not cope with any treatment and in those cases palliative care is offered.

The impressions from the conference are very individual, some patients think it is great that all these super specialists are here only to help me, and some patient expresses a more moderate uneasy feeling.

An assisting nurse takes care of the group of patients during the day. She makes sure the patients understand the information given at the conference and what is happening next. She is also available to answer questions and support.

After the conference the patient will have an appointment with a physician after lunch, an oncologist or O/H&N physician depending on the suggested treatment. At the O/H&N clinic the patients are offered surgical treatment leading to a removal of the tumor. It is the intention that after this appointment the patient should be ready for surgery. EKG is taken on all patients and at the end of the day an anesthetist is present and the last activity for the patient is to meet with the surgery coordinators for a summary and short introduction of the next step. Many of the patients are old and/or multiple sick so in some cases other examinations are needed before the surgery can be planned. In those cases radiation or chemotherapy is offered as the treatment this preparatory appointment takes place at the *Jubileumskliniken* instead. Time between MDK and surgical treatment or start of oncological treatment can be seen in **Figure 32**.

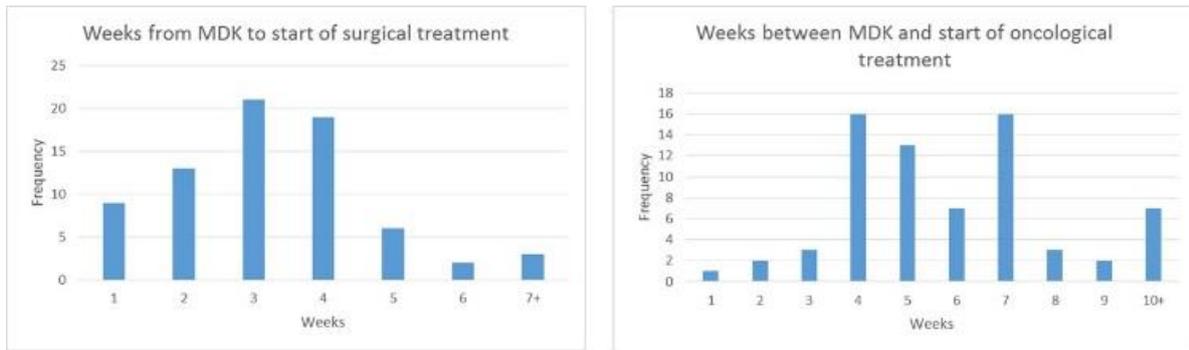


Figure 32: Weeks from MDK to start of treatment. The majority of the patients can be surgically treated within 5 weeks, while oncological treatments have longer lead times.

Since the needed surgery sometimes can give very complicated effects, cosmetic or practical (the removal of half the jaw or the tongue as examples), not all patients are interested in the proposed treatment. Such extreme treatments are only offered if the combined medical expertise believe that it is the only way to save the person’s life but no treatment are of course forced on any patient. When a patient is reluctant to undergo surgery the patient is usually offered radiation instead (in such case then often as a palliative action), something that happened in four cases during the studied period.

From **Figure 33** it can be seen what occurs after the MDK. There are 15 extra examinations needed due to insufficient basis to take a proper decision about treatment. The 50 cases that exits the process involves different categories of patients involving those who have cancer but will not have any treatment, patients that do not have cancer and patients having treatment or further investigation at other locations.

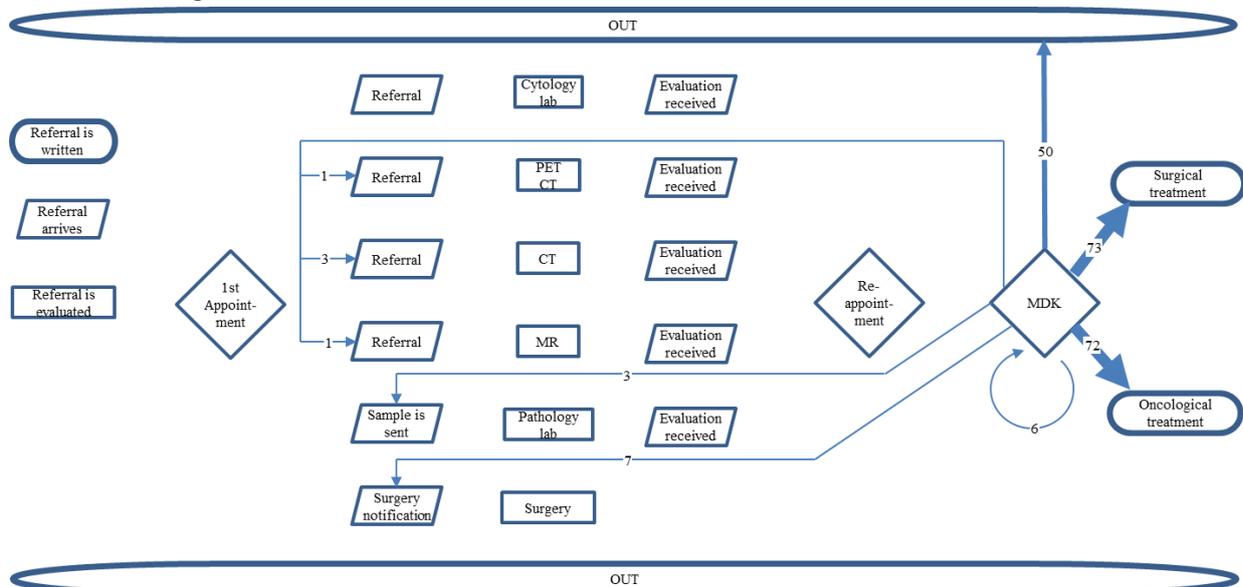


Figure 33: Activities after MDK

4.1.7 The complete picture of process

This last section of this chapter will describe the complete view of the process. **Figure 34** is made out of 237 medical journals and it is obvious that no omnipresent process exist. **Figure 34** is just a combination of all the steps presented throughout this chapter, with the only addition of the activity of PET-CT.

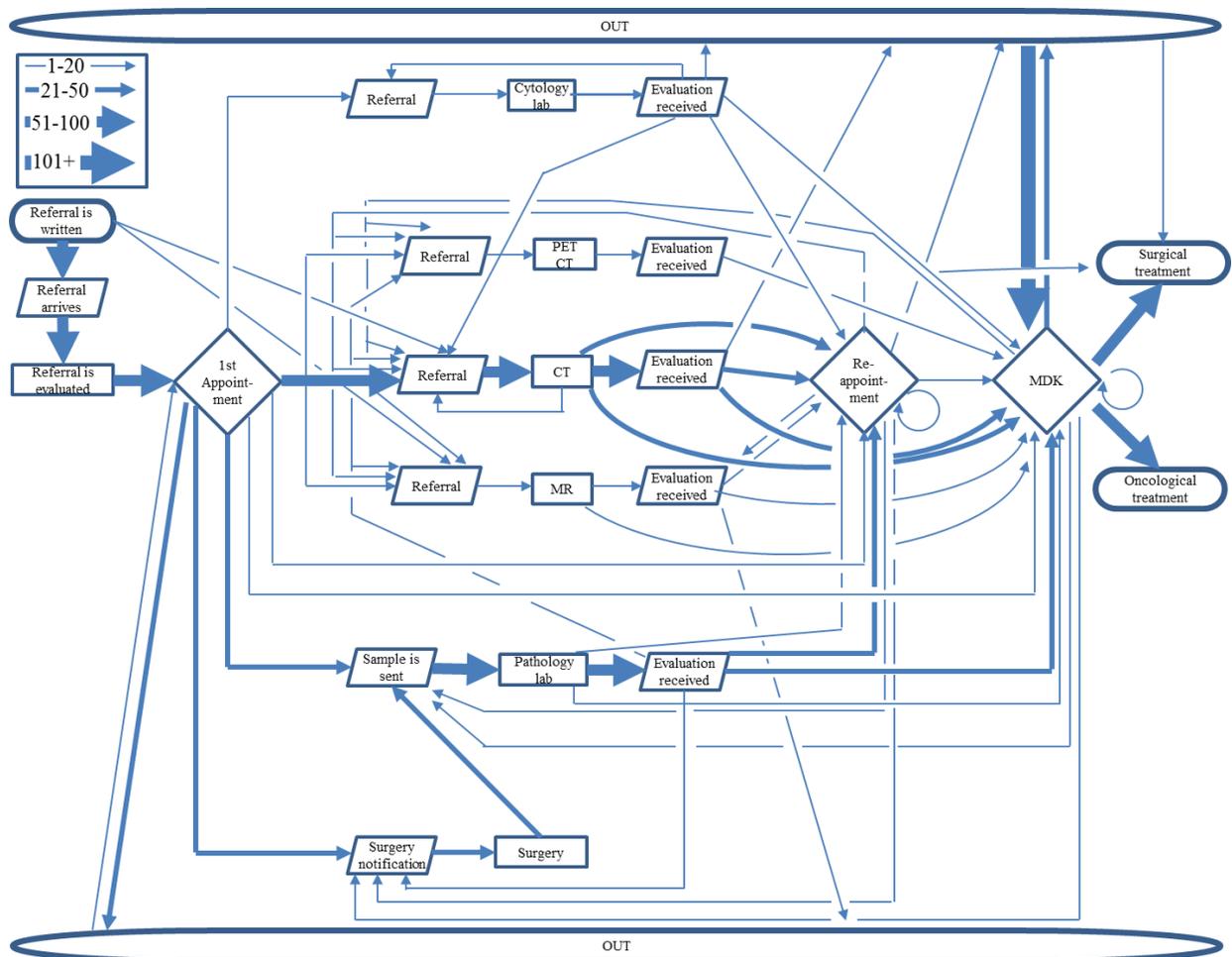


Figure 34: The total process map, showing that there are maybe not 237 processes but close enough

Table 6 shows the total amount of examinations done during the studied period for each type of examination. This could be used as material for planning the resource utilization for each kind of examination.

Table 6: Total examinations performed during the studied period, showing that CT and biopsy are the most common examinations carried out.

Type of Examination	Number of examinations performed/type of examination (During the 4 month period June-September)
Cytology	19
Biopsy (sampled at appointments)	37
Biopsy (sampled during surgery)	44
PET-CT	5
CT (head-neck-thorax)	99
MR	19

Within the diagnosing phase some standard processes has been identified that will be presented and described. In the discussion chapter comparison regarding the present process and its connection to SVF will be made. A segmentation regarding the patients that has made back loops and those who have not, shows that approximately $\frac{1}{4}$ of the patients that had a first appointment go back and forth through the process.

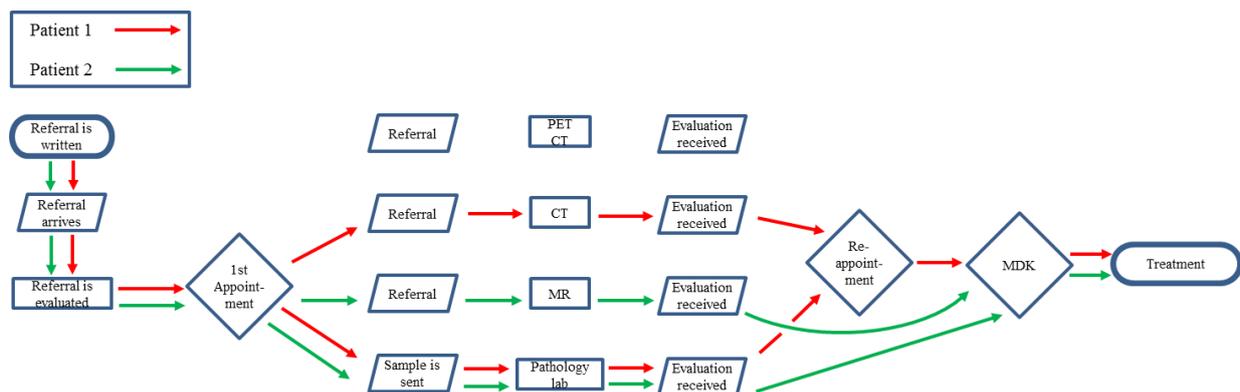


Figure 35: Two examples of standard processes

One standard patient pathway that has been identified is when all necessary examinations are ordered or performed at the first appointment and the results are presented to the patient at a reappointment. Depending on the result the patient will then exit the process or attend a MDK. 15 of the 106 patient take this route. In **Figure 35**, patient 1 is a representative for such an individual. **Figure 36** shows the timings for these individuals, and noticeable is that a standard in activities does not imply a standard time for diagnosing.

Another standard patient pathways is when all necessary examinations are ordered or performed at the first appointment and no reappointment are present and the patient only meet the O/H&N physician at the MDK. 22 of the 106 patient take this route. In **Figure 35**, patient 2 is a representative for such an individual. **Figure 36** shows the timings for these individuals, and just as for patient 1 a standard pathway does not imply a standard time.



Figure 36: Weeks between first appointment and reappointment for patient taking standard pathways. A standardized pathway does not imply a standardized time frame

The simplest standard patient pathway is when the physician can dismiss the cancer suspicion at the first appointment and the patient exit the process.

The second simplest patient pathway is when the patients are referred to the MDK from external departments and enters the process at the MDK, and from this activity enters either surgical or oncological treatment.

Figure 37 describes a complete patient pathway just as an example of how complex it can be. The patient is announced to an MDK from a hospital in the region and has by then already done examinations at the other hospital. At the meeting it is decided that more investigations are needed and these are to be conducted at SU. A biopsy during surgery is done and X-rays are conducted, but based on the evaluation from the pathology it is decided that an additional surgery is needed. Only after these additional examinations are conducted, enough results are present to make a proper diagnose, which is done at a new MDK and the patient is sent for surgical treatment.

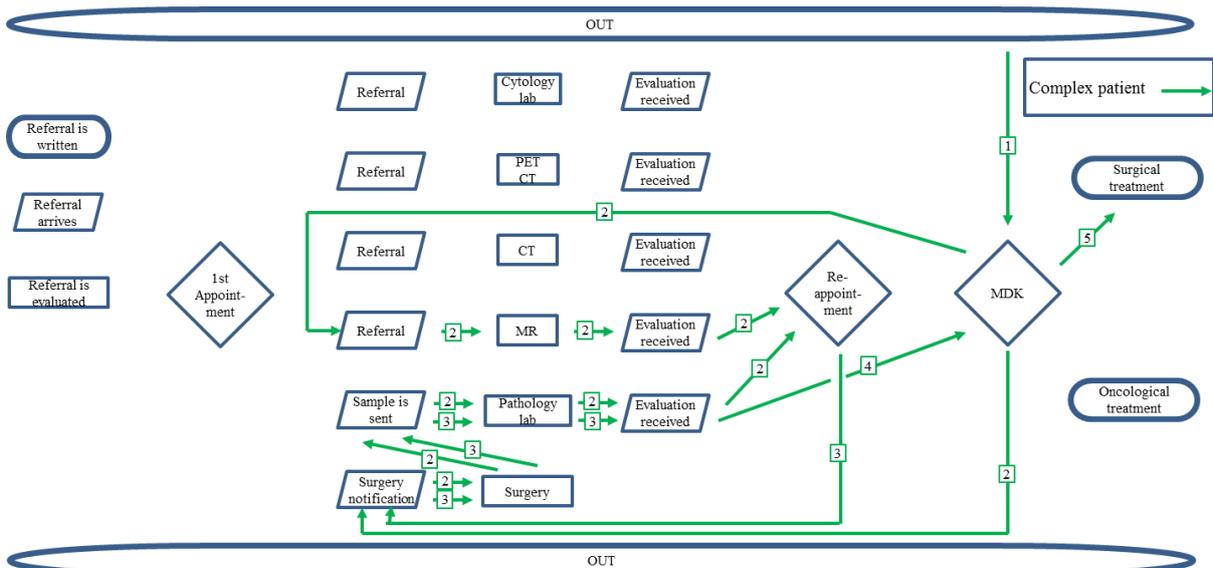


Figure 37: An illustration of a complex pathway

This final section covers those patients in our sample with a complete process at SU (from writing of referral to a treatment starts). In 21 cases patients were treated surgically and in 17 cases patient received oncological treatment. The total time of these processes can be seen in **Figure 38**. As can be seen there are longer total process time for those patient offered oncological treatment. The best total time for an oncological treated patient was 31 days while the longest lead time was 253 days. In four cases it took over 100 days. For the surgical treated patient the shortest process time was 28 days, the longest 176 days and in only 2 cases the total time exceeded 70 days.



Figure 38: Weeks from writing of referral to start of treatment. The total lead times for oncology treated patients are longer than surgically treated patients

4.2 The staffs perception

4.2.1 Perceptions about the present process

Most of the employees working in the cancer diagnosing process feel that they have a good picture of the holistic diagnosing process due to that they have been working there for a long time with close collaboration between colleagues. The staff also perceive that the process at O/H&N is also relatively well defined and the clinical guidelines are up to date. The national quality register for H&N cancer is considered to cover all important information needed to secure the quality of the process. A problem that is commonly mentioned in the interviews is that the overall responsibility to keep track of the patient through the whole process is not as clear as it should be. In the current situation, that responsibility is shared between different persons and roles depending on where the patient is within the diagnosing process.

The staff is overall satisfied with how their part of the diagnosing process works, with a few exceptions. There are opinions on that some of the lead times are long, including the time to the first visit at the clinic and the time between the decision at the MDK and the start of the treatment. There is also a concern that patients go back and forth in the process or performs examinations sequentially where test results are awaited before initiating the next examination. A major concern is that the delay times in diagnosing has an effect on the treatment, where a longer diagnosing time could mean more extensive treatment or worse.

The perception of clarity regarding organizational structure differs between personnel. Some have a solid view of who is responsible for each action, while some think that the structure is unclear. A few of the staff members do not know who to share issues in their process step

with and it is common that the employees does not work towards any specific goals, but performing their tasks as good as they can. Some also express that they are not getting any follow up or feedback on what they do. This is something that occurs in projects also, with follow up done almost solely on processes that needs to match certain set goals to give a financial contribution to the organization.

The perception of each employees work load is that it is manageable as long as they are fully staffed, but is hard when people are away on sickness leave or vacation. The psychological stress is also high when dealing with patient anxiety and it has been expressed that insufficient time and resources are spent to make the patient feel comfortable with the situation. The cancer patients are relatively few, but utilize a heavy amount of resources. Many patients have a miserable home situation and it is very hard to just leave someone with the note “thanks for today, see you next week when we remove your tongue”. A wish is that a curator and dietician should be present at the clinic to provide better support.

Some of the interviewees have expressed the importance of clearly written referrals. It is not unusual that the referrals are quite bad and vital information is left out (could be parts of the anamnesis or a telephone number). An unclearly written referral will per se be harder to assess to offer the patient a quick time. Another concern is that there are different opinions about which patients that should be prioritized as CV and enter a CV appointment. Some think that it should be done with margin so the risk of patients ending up outside the funnel after the referral assessment is small, while some are concerned that the larger size of the funnel might lead to overload and risk of a fully booked schedule. Another concern with a wider funnel is that other patients will suffer due to that they will have to wait longer for their turn. The classification has also been dynamically changed, making the interpretations and perceptions of how this is done a bit unclear.

Some interviews express that collaboration between physicians and assisting nurses could be closer, increasing the awareness and understanding of both roles. In some cases there have been expressions of extra work needed due to lack of understanding. It is also expressed that the IT systems are difficult to manage and hard to use as sources of information. This primarily concerns results from the performed tests at cytology, pathology and radiology. Regarding the surgery planning, some interviews express that the registrations for patients that needs surgery are troublesome, time consuming and hard to overview. Some of the staff members express that the collaboration with radiology is working better than the collaboration with pathology. Pathology needs more nurses that can prepare the test to increase their capacity and move faster. The radiology department shows that there is a lack of nurses operating their CT scans and there are insufficient MR scans to cover the inflow of patients in the current situation.

4.2.2 Perceptions about changes in general and the implementation of SVF

The personnel within the diagnosing process perceive that they are generally positive towards change. Almost all personnel feel that they have the chance to share their opinion and surface issues that occurs in each respective process step, assisting nurses as well as senior physicians. It is mentioned by some interviewees that improvement project often dissolve into

more or less no change, but even then the personnel still thinks that the initiative to the project has been important to have a dynamic environment that strive to improve. Regarding the implementation of SVF the knowledge of it differs between employees, where some are very familiar and working actively with it while some have limited knowledge of it and some are unaware of it. It is however important to know that at the time the interviews were conducted, the information sharing of SVF had just begun at the O/H&N clinic. The information spreading of new projects like this is made through dialog meetings where process owners meet with clinic staff, including assisting nurses to the operations manager, and shares the project information. Those who were aware of the project thought that it was a good idea to have a homogenous procedure independent of diagnosing site and expressed that the project itself highlights the process steps that is involved and what takes time. A common conception that the staff has is that their work will not change much in the standardized procedure, but at the same time they express that the work needs to be performed much faster and more structured than before.

A common thought that was surfaced during the interviews was that the set lead times in SVF are perceived hard to accomplish and at the same time preserve the level of quality needed. However, they express the benefit of performing a fast diagnosing procedure as it is the period when the patient has the highest level of anxiety and the period that is toughest for relatives. Some interviewees expressed that some types of tumors are harder to detect than others, which makes diagnosing more difficult and time consuming. There are concerns about the effects of the pre-booked times that comes with the implementation of SVF, where some are worried that all times might be fully booked at the clinic and at the radiology department. Another concern is that there is no standardized way of collaborating with pathology and radiology, making the procedures different on each hospital and this feels like a problem in the implementation as there will most likely implicate changes in the patient handling regarding pathology and radiology. This is surfaced by the thought that some of the staff has regarding that the radiology needs to be performed faster and they think that more cytology needs to be performed. A major concern is that other patients will be treated worse due to them getting under-prioritized, while cancer patients will need more resources and time.

When initiating the project it is considered important to start the work with SVF with a fresh setup without cues in the system. This is important to motivate staff in the new setup, without having to continue in the same situation, initiating the new way of working in an uphill situation. Since the project is initiated top-down from a higher court they believe that the resources that are needed will be provided. The resources are expressed to be needed for fixing the cues and to provide overcapacity in the process to better handle patient flow variation. From the interviews one can say that it is important that the resources handed out is used for this and not only education. Another crucial factor is that the process is balanced, where cues are avoided. A major factor that the personnel considers crucial for success concerns the coordinator role. The coordinator of the process and the contact nurse should be the same person according to several employees, due to the natural overview that the contact nurse has through the contact with the patient. The coordinator should have the holistic perspective of each patient's way through the process and keep track of what happens and

what is going to happen to each patient. This should be backed up with better monitoring systems, according to some of the staff, to provide a better and easier way for the coordinator to manage the patient through the diagnosing process. The final crucial factor for success of the implementation that is mentioned by the staff is that the tumor team should include more roles and the organization should be clear regarding responsibilities.

4.3 Three interesting processes at external locations

Three external processes have been studied. Field trips were conducted to Borås and Halmstad. The hospitals were chosen as they had recently shown significant improvements to their lead times in the diagnosing phase and thus gave reason to believe that there were some good ideas to extract from those sites.

4.3.1 Södra Älvsborgs Sjukhus

The Head & Neck clinic at SÄS gets approximately 175 referrals/week. Referrals are handled in paper form. These are analyzed by 4-5 physicians that classify each referral and give them a priority. This is done according to a schedule that is not daily. After the referral is classified, a secretary books the patient on an empty time slot. In this part of the process SÄS have experienced some problems, as it is common that the patients re-schedule the times due to that they have not been sufficiently notified about the importance of the examination.

Patients with a suspicion of cancer are booked to visit SÄS at CV appointment that are held Mondays and Wednesdays, and it is planned to start having them on Fridays as well. The CV appointments take 30 minutes compared to a common appointment that take 20 minutes. At SÄS they prefer to have a wide funnel for potential cancer patients with approximately 200 CV classified referrals/year, ending up in about 45 cancer patients/year. The wide funnel is important to catch as many cancer patients as possible as they express concerns about the patient not getting a proper examination by a non-tumor responsible physician leading to missing the tumor. The contact nurse is usually present at the CV appointment to assist in the examination and act as support starting from the first contact with the patient. This has been a way to early put a face on the contact for the patient, giving a clear and friendly approach to help the patient. At SÄS they have the same perception about the patient anxiety as at SU, meaning that the psychologically worst time for the patient is the diagnosing time. Having a contact nurse that is supporting the patients in these periods are crucial to provide the support that the patients need to manage these hard times. The contact nurse is also the coordinator that keeps track of each patient during the diagnosing process. The tracking is made on paper and on whiteboard.

During the appointment it is important from the beginning to consider the examinations that the patient needs and plan as much as possible at the first visit. They perform biopsies that do not need surgery and cytology at the appointment. They have pre-booked time slots at MR but not for CT. For MR they can provide an x-ray time and give them the referral for it at the first appointment, but for CT they need to call the x-ray department and discuss available time slots. It is convenient for both patients and the staff to provide the patient with a time at the appointment, which saves time and effort and also gives a clearer handling for the patient. Regarding fixing x-rays fast it is not a problem though due to a good collaboration with the x-

ray department fixed by the head of their tumor team. Specimens from the biopsies and cytology are delivered by the contact nurse to pathology by her walking the specimens there right after the appointment. The examination of specimens takes time as pathology is overloaded with work at SÄS. When patients need surgery as a part of the examination, booking is made through surgery coordinators that they have a good collaboration with, and when a patient with cancer suspicion needs surgery they enter a fast track where less prioritized patients are postponed. The patients have in most cases two appointments at the clinic, the first at the CV appointment and the second after the examinations are done to share the results of those and discuss the next step of the process.

When patients are finished with examinations at SÄS they are booked for the MDK at SU. This need to be done latest at 12:00 on Friday in order to send the patient for the next conference at Thursday, due to the extra reviewing of specimens and x-rays at SU, and the specimens are sent by mail. Otherwise they will be received on the following Thursday, adding an extra week to the diagnosing time. This is something they see as a problem and wishes could be handled faster. Another problem they have at SÄS is that the primary care is writing unclear referrals, leading to a risk that the patient ends up outside the funnel for cancer diagnosing. They also express that the patients are looping in the primary care before the severity of their issue is noted. The head of the tumor team plans to write clear guidelines for the primary care about how to handle the symptoms. Regarding responsibility of the cancer diagnosing at the O/H&N clinic at SÄS, the head of the tumor team has an unspoken responsibility to manage the process. The head of the department has the official responsibility but the head of the tumor team handles the process freely without any hierarchal issues.

They express concerns about the implementation of SVF and wonder what will happen if they follow or do not follow the lead times. The pathology department will have more pressure and is already overloaded and they are anxious about how much this will affect their ordinary patients. They also say that some patients are hard to diagnose due to complicated locations and distributions of tumors. The inhomogeneous nature of the tumors leads to longer lead times and makes it hard to reach the set times in SVF.

4.3.2 The region of Halland

The Halland region gets about 75 referrals/day, which are reviewed by 3-4 physicians that classifies each referral and determines how it should be prioritized. The referrals are digitally handled through their IT system, VAS. Examinations are done in Halmstad, Varberg and Kungsbacka. After the referrals are prioritized, a secretary calls each patient and books them in empty slots, which should be within 2-3 days. Referrals are sent from the primary care in two tracks. If the physician has a high suspicion of cancer a referral is sent and the physician calls the hospital and informs them about the suspected cancer patient, who hopefully can get an appointment the same day. If the patients have more vague symptoms, the primary care physician sends a referral for reviewing at the hospital.

In Halland they have Onk appointments, corresponding to CV appointments, two times/week. In these appointment they have first appointments, reappointments and after treatment

appointments. During the first appointment they try to perform a biopsy, but if not possible they book surgery to perform it. CT is booked if the patient shows very clear symptoms but if the symptoms are vague they wait for the PAD to arrive before referring to CT. Getting a slot for CT is not a problem and they can get it the same day due to an agreement between the O/H&N clinic and the radiology department. VAS helps in this fast execution where internal referrals are easily sent between departments. Getting a time for MR is more difficult as there is a higher pressure to use the MR machine. If there is a mass involved, the physician takes a cytology specimen on the first appointment or the patient gets sent to a drop-in clinic for cytology. A contact nurse is assisting the *Onk-appointments* and commences contact with the patients at their first appointment.

A second appointment is booked for the patient when it is estimated that the test results have arrived. This appointment is booked the occasion when the biopsy is performed, through sampling from the first appointment or surgery. The physician having the second appointment is responsible for making sure that the needed test results have arrived at the time of the appointment and calls ahead to radiology and pathology to ensure this.

The patient is sent to the MDK when they have a strong foundation to make a decision. Based on the location of where the patient live they are sent to either Lund or SU for final diagnosis, with the river Ätran as divider to this decision. There are different demands of what should be included in the decision making material, where SU demands MR on certain sets of patients and Lund does not, as one example.

Patient coordination is handled by the physician performing the action of respective process, meaning that there is no over-viewing coordinator function but each physician handle their part of the process as clear as possible and keeps track of their tasks.

In Halland the interviewed physician has made a process map with the current steps of the diagnosing process, where they have surfaced what is needed in order to improve their work and raised the awareness of the process. He has also made a *cookbook* with information on how to perform the diagnosing process at the three hospitals in Halland, so they all have a common praxis. He also performs continuous follow ups on how the staff performs, gives feedback and shows their progress to increase the motivation and raise the awareness of how the organization operates. A concern is that in the current situation there are too many IT systems to operate for the physicians that sidetrack them from their core operations, which is to practice medicine. There is also dissatisfaction with the incompatibility between the IT systems of each hospital, making the administration more time consuming than it could be. They are also concerned about the implementation of SVF where they think it is unclear which patients should be involved in the standardized process and when it starts. The idea of a standardized process is good but they have trouble making sense of how it is going to work. Overcapacity to handle variation is something they think is crucial for succeeding in achieving the set goals of SVF. Another issue is that the referrals are often dictated, where physicians tape records the content for the referral for a secretary to transcribe and then have the physician review and sign the referral before it could be sent. Some of the examinations they think will be made more frequently than before, which puts pressure on the current

situation. They also see the necessity of a coordinator, keeping an overview of each patient through the process.

4.3.3 The Danish Pakkeforløb

The Danish project that has inspired to create a standardized procedure in Sweden was initiated due to that long cancer diagnosing intervals were discovered in Denmark. The project, *Pakkeforløb*, refers to a fast track diagnosing system for patients that has clear symptoms that arises the suspicion of cancer in the primary care. The clear symptoms or alarm symptoms where defined as a first step of the project to screen which patients should enter the process and which patients should not. Other patients that do not match the alarm symptoms must also still be treated with high quality as the patients that show alarm symptoms only correspond to approximately 40% of the cancer patients. In Denmark they have two options for handling the other cancer patients:

- * Diagnostics centers – Specialized in examining cancer, where all necessary examinations can be performed adjacent to each other.
- * Yes/No clinics – With simple cost/time effective examinations with a quick answer to whether the patient has cancer or not.

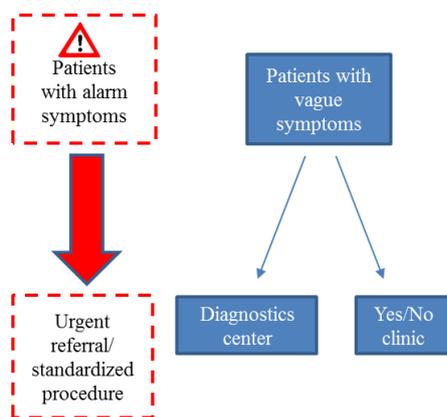


Figure 39: The Danish setup of how to handle cancer the diagnosing process

The project was handed out top-down from political level, where all health regions had to participate. When initiating the project they started with the most frequent cancer types and had the national board of health develop fast track systems for those processes based on them having endless resources. The lead times used in formulating each process then became unrealistic as the fast tracks were based on non-existing resources. From the videos it is said that realistic times is something that would have been preferable. After the alarm symptoms where developed, the processes for each type of cancer where developed showing patient pathways through the diagnosing process. In the new fast track system examinations are ordered simultaneously instead of sequentially and the patient is offered a diagnosing package from the moment the alarm symptoms are found. Referrals from the primary care are done by phone where the practitioner in the primary care calls the contact nurse at the hospital who summon the patient. The contact nurse is also the coordinator in the Danish system. The contact nurse books all the needed examinations in the fast track and keeps track of each

patient through flowcharts where the patient is given a digital tag to see where in the process the patient is and to be able to perform follow ups on lead times on a national level. The contact nurse maintains contact with the patient and supports the patient during the entire diagnosing phase.

The appointment of the fast track system has been positive for both patients and practitioners as patients express that they are treated in a clear and professional approach from the beginning and practitioners in the primary care know exactly what to do when patients show specific symptoms, making their work easier. They also express that the patients have right to a fast handling when they show clear symptoms, and should not worry for a longer time than necessary to get their diagnosis. Regarding the costs of working in the new system with fast tracks, they think that the direct cost is higher but if it leads to faster treatment, fewer patients will need more extensive care as an effect. A concern is that patients that are not included in the fast track system will take longer time, which leads to dissatisfaction and potential resistance against healthcare.

The result of implementing the standardized procedure, the fast track referral system, for patients with alarm symptoms is interesting to consider. The article written by Bach Larsen et al (2013) contains a follow up study on the effects of implementing the fast track referral system in Denmark. It shows that the lead times are reduced significantly for patients that enter the fast track but also for patients that are excluded, which is contradictive to what is said in the video interviews. The study then states that the positive effects could also be an effect of other factors than the implementation of a fast track system.

4.4 Chapter summary

The process

- The studied process starts with the patient entering the diagnosing phase, either through finding suspicions of cancer and sending a referral to the O/H&N clinic or entering the diagnosing phase in other ways
- The studied process ends with the patient exiting the diagnosing phase, either through exiting along the way due to different reasons or when the treatment starts at SU.
- The different sub-processes that are studied shows that the workload differs and some steps under more pressure than others
- Both external examination sites show great variation and potential for improvements
- The complete picture of the process shows that there are many paths that a patient can take in the diagnosing phase
- Explanations to the differences are that;
 - The process is different for different situations
 - Some cancers are hard to diagnose
 - The procedure differs depending on how certain the physician is at the appointment whether it is cancer or not
 - The social situation of each patient could differ with many patients that are in bad shape and hard to manage
- The number of patients that performs each kind of examination during the studied period could be used to plan the resource utilization

The staffs perception

- The majority of personal are overall positive to current process and own work
- Some express that they are worried that lead times sometimes are long and that SVF times are even tougher
- The workload is perceived as high
- The majority of personal are positive to change activities in general and to SVF in detail and expect that their own opinions are heard

The benchmarking objects

- The benchmarks at the other two hospitals showed ideas that could be used at all other sites including;
 - Clarity of the role of the contact nurse, with easy monitoring of patients
 - Benefits of a more integrated IT system
- The benchmark towards the Danish system shows that all patients cannot be involved in the standardized procedure, and the show that about 40% are involved in their fast track referral system, the *Pakkeforløb*

5. Analysis

This chapter will present a comparison and analysis of the empirical findings in relation to the theoretical framework. It will consist of two sections and will basically follow the same line up as chapter four. The first section will cover the process at SU but with the addition that connections between each sub-section also will include findings from the processes of the benchmarking objects. The second section will cover the analysis of the staff's perception of their work and attitude to change.

5.1 The process of diagnosing cancer

As mentioned the analysis will connect the theoretical framework, SVF and the empirical findings. A visualization of the regarded sub-processes in SVF and their respective targets are shown in **Figure 40**. The PAD for cytology tests and for biopsies are the same in SVF, but has been separately measured in our study, due to that they are made in different ways.

Figure 40 also shows a visualization of the start and end of the studied process.

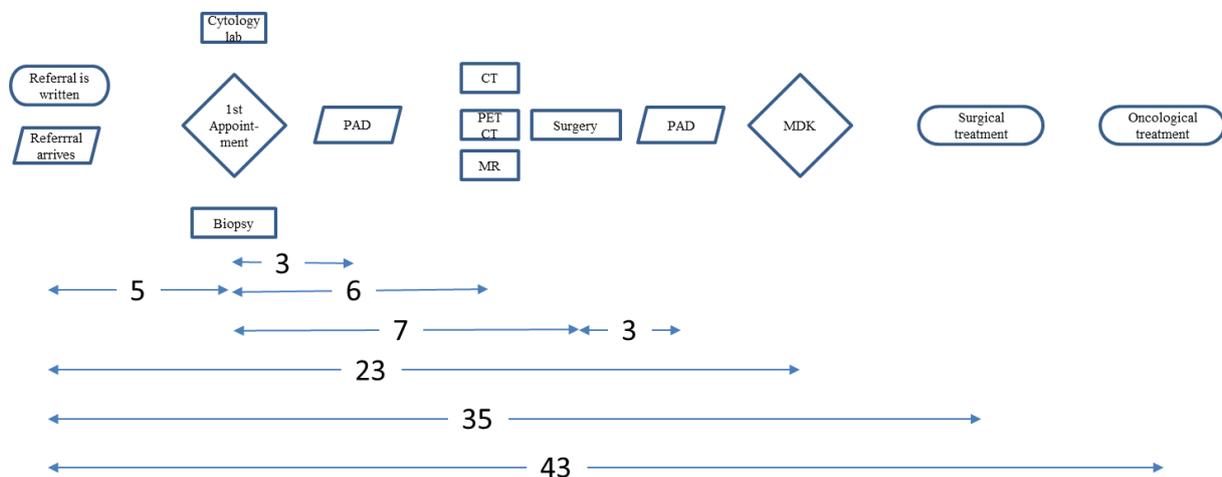


Figure 40: Lead times in days according to SVF

5.1.2 The handling of referrals

The process begins with that symptoms are found and referrals are sent to the O/H&N clinic at SU. According to SVF, writing a referral and receiving the referral should occur the same day. **Figure 7** on page 31, shows that the 0 days are far from achieved where only 16 out of 87 cases matches that goal and some cases take over a week. The handling of the referrals mirrors the top-down approach and one might from a holistic stakeholder perspective ask if the procedure is optimized. The time from when the symptoms are found to a referral arrives varies from 0 days to 11 days and it is important to find the root causes to this variation. As about half of the referrals that took 7 days or more came from private practices one could consider the possibilities that inhomogeneous handling of referrals could be a root to variation. The situation both in Denmark and Halland where primary care are tasked to phone the specialty clinic once a cancer suspicion referral are written would probably be a way of reducing this non value added time. Another idea is that the dictations made by physicians lead to more activities between found symptoms to arrival of referral, which takes time and results in variations as not all physicians dictates but writes the referral themselves. There is

room for both improving the resource utilization and variation reduction, explained in the literature of process mapping, in this sub-process to increase the use of resources to create better value for the patients.

The patients are called by a nurse for booking of the first appointment, meaning that a cunning practitioner could make the patient aware of the importance of the situation and through that reduce the chance of the patient choosing to postpone the appointment to better match their schedule. Analyzing according to the value based healthcare perspective according to Porter (2010), this means that the patient still has the choice to schedule according to the third tier of healthcare giving patient a choice, but highlights the first tier of value based healthcare to achieve a good health status. When comparing with SÄS where this phone call is done by a secretary and they express a problem with patients not willing to accept the proposed time for an appointment. The SU version must be considered superior in this case where a medically cunning staff member is responsible for the booking.

Figure 9 on page 33 shows that the evaluation of referrals are mainly performed the same day, but varies up to 6 days or at the most 4 workdays. In SVF all days are considered and the targeted time is zero days between these activities. No clear explanation to the cases with 3 or four workdays lead time are found but a majority of the referrals with longest lead time are not prioritized as CV. One might therefore speculate if these referrals were so vaguely written that they bounced between different post bins before reaching the tumor team. The situation today where there are only two senior physicians at SU that handles the referral evaluation is a recent change that is completely in line with the organizational development literature stating that in order to increase the performance it is important with clearly defined tasks and roles. The fact that the number of assessing physicians is less than both at Halmstad and SÄS implies that the SU referral assessment would probably yield the lowest variation. However, a discussion within the tumor team about the evaluation routine could be of value in order to get closer to the goal of assessing all referrals within the same day for all patients.

5.1.2 The first appointment

In the current situation, the time between evaluation of referrals and the first appointment is targeted to be within 7 days.

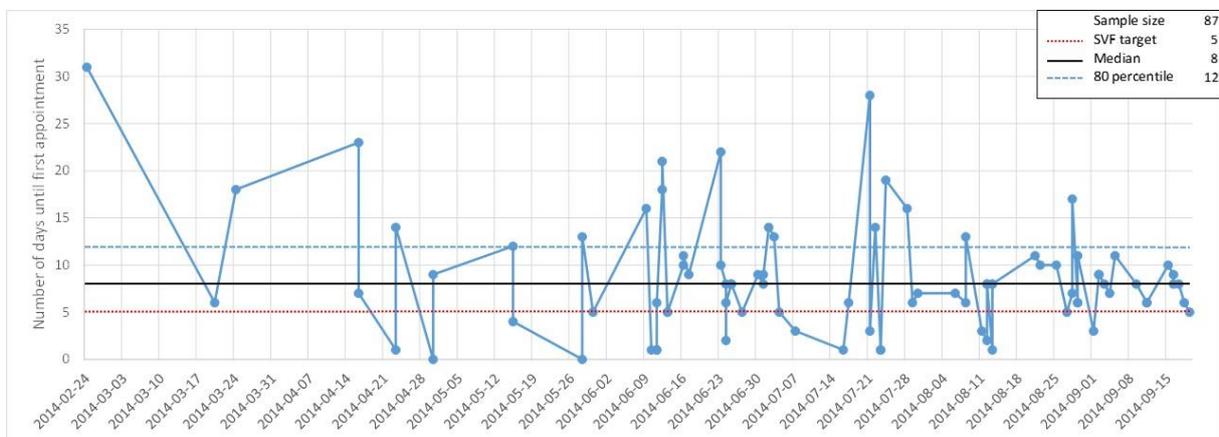


Figure 41: Time between the referral arrive until the first appointment occur

In SVF the goal is 5 days from arrival of referral to appointment meaning that the time is both shorter and also include more activities. In reality we can see from **Figure 41** that in most of the cases the time from the referral arrives to the first appointment ranges between 6-10 days. **Figure 41** naturally also indicates that during the summer the mean time to get an appointment increases by approximately a day but the variation increases even more. **Figure 41** shows that the spread of the measured lead times is wide and this sub-process is far from stable regarding variation. Of the 11 most extreme cases 9 came from non CV prioritized referrals indicating that there is also a problem with unclear referrals which lead to errors in the assessment and wrong prioritizations. The cookbook created by the clinic in Halmstad may act as a model of how improved collaboration between the primary and secondary care and decreasing the gap may be achieved. The two CV prioritized patient with longest lead time can probably be explained as follows. In one case the patient has a very bad social shape and it is unclear if the patient really accepted the first possible offered time or it was possible to get hold of the patient. The other case is a consequence of preceding activities since this case concerns the same case as has the longest time between arrivals of referral to assessment. From a value based healthcare point of view it is important to consider the value creating activities in this part of the process and from the process mapping advantages we could see that there is room for improvements regarding increased capacity through a faster handling, possibilities to reduce resource utilization and reduce variation.

The examinations at the first appointment were performed in a homogenous way, indicating that the procedure is clearly defined, making the examinations clear and effective. That the appointments are conducted very similar at all three locations (SU, SÄS and Halmstad) implies that the clinical guidelines are well received and that the care is based on best practice medicine just as described in the literature. The dictations that physicians make for further referrals is a factor that could increase the handling time and something that could be considered for potential improvements to decrease the lead time and resource utilization.

The contact nurse commences contact after the first appointment and by then another nurse at the appointment and the nurse handling referrals have already had contact with the patient. This makes the patient contact a bit unclear for both the patients and the staff. The process at SÄS where the contact nurse assists during the CV appointment seems like a simpler process. Patient communication and coordination of patient activities are actions that are involved in SVF. At SU they are performed today by the same persons, but there is room for increased clarification and expanded mandate to take further control of the holistic handling of patients through the process of cancer diagnostics. In value based healthcare it is important with patient communication and a sense of participation (Nordenström, 2014), implying that the role of the contact/coordinator is vital to providing patient value.

5.1.3 Surgery

SVF describes that if surgery is needed as examination it should be performed within one week from the first appointment. This must be seen as a rather incomplete goal since about half of the surgeries carried out in our data, are triggered from other activities than the first appointment.

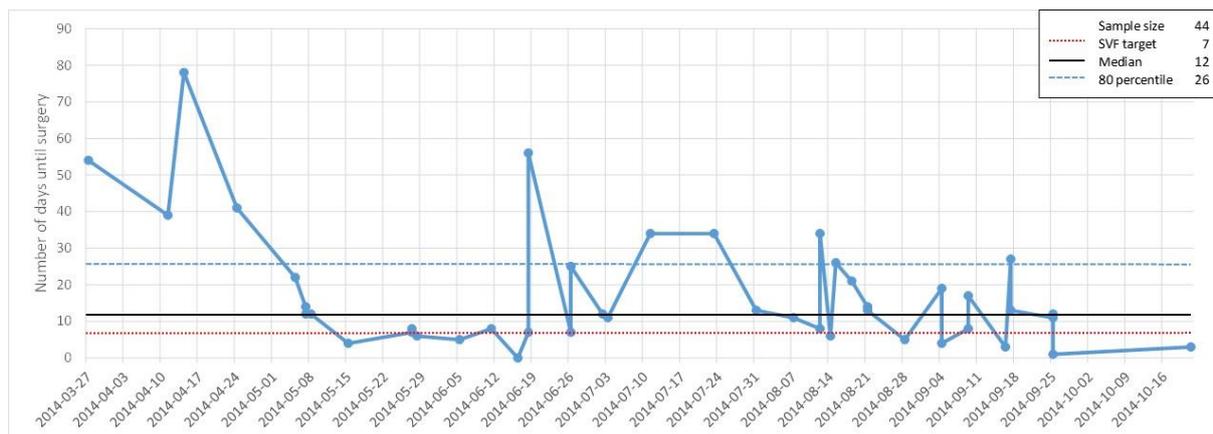


Figure 42: Time between the registrations are written and the surgery take place

Figure 42 shows that the spread of the lead times between the registration and the surgery is huge. We believe that the clinic’s target of today ranging from the registration of the surgery until surgery is carried out is a more appropriate target that is more realistic towards the current situation. **Figure 14** on page 37, shows that ¼ of the cases are conducted within the first week after registration and about 1/3 of all cases are just above, showing that the clinic’s stated target is possible to reach and that the clinic has a high performance. However, the variation in time between surgery registration and performed surgery is high and there are 3 extreme cases present in the data. In one case a patient is in very bad social shape, in one case the patient was abroad and in the last case cancer was not really suspected when the surgery was registered. It seems logical that cases like these are hard to manage for a fast handling and as shown they might occur due to both personal issues as well as vague symptoms. To identify extreme cases as those above by doing a thorough present state description, is according to the process mapping literature a good way of highlight hidden problems and identify sources of variation.

Another issue is the sub-process of registration of patients for surgery, where the OPERÄTT system is used which gives the clinic one more system to adapt to and it seems far from the supportive IT-system suggested by value based literature. This leads to massive manual work for the surgery coordinators that needs to complement almost every registration. There is potential for the process to be made clearer and more homogenous and according to the theories of organizational development enhance the performance of the sub-process. One could also consider the possibility to reduce the resource utilization to provide more value per spent resource and make the process step more streamlined. This is of value for both employees that will have a clearer task and patients that could get faster handling.

The diagnosing process for those patients with a tumor localization where surgery is needed will be very different than where the tumor is more accessible. The process will have the steps in radiology before the surgery and the surgery to extirpate a specimen for pathology evaluation. In the lead times for the overall process of diagnostics the times for these cancers are targeted in the same way as for those who could be sampled at the first appointment. Those are also hard to diagnose and it is crucial to maintain the quality of the care not rushing through the process just to make it quicker.

5.1.4 External examinations

Regarding the cytology examination, the test is set to be done the same day as when referred to with PAD done within 3 days according to SVF. The data shows that evaluation of the cytology specimen is in most cases done within 1 day, which indicates that they are performing well in the pathology department regarding cytology evaluation. The patients could choose when to go to the drop-in and does so to up to 5 days after the appointment, even if they are told to go there the same day or the day after. Regarding evaluation of a tissue specimen taken at an appointment or surgery, the PAD targeted lead time in SVF is the same as for cytology. However, the time between the taken specimen and the evaluation varies a lot which can be seen in **Figure 43**.

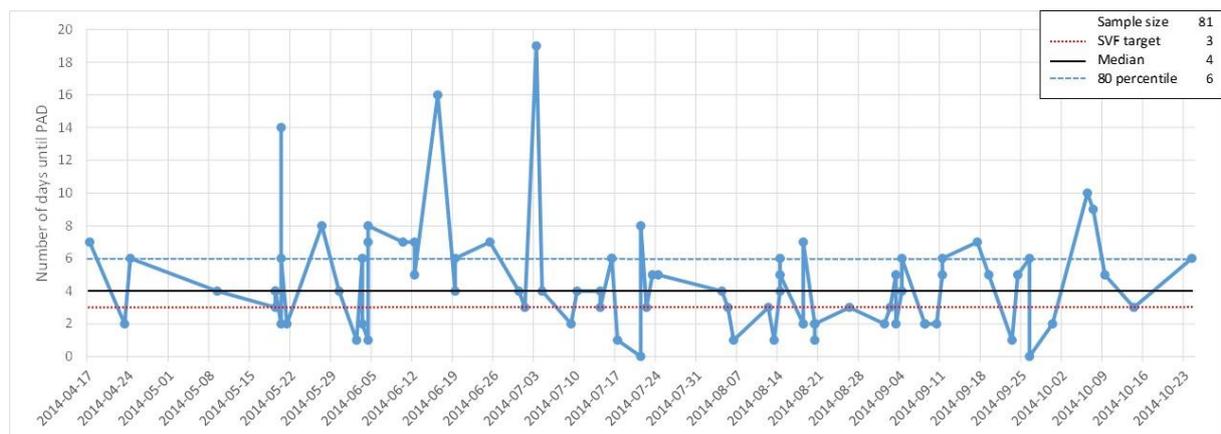


Figure 43: Time between the biopsy specimen exist and the evaluation is written

Figure 43 shows that most of the evaluations are close to the targeted time, with some exceptions. The pathologist expressed during the interview a very high workload and the constant need to prioritize urgent specimens and put others in queue. Even though cancer suspected O/H&N samples are handled directly the data shows that the time varies a lot. The high variation could partly be explained by that the process at the pathology lab contains many sub-processes, the department is constantly overloaded with work and the tissues are handled differently depending on its shape. In one occasion the delay for PAD caused an unnecessary reappointment, something that must be considered as this led to no added value and unnecessary resource utilization.

The mail processes with the test result are varying regarding lead times, meaning that the time to when the test results arrive at the clinic could be long. As a consequence of these delays the O/H&N physician and the pathologist often communicate the result by phone. By that they have created an additional, non-standard activity because of a poor unsupportive IT-system, mentioned as a key dimension of valuable healthcare according to Nordenström (2014). The collaboration between the clinic and pathology could be increased to create a better holistic patient value. An improved collaboration would also reduce the uncertainty of what is going to be done when moving towards SVF to ensure that the needed changes are perceived in a homogenous way to provide overall value. In some cases the pathology results triggers further examinations (mostly x-rays). One could consider the opportunity to order those examinations

in parallel instead of sequentially to provide a faster diagnostics. This is however a trade-off between the resource utilization and the capacity to perform faster diagnostics.

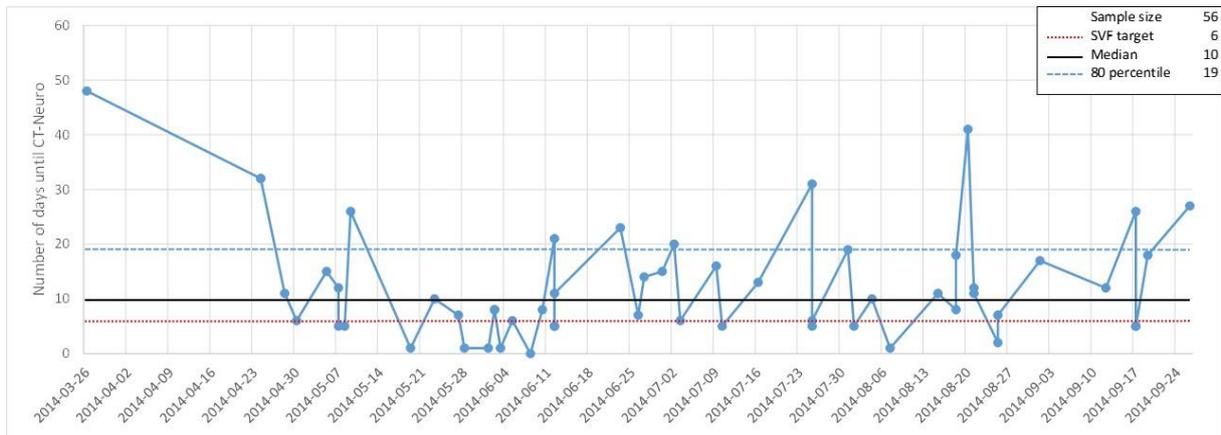


Figure 44: Time between referral of CT-Neuro is written and the scan occur

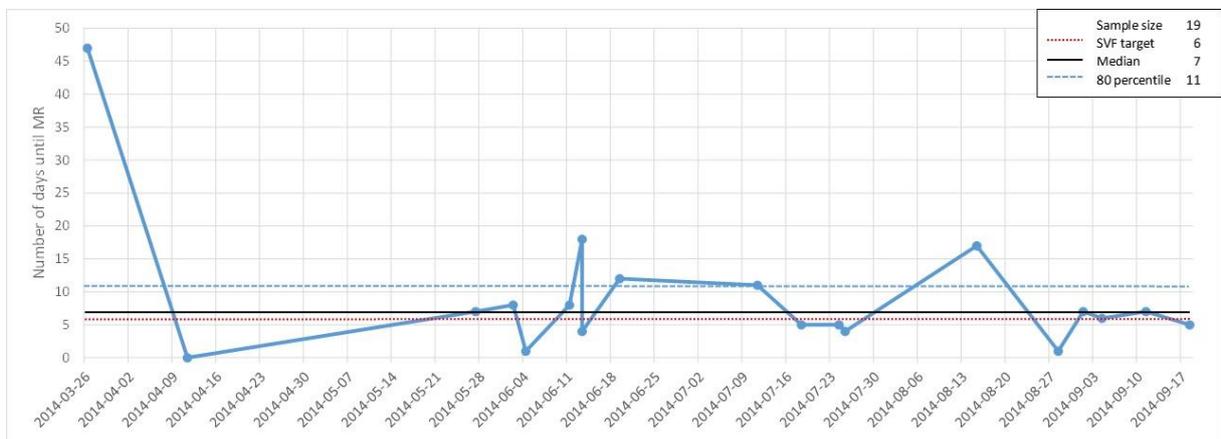


Figure 45: Time between referral of MR is written and the scan occur

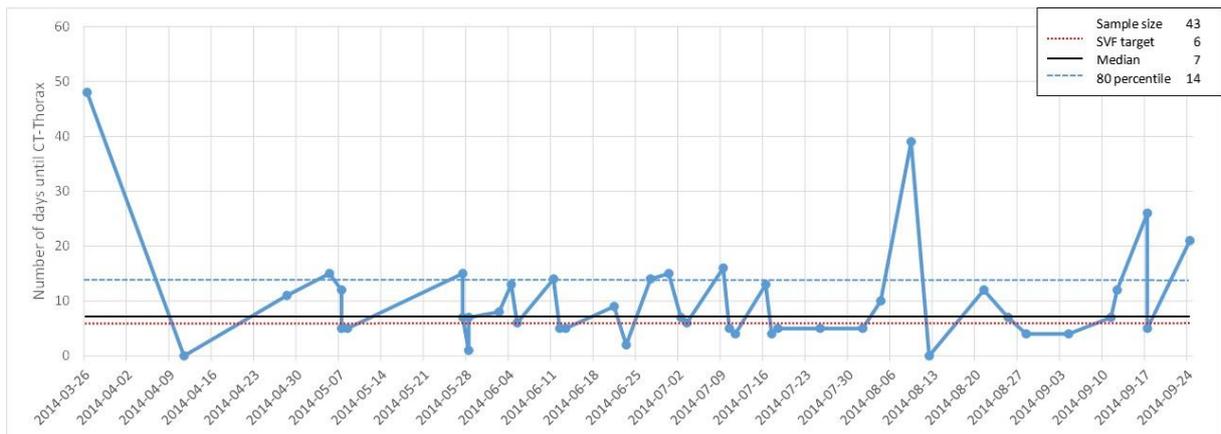


Figure 46: Time between referral of CT-Thorax is written and the scan occur

Figure 44, Figure 45 and Figure 46 shows that the MR and the CT for thorax are closer to the targeted times, with a few exceptions, than the Neuro CT for H&N. From this we could see that the waiting time to get a Neuro CT will in most cases be far away from the targeted

times and cause delays for the entire diagnosing phase, making it a subject for potential improvement as it is likely a bottleneck for many of the assessed patients. The targets set in SVF for radiology examinations are that they should be conducted within 6 days from first appointment. Just as in the case where surgery is needed this target is a bit blunt considering that so many X-rays are triggered from other activities. By looking at the data for all types of radiology **Figure 45** and **Figure 46** it is easy to see that the target is hard to match in the current situation due to the heavy overload. In the value based healthcare theory the notion of outcome of healthcare is related to different tiers. The CT scans are those having the longest waiting times and has most potential to improve for increased first tier healthcare practice (Porter, 2010).

The booking of patients is as said made on a daily basis while it is supposed to be handled through pre-booked time slots, which implies that the process is a bit ambiguous giving potential for a clearer structure, explained as a performance driver in organizational development, to ease the handling and planning of radiology examinations. At the same time, as coordination between departments as mentioned in the literature is of vital importance for a complete care structure, it is understandable that the surgery coordinators has daily telephone contact with the radiology department with todays' IT-system. At SÄS the coordination and access to radiology is primarily a function of personal skill from the leader of their tumor team. In Halmstad, getting a CT is usually no problems while MR is a bit tougher. Such difference in resource utilization must be considered when comparing lead time for complete diagnosing between regions. Dealing with the resource issues is important to achieve best practice and secure high performance for first tier outcome measures of healthcare. The evaluation of CT is performed close to the examination and indicates that the radiologist could perform the appointed task within reasonable time and does that well. The process step of sending the evaluation of the x-rays to the O/H&N clinic is also varying in lead times, making the internal mail and information handling system a subject for potential improvement.

Just as when analyzing the lead times for surgery, extreme cases identified for pathology and radiology originate from the same kind of problems.

5.1.5 Reappointment and MDK

Both SÄS and Halmstad expresses the intention to book a second appointment before the patient is sent to MDK, while it can be seen from the empirical data that this is far from the case at SU. A smooth patient pathway is one of the foundations of value based healthcare and the reduction of this second appointment at SU when possible lies well in line with this theoretical area.

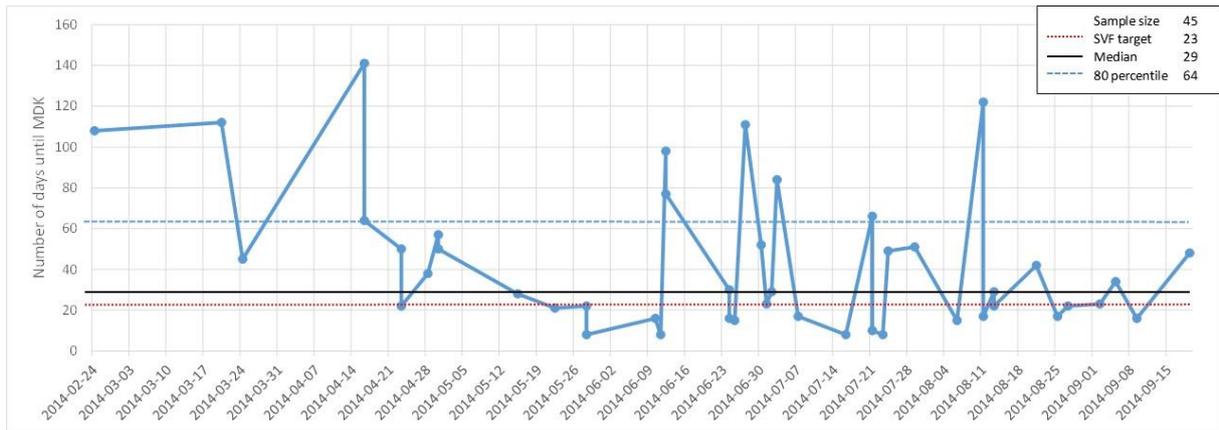


Figure 47: Time between the referral arrives and the patient is discussed at a MDK

By looking at **Figure 47** we could see that most patients are handled close to the targeted time between arrival of referral and MDK. The graph shows that the spread of the other cases that are not close to the target is wide and could be cases that should be treated in a non-standardized way. The variation and long lead times for these cases could be explained by the highlighted causes of variation that affects all sub-processes in the diagnosing phase; vague symptoms, personal patient issues and hard diagnosed cases.

MDK for H&N cancer patients has been conducted at SU for many years and the routine is well organized, implying that regarding this issue SVF will create no change. From a patient centered perspective it is noticeable that the conferences are never full and all patients are invited to participate. The fact that the pathologist and the radiologist reexamine specimens and pictures enhance the quality and make sure that the best available practice is carried out. This reexamination and discussion regarding diagnoses and treatment is obvious for all medical personnel involved and no one expresses any hard feelings when overruled. This is something that acts as a proof of a good organizational culture.

5.1.6 The complete process

Stated in the process mapping chapter one could exclude special cases when creating a process map for a more visual overview. Such an effort has been done at Halmstad and it has been used for valuable quality improvements. However in this case, where the actual purpose is to map the exact situation, excluding the vast number of odd cases would yield such an incomplete process map that it would not fulfill the purpose.

Figure 34, with all identified different pathways, shows a very blurry picture and one might ask if there are any standardized processes at all. We however believe that this picture drawn only from the data of the medial records is not clearly representative. When considering the holistic view including the knowledge gained from observation and interviews of the process diagnosing H&N cancer at SU we could see that the process already is somewhat standardized. From comparing the components in SVF with the actual situation at SU, we could see that most actions are already in place. The main difference compared to implementing SVF is that the lead times are tighter. Reducing the lead times in the diagnosing

phase has impact on the first tier of healthcare, the health status. The health status is improved through reducing the time that the patient needs to be anxious about their condition, reducing the psychological agony and through theoretically increasing the survivability through providing faster treatment.

Table 6 on page 50, shows the examinations made during the studied period, which could be used to plan the need for each examination per time unit. Mapping of this resource utilization will provide a baseline to use for planning and improve the resource allocation to use resources where it is needed and leveling out the bottlenecks of the process. By applying knowledge of variation to this, one could use this planning to create overcapacity in the process to be able to handle momentarily increases in patient flow. This creates opportunities to both increase the capacity of the process and improve the resource utilization.

SVF states that the total time from writing of a referral to treatment should be offered within 35 days for surgical treatment and 42 days for oncological treatment. Based on our findings, shown in **Figure 48** and **Figure 49**, these lead times are reachable for the surgical treatments but seem quite optimistic for the oncological treatments. One aspect that makes the targeted times for oncological treatment hard to accomplish is that the current cue to radiation is 6 weeks, which covers the entire targeted lead time. As with all the preceding described lead times between the activities the complete time show cases where the extremes are long. When analyzing these special cases one find the same poor individuals with a miserable social situation. In a value based healthcare patient perspective or patient pathway perspective no one should of course need to have a total lead time of 100 days or more, but considering the individual situation these cases cannot be blamed on the process at SU.



Figure 48: Time between the referral arrives and the patient starts surgical treatment

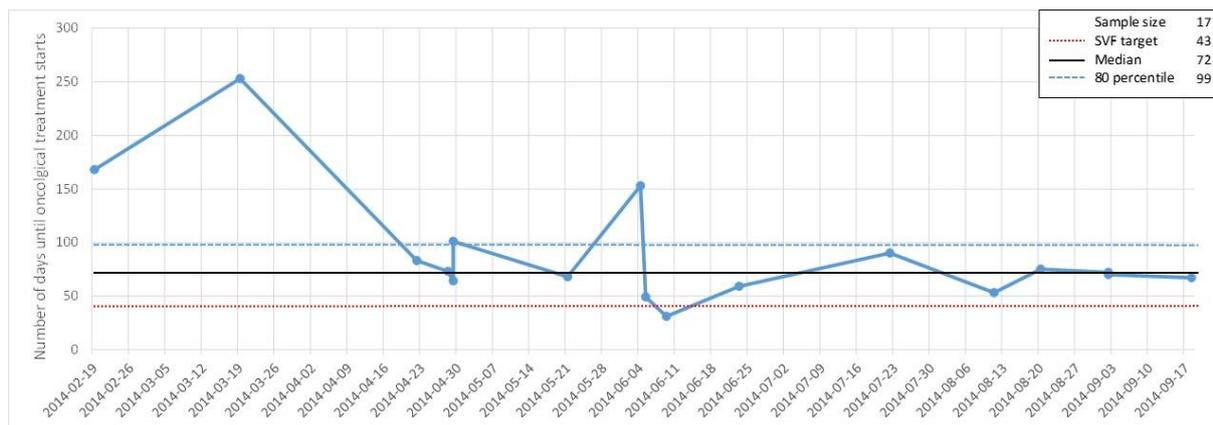


Figure 49: Time between the referral arrives and the patient starts oncological treatment

Figure 48 and **Figure 49** shows that the lead times for the total diagnosing phase differs significantly depending on the chosen treatment.

One can reflect on the idea to have a more compatible system-wide information system that could handle the flow of information. By comparing to the situation in Halland they use a faster way of sharing information internally through their system which gives them a much faster flow of information and there is no need to call other departments to retrieve the evaluation before the mail arrives. This gives a more resource efficient information flow and provides a faster handling for each patient, which adds value.

It could be interesting to analyze SVF in relationship to the chain/shop/network strategy for improving healthcare (Stabell & Fjelstad, 1998). Comparing with the Danish initiative, their system seems well in line with the different set ups of a fast track and the yes/no clinics equaling the chain structure and the diagnostic center equaling the shop. Regarding the Swedish SVF for H&N, the connections are not as clear where all patients should still be referred to the specialty clinic and all activities after this should emerge from this location. The specialty clinics looks to us much like a shop but according to SVF they should work like a chain. The network structure should also in some way be included in the SVF which puts pressure and responsibility on the contact and/or coordinating nurse. As a concluding analytical thought it seems as the Swedish initiative of SVF is a task for enhancing the efficiency of the flow of the patient through the system but organized in a system that focus on high resource efficiency.

5.2 The Staffs perceptions

The O/H&N clinic at SU must be considered to have a very good organizational culture. The staff expresses a common understanding of how to operate and a good holistic picture of the complete process.

One issue that did emerge during the interviews was the somewhat unclear responsibility of following the patient through the process. The personnel are also somewhat concerned that they do not have enough time to take care of the person behind the patient. The working procedures for contact nurses is under development and SVF will probably help to focus on this question and solve or at least ease these issues. Providing a clear role for contact with

patients and coordinating the patient process will enhance the performance for this task and provide value for the organization through clearer handling and value for the patient through the clear contact point with the hospital, which can help handling the uncertainty and anxiety.

Some categories of personnel express that there is no feedback on completed task, which is something that is argued for in the literature as crucial for a productive organizational culture. There is also a risk of what the Shani et al (2009) describes as the Pygmalion effect when the staff members are unaware of what is expected of them. The lack of feedback could be a result of absence of measurements that measures the quality and other outcomes of process steps, making it hard for both staff and management to follow up on the performed tasks. In some cases the responsibility was unclear and thus there is room for a clearer leadership, even if it is clear in most cases. The collaboration between the staff members at the clinic works well but it is expressed that the collaboration between nurses and physicians could be closer, which could enhance the long term efficiency of the operations.

At many occasions, the staff expresses worries about the lead time of cancer diagnosis and the occasionally back looping within the process. These kinds of worries can probably be the explanation that the absolute majority of personnel have a positive attitude to SVF regardless their knowledge about what it actually means. It is our belief that the personnel are really concerned for the wellbeing of their patient and everything that can speed up the process is by definition of value. Such notion strongly indicates that the patient is really put in center of the care at the clinic. The positive attitude towards changes makes the clinic staff very susceptible to the development that waits ahead and the learning anxiety seems to be no problem at the O/H&N clinic at SU.

5.3 Chapter summary

- The lead times presented in SVF are hard to reach based on the current lead times and variation that causes them.
- Matching what the literature says about clearly defined tasks and roles to the situation at SU, we could say that the roles and responsibilities could be made clearer and enable more control over follow ups and feedback, leading to an increased performance in the daily operations
- The different activities could have a clearer direction regarding the different tiers of healthcare, prioritizing the first tier
- The positive attitude towards change makes the staff susceptible to upcoming changes
- Comparing the different systems used for communication at the different sites, we could see that the information has potential to be shared faster at SU
- The tracking of patients could be visualized and made in a more structured way
- From the process mapping of the complete process we could identify potential improvements regarding;
 - Capacity
 - Resource utilization
 - Variation
- Regarding the three aspects above, the mapping surfaces information that indicates how the system could be balanced to better use the resources to make the patients flow faster through the entire process

6. Concluding discussion

This chapter will consist of reflections on the findings. According to Bryman & Bell (2011) a discussion should focus on the implications of the findings in relation to the purpose that have driven the research. Based on that statement, this chapter will have two sections, the first presenting the identified key factors for a smooth implementation and the second presenting thoughts regarding the possibility to use this work as a model for future similar projects.

6.1 Identified key factors for a smooth implementation of SVF

After conducting such a present state description and analysis as we have done it is natural that the identified factors will cover different levels of authority. There has been no effort to prioritize the identified factors. In **Figure 50** which is the same as **Figure 3** with one additional arrow, we are trying to illustrate our hope that this discussion around certain topics should increase learning.

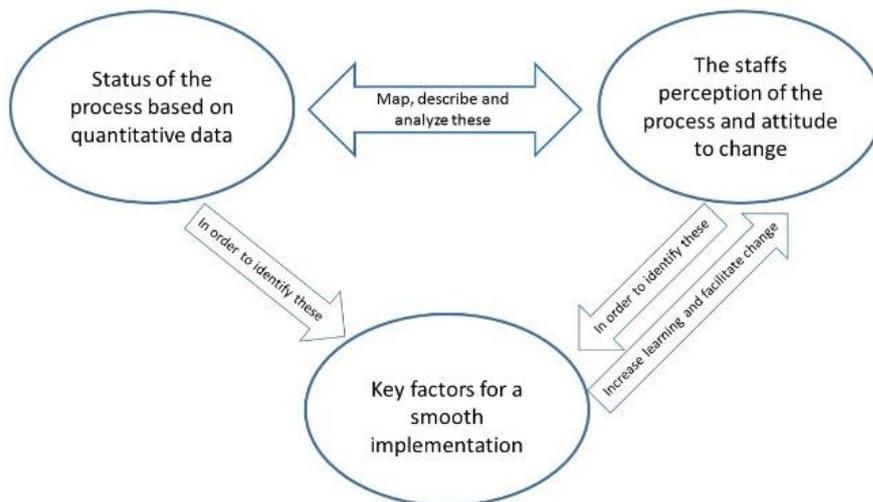


Figure 50: A visual representation and connection between purpose and discussion

6.1.1 Understanding the intention with SVF

When doing our interviews and talking to people during our observations we time after another got the feeling that many individuals were not really familiar with what SVF really was or at least had a skewed picture of the intention with SVF.

A major concern people in clinical position was expressing was the very tough time between the activities. At the same time process owners and people from *Sveriges Kommuner och Landsting* (SKL) express that these times should be seen as a target, they are in fact set without considering the constrains of today's resource situation. The fact that timings in many cases are unrealistic but the clinical staff members experience them as demands to achieve creates much unnecessary worries. In SVF all lead times for examinations originate from the first appointment, but as we have showed in this study many examinations are actually triggered by specimen evaluations, reappointments or MDK. For all these individual processes the SVF lead times will be practically impossible.

The other major concern people expressed concerned the share of patients that should be included in the statistic for SVF. The national quality register of H&N normally reports

median and 80 percentile lead times and even based on these numbers the timings of SVF is tight. Currently many expresses concerns that the lead times in SVF should involve all patients, when at the same time the Danish Pakkeforløb shows that approximately 40% of the patients are actually diagnosed through their fast track system.

When working closely with the SVF document for an extensive period of time as we have, it becomes clear that the intention really is to act as a guide. All interviewees express positive attitude towards programs that will fulfill decrease in lead time between activities and enhance the perceived experience for the patient, but without proper understanding, a program as SVF will meet unnecessary resistance and worries among the staff.

One final thought regarding the SVF is that the lead times in SVF are stated as the offered times, but the only possible times to register is the actual times. That implies that timings measured based on SVF will not be possible for the majority of all those cases we found with patient in poor shape or suffering from other personal issues.

6.1.2 Learn from external actors

The fact that a contact nurse assist at the CV appointment at SÄS while at SU the patient are introduced to the contact nurse as a separate procedure after the reception implies that the process at SÄS is smoother since the patient meets less individuals. Some of the interviewees expressed that the diagnosing period are the worst for the patient. By introducing the contact nurse as early in the process as possible we believe that the experienced quality will be enhanced. At the same time a contact nurse, especially at SU, have many patients to keep contact with and assisting at an appointment will take time.

To back track patients from MELIOR is naturally if to be done at all, a single event. However to track all the patients presently in the pipeline should be a high priority. At SÄS one does just that with a simple spreadsheet but we argue for an even more visual appealing solution where all timings/activities are noted and followed on a whiteboard.

The coordinating function is clearly expressed in SVF. However, people at different levels express different ideas of how to organize. In our study we could identify a shift from clinical personnel to decision making personnel. Process owners and administration personnel did see the coordinating activity as a function and not necessarily as an individual task. At the same time the individuals that today did the coordination and had contact with the patients expressed great advantages if those two activities would be tighter. Based on a patient perspective we argue for the second option where coordination and contact should be done by the same individual. At the same time, presently these individuals at SU are under heavy workload. It is then our belief that some of the administered funds should be spent on creating this new coordinator/contact nurse function and assign more time of work for those activities.

6.1.3 Do a present state analysis

When first introduced to this project and to SVF we understood it as an implementation program of quite a vast scale. However, based on the results found and the mapping of the process at the O/H&N clinic at SU this has changed quite dramatically. It has become clear that even though the lead times are quite far from achieved much of the structure stated in

SVF is present at the clinic. The tumor team has the last couple of years done many improvements completely in line with the SVF such as introducing the CV appointments and reducing the number of assessor of referrals. At the same time, work is presently made to describe the role of the contact nurses and earmarked slots at the radiology department for a smoother coordination are at place. Based on facts as these stated above, we have come to the conclusion that for the O/H&N clinic at SU the SVF is more of a calibration initiative than an implementation. A calibration of an existing state is per se much less workload than an implementation of a new structure.

We therefore argue that the first step for all clinics that would introduce SVF is to do a present state description. Only by doing a present state analysis it could be possible to understand if one faces an implementation or calibration. A present state analysis will also have the benefit that it can be used as a baseline for future evaluation of the SVF implementation. As stated in the literature chapter an investigation of the present state may also as well act as an enzyme and catalyze improvements from those persons involved or interviewed. A third important point to highlight is that a present state description will create a data based picture of many notions that individual have an opinion upon. Examples here are variation in arriving referrals, parallel or sequential examinations pathways or whatever the variation in total time adhere from the clinic's activities or from external ones.

6.1.4 Management related issues

The internal information system at SU shows room for major improvements. As seen in the presented findings, evaluations of external examination in paper form arrive to the clinic with huge variation and often after several days. These delays have caused the introduction of additional task for physicians where they have to seek the result of the test either by telephone from the pathology or by accessing the radiology IT-system. Such extra activities create waste of time and will by their own cause additional variation. We believe or suspect that a physician that has limited time may choose to not actively seek the information if believing that the chance of cancer is low.

As SVF states that a patient with suspected cancer should be referred the very same day it is very incompatible with the current situation. In the future one single digital referral system could speed up the process. Mandatory fields in such a system will at the same time enhance the quality of the referrals and reduce the chance of some patient pathways to be delayed.

The final identified key factor concerns the collaboration between the primary care and the specialty clinic. In Halland and Denmark they have introduced a system in which the primary care must dial to the clinic when cancer is suspected for a patient, this has on both places speeded up the process. To introduce such a procedure at all the primary care facilities in VGR is obvious a large project, but a first step might at SU be to create a cookbook like the one existing in Halland and post it on the O/H&N clinics homepage.

6.2 Evaluation of used method

The discussion regarding using our method as a generic model for similar current state mappings will be evaluated in the three steps following the first stages in process mapping presented in the theory chapter; Project identification, Data collection and Process map creation.

6.2.1 Project identification

The start and end of the studied process were decided to match SVF from when a suspicion of cancer arouses in the primary care to when the treatment starts. This is common for all cancer processes, making the time frame of the studied process applicable to all types of cancer processes. The studied sub-processes were processes concerning the examination of cancer done at SU, where activities that are involved in diagnosing the patient are studied.

Examinations that concerns the general conditions of the patient are excluded, e.g. heart and lung functionality. By choosing all steps that are involved in the diagnosing phase, the overall picture of the whole process could be highlighted and provide a better view for the personnel to better know their role in the procedure and get an improved understanding of the holistic diagnosing process, which are advantages explained in the process mapping chapter. When deciding on the scope of the process and which process steps to involve it was helpful to speak with the process owners to create a basic sense of the configuration of the process.

The time frame that was chosen to be 4 months was sufficient to perform a representable view of the current state and sufficient to use as a baseline for further decision making. It was discussed whether the study involved sufficient data to validate the findings, but the study proved to involve the information needed to show the current state and find important deviations that needs to be considered to perform a highlighting of the key factors to calibrate the current situation. For other processes it could be useful to use a time interval similar to the one we have used as the time frame, not be too long and not too far back to secure that the current state is actually studied. When considering a process with a larger population, like prostate cancer, it could be useful to choose a random sample of patients from a 3-4 months period to still see if there is any variation over time and still have a manageable sample size. Another idea is to use a smaller sample size for other processes, as we believe that the main issues will still be found but with less effort.

6.2.2 Data Collection

The mixed method of using interviews, observations and medical record reviewing provided a representative picture of the actual situation of the current state and prohibits that false information is used to create the process map, which is one of the pitfalls explained in the process mapping chapter. The interviews were important to gain information from the staff about their conception of the situation and SVF, and to gain a sense of how the internal culture is and how the staff thinks about changes in the organization. The observations were good for further validating the words of the staff and making sure that the information was not misinterpreted. The deep digging into the medical records was first met with skepticism, as others thought that the sufficient information was attainable through easier ways. However, this showed to be the only way to gain information about the roots to deviant lead times, which otherwise is hard to know and a common problem in mapping processes according to

the theory. Another advantage of extracting information from the medical records is that the information is gathered from the source, with no extra steps of human interfering in the data, making the source more trustworthy. The learning curve of extracting the needed data was a minor issue that made it hard to do the extraction correctly from the start. Additionally, some of the conclusions and root causes were hard to find as none of us were medically proficient. An idea to mitigate those factors and to improve the data gathering and analysis is to have a medically proficient person perform the current status report. Or at least form a team where one member is medically educated, connecting back to the method chapter regarding strategy and Deming's profound knowledge.

Another issue to be aware of is that the IT systems differ between hospitals and even though we could harvest the sufficient information, we cannot say anything about the generalizability to perform similar studies at other sites. This makes the method internally generic at SU for other cancer processes, but the external generalizability uncertain.

6.2.3 Process map creation

The map of the complete picture of the process is a bit contradictive to what the theory says about drawing a process map that should exclude the cases that are not standard. However, the purpose of the research was to map the current state and thus all of the cases should be included to provide the complete picture, even though it seems messy. The complete picture does not make an analysis easy to perform and each sub-process was separately reviewed and mapped to gain a deeper understanding of the process. From analyzing the maps and reviewing our data we could make a rough grouping of the 9 cancer processes into 2, those needing surgery and those who do not. This partly explains the messiness of the complete map. Another aspect to consider is that the process of diagnosing H&N cancer could be hard due to the inaccessible locations and the vague symptoms that they show, making patients go back and forth in the examination process. Making these types of maps showing the path of a patient was a good way to visualize how the patient moves through the diagnosing process. It was time consuming to perform for all patients, but good for showing some case examples. The mapping of lead times between each process was done to show the spread of handling times.

As stated in the literature, the mapping itself is not the goal. All the ways that the data was presented into maps and diagrams helped in providing a sufficient baseline to highlight the state of the current situation and to compare to the conceptions to distinguish the keys for a successful implementation, or calibration. The mapping made it possible to dig deeper and analyze the roots to the found deviations and surface some issues that needs handling in order to improve the organization to set the pace toward the visionary goals presented in the plan of SVF.

In all, the method of choice proved very suitable and could be used for similar projects in the future. The number of interviews, examined medical records and field trips could be altered depending on available resources.

6.3 Chapter summary

Key factors for the implementation of SVF is according to our study to;

- Understand the intention with SVF
 - Lead time targets are visions
 - SVF is not for 100% of the patients
- Improve the role of the Contact nurse/Coordinator
 - Should be the same person performing the tasks leading to a good overall view of the process and possibilities to thoroughly track patients
 - Early entry in process is better to improve patient connection
 - Visual aids to track patient pathways on a daily basis
- Do a current state analysis to;
 - Surface bottlenecks
 - Find root causes to variation
 - Improve the baseline to plan for better resource utilization
 - Know if you are facing an implementation or a calibration
- Think in systems and increase communication between different parts of the cancer healthcare to speed up the handling time and increase the holistic perspective of the whole service to better know where in the system to improve in order to increase the value for the patients

The evaluation of our method shows that;

- The medical record data collection was a profound way to track the necessary lead times between the activities in the diagnosing phase
- Finding some of the root causes would not have been possible if not doing the detailed reviewing of medical records
- Interviewing gave a good insight in the staffs perception to know their view of the process and their ideas about changes and SVF
- The observations were important to get a real view of the current situation in different parts of the process
- The sample size used was sufficient to perform a present state analysis and show the current situation at the O/H&N clinic at SU. The procedure can be used for other processes at SU, but it is uncertain how to use it at other sites, using other IT systems
- In all, the method of choice proved very suitable and could be used for similar projects in the future

7. Recommendations

The presented recommendations are not covering all ideas that was surfaced in this thesis and should be considered as an example of a presentation of the key aspects that could be concluded from similar studies, showing what the regarded clinic should do based on the performed present state

- As a first recommendation we could say that making a present state analysis is important to start the work towards the standardized process from the right direction, meaning that you need to know the current situation to understand what needs to be done in order to reach the wanted state.
- Found areas in the process that have potential to be improved regarding lead time and resource utilization and need to be focused to reach the targets in SVF are:
 - The mail/information system
 - The radiology department
 - The radiation department
 - The surgery
 - All activities that precede the first appointment
 - These could be seen as bottlenecks that need to be addressed to reach the tough targets stated in SVF and make the whole process more balanced.
- There should be a clearer role that has the task to track patients through the whole diagnosing process and have an overall responsibility to make sure each patient is handled within reasonable time.
- The role of the coordinator and the contact nurse should be performed by the same person, which has a clear view of the patient externally and has more knowledge about the patient than anyone else and thus has the overview to coordinate the activities internally for each patient.
- In the current situation the patients have contact with several nurses depending on where in the process they are. Instead there should be one person following the patient through the whole diagnosing process.
- The contact nurse should make an earlier entry in the diagnosing process.
- The tracking of each patient in the process should be visualized. In this case a whiteboard is sufficient as the cancer patients in the process are few.
- The information about SVF regarding how many patients should be included and the idea of the visionary goals should be spread among all staff members that are involved in the diagnosing process.
- Find a common ground of which patients should be prioritized as CV and be seen as suspected cancer patients.
- There should be a clearer routine regarding the collaboration between the external examination processes and the clinic to make the handling straight forward.
- The tumor team should include more roles to further surface the ideas of the personnel and make everyone more involved.
- The organization and responsibilities should be made clearer through visualization and communication.

8. References

- Alford, J. & Yates, S., 2014. Mapping Public Value Processes. *International Journal of Public Sector Management*, pp. 334-352.
- Allander, K., 2014. *Regionalt cancercentrum väst*. [Online] Available at: <http://cancercentrum.se/vast/> [Accessed 14 03 2014].
- Argote, L., 2012. *Organizational Learning*. s.l.:Springer.
- Argyris, C., 2012. *Organizational Traps: Leadership, Culture, Organizational Design*. s.l.:Oxford University press.
- Bach Larsen, M. et al., 2013. Secondary care intervals before and after the introduction of urgent referral guidelines for suspected cancer in Denmark: a comparative before-after study. *BMC Health Services Research*.
- Batalden, P. B. & Stoltz, P. K., 1993. A framework for the continuous improvement of health care. *The journal of quality improvements: the joint commission*, Volume 19, pp. 424-452.
- Beckhard, R., 1969. *Organization Development: Strategies and Models*. Reading, MA: Addison-Wesley.
- Beran, M., 2015. *Process owner* [Interview] (12 03 2015).
- Beran, M. & Nyman, J., 2015. *Nulägesbeskrivning av regional vårdprocess för Huvud- och Halscancer*, Göteborg: Internt RCC dokument.
- Bergman, B. & Klefsjö, B., 2010. *Quality, from customers needs to customers satisfaction*. 3 ed. Lund: Studentlitteratur AB.
- Boklund, H. G., 2012. *Nytt bröstcenter invigs i Skåne, Skåne universitetssjukhus*. [Online] Available at: <http://www.skane.se/sv/Webbplatser/Skanes-universitetssjukhus/Nyheter/Arkiv/Nyheter-2012/invigning-brostcentrum/> [Accessed 26 02 2015].
- Bryman, A. & Bell, E., 2011. *Business research methods*. 3 ed. Oxford: Oxford university press.
- Cooper, T. & Moore, C., 2013. Use Process Mapping to Improve Quality. *Chemical Engineering Progress*, pp. Aug 2013 p.45-52.
- Coutu, D., 2002. The anxiety of learning. *Harvard Business Review*, March-April, pp. 1-8.
- Crandall, R. & Diener, E., 1978. *Ethics in Social and Behavioral Research*. Chicago: University of Chicago Press.
- Ferdows, K., Lewis, M. A. & Machuca, J. A., 2004. Rapid-fire fulfillment. *Harvard business review*, November, pp. 104-110.

- Garelius, H., 2015. *Dialogdag RCC väst inför SVF införande*. Gothenburg: s.n.
- Glynn, M., Lant, T. & Milliken, F., 1994. Mapping learning processes in organizations: A multi-level framework for linking learning and organizing. *Advances in Managerial Cognition and Organizational Information Processing*, 5, pp. 43-83.
- Google, 2015. *Google scholar, search results*. [Online]
Available at:
http://scholar.google.se/scholar?start=0&q=value+based+healthcare&hl=sv&as_sdt=0,5
- Gremyr, I., 2013. *Lecture serie, TEK161 Design for quality*. Gothenburg: s.n.
- Hall, J. & Johnson, E., 2009. When Should a Process be Art. *Harvard Business Review*, pp. 58-65.
- Harwell, M., 2011. Research Design in Qualitative/Quantitative/Mixed Methods. In: *The Sage Handbook for Research in Education*. Thousand Oaks: Sage, pp. 147-160.
- Hellström, A. et al., 2013. *Att utveckla vården - Erfarenheter av kvalitet, verksamhetsutveckling*. Lund: Studentlitteratur AB.
- Holmberg, E. & Samuelsson, M., 2011. *Regionalt vårdprogram/riktlinjer 2011 Huvudhalscancer*, Gothenburg: Regionalt cancercentrum väst.
- Höglund, P. J. et al., 2012. Värdebaserad vård - strategi för effektivare svensk sjukvård. *Läkartidningen*, 109(47), pp. 2159-2161.
- Höglund, P., Lifvergren, S., Hellström, A. & Ebbevi, D., 2015. *Hur organiserar vi vården för att skapa bästa möjliga värde? - värde logiker skapar bättre förutsättningar*. Göteborg: draft for Läkartidningen.
- Jacka, M. & Keller, P., 2002. *Business Process Mapping*. New York: John Wiley & sons, Inc.
- Jackson, T., 2013. *Mapping Clinical Value Streams*. s.l.:Productivity Press.
- Langabeer, J., 2008. *Health Care Operations Management*. s.l.:Jones & Bartlett Publishers.
- Lewis, L., 2011. *Organizational Change: Creating Change Through Strategic Communication*. s.l.:Blackwell LTD.
- Lifvergren, S., 2013. *Quality Improvement in Healthcare*. Gothenburg: Chalmers University of Technology.
- Lifvergren, S., 2014. *Introductory meeting [Interview] (19 02 2014)*.
- McPhee, R. & Zuag, P., 2001. Organizational Theory, organizational communication, organizational knowledge and problematic integration. *Journal fo Communication* , 51(3), pp. 574-591.
- Modig, N. & Åhlström, P., 2011. *Vad är Lean*. Halmstad: Bulls Graphics AB.

- Nadler, D. & Tushman, M., 1997. Implementing New Design. *Managing Organizational Change*.
- Nordenström, J., 2014. *Värdebaserad vård*. Vingåker : Linderoths tryckeri.
- Porter, M. E. & Lee, T. H., 2013. The strategy that will fix health care. *Harvard business review*, october, pp. 50-70.
- Porter, M. E., 2010. What is value in health care?. *The New England journal of Medicine*, 23 december, pp. 2447-2481.
- Porter, M. E. & Teisberg, E. O., 2006. *Redefining health care, creating value-based competition on results*. Boston: Harvard Business school press.
- Regeringskansliet och Sveriges kommuner och landsting, 2015. *Varje dag räknas! Nationell satsning för kortare väntetider i cancervården*. [Online]
Available at: <http://www.cancercentrum.se/sv/Utvecklingsuppdrag/Varje-dag-raknas/Informationsmaterial/>
[Accessed 20 04 2015].
- Regionala cancercentrum i samverkan, 2014. *Manual för att utforma Standardiserat vårdförlopp för xx cancer*, s.l.: Regionala cancercentrum i samverkan.
- Regionalt cancercentrum i samverkan, 2014. *Huvud- och halscancer beskrivning av standardiserat vårdförlopp*. [Online]
Available at: <http://www.cancercentrum.se/sv/Utvecklingsuppdrag/Varje-dag-raknas/Standardiserade-vardforlopp2/>
[Accessed 16 03 2015].
- Scheinberg, S., 2014. *Lecture in Qualitative Research Methods Curiosity & Interviewing*. Gothenburg: s.n.
- Schein, E., 1990. Organizational Culture. *American Psychologist*, 45(2), pp. 109-119.
- Shani, R., Chandler, D., Coget, J.-F. & Lau, J., 2009. *Behavior in Organizations; An Experimental Approach*. s.l.:McGraw Hill.
- Slack, N., Chambers, S. & Johnston, R., 2010. *Operations management*. 6 ed. Harlow: Pearson Education Limited.
- Socialdepartementet, 2014. *Regeringsbeslut 1:14 2014, Medel för att stödja utvecklingsarbetet inom cancervården*. Stockholm: s.n.
- Socialstyrelsen, 2009. *Nationella indikationer för God vård*. [Online]
Available at: www.socialstyrelsen.se
- Socialstyrelsen, 2012. *Ekonomiska Analyser*, Stockholm: Socialstyrelsen/publikationer.
- Spradley, J., 1980. *Participant Observation*. Orlando: Harcourt College Publishers.

Stabell, C. B. & Fjelstad, Ö. D., 1998. Configuring value for competitive advantage: on chains, shops and network. *Strategic management journal*, Volume 19, pp. 413-437.

Stapenhurst, T., 2005. *Mastering Statistical Process Control*. s.l.:Elsevier Ltd.

Statens Offentliga Utredningar, 2009. *En nationell cancerstrategi för framtiden*, Stockholm: Edita Sverige AB.

The W Edward Deming Institute, 2015. *The system of profound knowledge*. [Online]
Available at: <https://www.deming.org>
[Accessed 18 03 2015].

Treble, T. et al., 2010. Process Mapping the Patient Journey Through Health Care: an introduction. *British Medical journal*, pp. 394-397.

Trochim, W. M., 2006. *Research methods knowledge base*. [Online]
Available at: <http://www.socialresearchmethods.net>
[Accessed 18 03 2015].

Wallén, G., 2011. *Vetenskapsteori och forskningsmetodik*. 2 ed. Lund: Studentlitteratur AB.

Appendix A – Interview Template (Swedish)

Intervjumall

Datum:

Namn:

Roll:

Aktivitet:

Beskriv din aktivitet (patientflödet)

Vad gör du?

Vad gör patienten där? Hur lång tid tar det?

Vart skickas patienten?

Hur ser informationens väg ut i den här aktiviteten? (informationsflödet)

På vilket sätt får man information om att patienten är på väg?

På vilket sätt ger man information om att patienten är på väg därifrån?

Vem bokar tiden hos er?

Vem berättar för patienten vad som ska hända sen?

Hur många steg bokas på en gång?

Hur är inställningen till dagens arbetsituation?

Hur är hennes bild av hur hela patientprocessen ser ut?

Tycker hon att hon har koll på andras aktiviteter?

Tror hon att andra vet vad hon gör?

Vad ser de för problem med dagens arbetssätt?

Är de nöjda med sin aktivitet?

Hur upplevs arbetsbelastningen?

Hur är inställningen till förändringar i allmänhet?

Era uppsatta mål, är de tydliga?

Hur är inställningen till Införandet av SVF?

Känner personen till SVF?

Vad tycker hon om SVF?

Vad tror hon kommer förändras i o m införandet?

Tror hon att hennes åsikter kommer efterfrågas vid införandet? (kommer hon få vara delaktig)

Vilka farhågor ser hon på införandet?

Vilka fördelar ser hon på införandet?

Vad är kritiska faktorer för att lyckas med införandet?

Vilka farhågor tror hon att andra har på införandet?

Vilket jobb pågår just nu här med anledning av införandet?

Vem och vad styr tillgången till Resurser?

Avslutningsvis, något att tillägga som skulle kunna hjälpa oss?

Appendix B – Data Collection Measurement Points

Data Collection Measurement Points		
Aktivitet	Activity	Type of data
Prio	Priority level	Ranking
Remiss till klinik skrivs	Referral to clinic is written	Date
Remittent till klinik	Sender of referral	Date
Remiss till klinik ankommer	Arrival of referral to clinic	Date
Remiss till klinik granskad	Assessment of referral	Date
Första besök på ÖNH	First appointment at the H&N clinic	Date
Återbesök på mottagning	Reappointment at the H&N clinic	Date
Operationsanmälan	Surgery notification for examination surgery	Date
Operation som undersökning	Surgery as an examination	Date
Remiss till cytolog/prov till patolog	Referral to cytology or pathology is written	Date
TYP av patologijobb	Type of examination at the pathology department	Text
Stämpeldatum på remiss hos patolog	Sample is registered at the pathology department	Date
PAD utlåtande	PAD	Date
PAD svar kommer till ÖNH	PAD arrives at the H&N clinic	Date
Remiss till Röntgen skrivs	Referral to radiology is written	Date
Typ av Röntgen	Type of radiology examination	Text
Röntgendatum	Radiology examination	Date
Röntgenutlåtande	Radiology evaluation done	Date
Röntgensvar ankom klinik	Radiology evaluation arrives at the H&N clinic	Date
MDK	MDT	Date
Huvuddiagnos	Main diagnosis	Text
Pappersfall	Paper case (If the patient is present at the MDT or not)	Yes/No
Beslut	Treatment decision	Text
Planering av strålbehandling/uppstart med cytostatika	Start of oncological treatment	Date
Behandlande operation	Start of surgical treatment	Date