



Lean Healthcare: A cross-section of South African ARV Clinics

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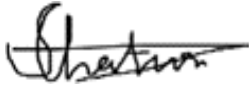
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Date: 28th May 2018

DECLARATION

I, declare that this research report is my own unaided work, unless specifically referenced as such in the text. It is being submitted for the Degree of Master of Science in Industrial Engineering to the University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination to any other University.



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Signed this 28th day of May 2018

ABSTRACT

The aim of this study is to assess waste in Anti-Retroviral (ARV) Clinics. This is against the background of an overburdened public sector – that serves a large percentage of the population in South Africa. South Africa is home to the world's largest epidemic with approximately 7,06 million - 18.0% of general population, living with HIV as of 2017 (1). The objective of the study is to identify and categorise the drivers of waste present ARV Clinics - to evaluate the resultant impact of waste on the governance and administration of ARV Clinic operations as well as service delivery to the patient.

Frameworks have been developed to measure and assess waste – with the hope that they will pave a pathway for the introduction of lean in ARV Clinics and in time the public health system. To achieve this, the research employs a qualitative analysis design approach incorporating both primary sources (multiple case studies) and secondary sources (academic publications and grey literature) of data. The study found that there is an abundance of waste in the daily operations of the ARV Clinics – there are very few people in the clinics and hospitals who 'see' these wastes because there is a need to develop the capabilities of the staff, as they are the essential foundation for improving partnerships, processes and the provision of service. However, the waste did not only exist at operational levels – the biggest potential for elimination of waste laid at the top, with the National Department of Health (NDoH), where policies and budgets are rolled out that affect what happens to the ARV clinics – a holistic approach to transformation needs to be considered.

The research provides a contribution to knowledge in three key areas: firstly, through the development of frameworks, secondly through the validation of the frameworks via multiple case studies; and thirdly suggestions that provide a narrative that explain the link between waste - overall performance of ARV Clinics and the quality of service to patients.

“Life is a series of natural and spontaneous changes. Don't resist them - that only creates sorrow. Let reality be reality. Let things flow naturally forward in whatever way they like.”

- Lao Tzu

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List of Abbreviations

ARV	Antiretroviral
NDoH	National Department of Health
RTC	Right to Care
TPS	Toyota Production System
GDP	Gross Domestic Product
JIT	Just-in- Time
TWI	Training Within Industry
VSM	Value-stream Mapping
OPD	Outpatient Department
CBS	Catherine Booth Hospital
NGO	Non-Governmental Organisation
SAHR	South African Health Review
RIE	Rapid Improvement Events
PNHS	Park Nicollet Health Services
OOPD	Orthopaedics Outpatient Department
RCA	Root Cause Analysis
PDCA	Plan-Do-Check-Act

1. INTRODUCTION

1.1.Purpose of the Study

The purpose of this study is to develop a method to identify the different approaches to waste management in selected antiretroviral (ARV) clinics in the South African public health sector. A case study analysis was conducted three sites which will be referred to as: Clinic A, Clinic B at Hospital B and Clinic C at Hospital C.

1.2.Research Background

The South African healthcare system consists of both a public and private sector (2) The public sector services 84% of the country's population, as it is affordable to the majority of the citizens (70% of the population still live in households earning less than R6000 a month) (3). The public sector is overburdened and is struggling to deal with the HIV/AIDS epidemic (4). South Africa is home to the world's largest epidemic with an estimated 7,06 million people, which constitutes 18% of general population, living with HIV as of 2017 (1). Operational efficiency needs to be improved, to adequately deal with the demand placed on the public healthcare sector while delivering superior quality healthcare to patients.

One of the first steps to providing quality health services is measuring health service efficiency. Service provision in the public health sector is based on cost and effectiveness of services, in addition to expanding, improving and developing health. This requires a scientific approach in planning, assessment and evaluation (5). To achieve this health systems around the world, have started to develop policies aiming to improve the efficiency of services provision and regulate the rise in health expenditure (6).

Process improvement methodologies from the manufacturing sector, such as lean and benchmarking, have been successfully adopted by healthcare services around the world. Hospital benchmarking presents benefits to all stakeholders: it allows governments to obtain financial comparison of hospitals' costs and quality as well as designing public health policies; hospital managers can evaluate the performance of their hospitals in comparison to similar hospitals; the public gets to make comparisons between hospitals' quality, to make informed choices when selecting a health provider (7). On the other hand, Lean Healthcare is a holistic way of thinking and that underpins sustained continuous improvement. It entails a systematic

method and a set of operating philosophies that help create maximum value for patients by reducing waste and eliminating non-value adding activities (8).

Implementation of lean healthcare into the South African public sector is still at an early stage of development, and its value stands to be questioned, as the majority of literature highlights the use of lean healthcare without providing substantial evidence to evaluate whether it can work (9) (10). The studies conducted translate some lean principles into the healthcare environment and speculate about its potential use and benefits. Lean Healthcare implementation is a challenge as lean thinking needs to be embraced more broadly across the wider public healthcare system.

1.3. Research Motivation

Over the past few years, lean thinking has become a popular approach to healthcare reform, as it has been documented to reduce public spending, increased service productivity, optimize resource utilisation and improved service quality (16). However, the model and implementation of Lean to date has not shown promised results.

Improving complex systems like healthcare organisations presents challenges. Recent trends have applied process improvement methodologies to the service industry. Even though Lean is not named, several areas in the service sector have to some degree applied a Lean-style approach in hopes of improving overall operational efficiency and effectiveness (11). In the USA and the UK Lean has been applied to various services environments, examples of this include: Central Government (12) and Local Government (13), Court systems (14), healthcare systems (15) and airline services (16). This has led to improvements of over 80% in waiting times, unnecessary motions, inappropriate processing, transportation and unnecessary inventory (seven lean wastes) (17).

To become reformed healthcare organisations, popularly implemented the lean approach, however from past studies it is apparent that lean thinking is a difficult concept to understand and translate into healthcare (9). This creates the need for a holistic model which can help managers and employees at healthcare organisations embody lean thinking and measure their performance in the healthcare sector. Frameworks have been developed to aid the clinics in waste management – this should pave a pathway for the adoption of lean.

1.4. Problem Statement

Healthcare like any other organisation is wasteful. Studies around patient flow have estimated the number of Non-Value Adding activities in healthcare at 60% (18). In the public sector an estimated 40 % of healthcare spending is wasted on inefficiencies such as unnecessary backlog and inappropriate processing, duplicative treatment, error and complications that result from lapses of quality. Both the hospitals and the primary customer (the patient), suffers due to the high levels of waste present in the system (19).

1.5. Research Question

There are many benefits that come with the implementation of lean into the public health sector, from past studies it can be assessed that the ultimate potential of lean has not been fully realised, embraced and understood. A framework has been proposed, (can be found in Chapter 2.5) to assess waste, which is one of the three lean concerns in an operational system

A method to assess, monitor and measure waste is essential to gather an understanding of what the actual root cause for the waste is, where it occurs and its impact on the public healthcare system. An understanding of these factors should pave a pathway towards attaining lean implementation.

To determine what strategy must be employed to identify waste in the public health system, the following research questions needs to be answered:

RQ: What are the different approaches to Lean Waste Management in selected ARV Clinics in the South African public health sector?

The research question was broken down into the following sub questions:

SQ 1: How can the different types of waste present in the South African public health system be identified and categorised?

SQ 2: What are the key drivers of the waste identified at the ARV Clinic in the South African public health system?

These questions are linked to one of the fundamental concerns currently faced which is: how to move from adapting lean to adopting it in the public health sector the patient.

1.6. Research objectives

Research objectives were formulated to assist in answering the research question; these are as follows:

- i. To develop a framework that makes use of lean principles to aid in the identification and categorization of waste in healthcare.
- ii. To determine the key drivers of waste present in ARV Clinics in the public the health sector.
- iii. To evaluate the resultant impact of waste on the governance and administration of ARV Clinic operations as well as service delivery to the patient.

1.7. Ethical Considerations

Due to the direct (interviews) and indirect (observations) interactions with human research subjects in this study, it was essential to obtain ethical clearance prior to data collection. The project was approved by the Human Research Ethics Committee and by the Province of Mpumalanga.

The proposal of the project, the interview protocol used for data collection and the letter of consent given to participants in the study have been cleared. Before any interviews could be conducted, a brief description of the research and its objectives were explained to the participants. The researcher then proceeded to explain the requirements in letter of consent that assures the participants that he/she: would remain anonymous, had the right to withdraw from the study at any point and had the right to keep information confidential if they wished to do so.

The participants were then asked to sign the letter of consent if they wanted to participate in the study before data was collected. The names of the clinics and the clinical staff members who participated in the research have been excluded from this report. Ethical considerations are covered in greater depth in Chapter 3.2.1.3

1.8. Limitations and Constraints

The most significant limitation of this study was that data was collected from only one of the nine provinces in the Republic of South Africa - Mpumalanga. This was due to difficulty in acquiring ethical clearances from the different districts and provinces (bureaucracy), lack of additional funding that would allow for the researcher to visit all the provinces and time frame.

Owing to the limited geographic outreach of the sample selection, results cannot necessarily be generalised to the rest of the country. However, the research is exploratory and aims to contribute to a larger body of work; frameworks have been developed to enable comparisons to be made by future case studies that adopt it or similar versions of it.

The scope of the research is limited to identifying waste in ARV clinics in the public sector only, the rest of the departments in the hospital and the private sector are explicitly excluded. Refining of the scope provided the researcher with the opportunity to gather rich data within the time frame that could be used for comparison and allow for emergence of themes.

2. LITERATURE REVIEW

2.1. Lean Method

The lean methodology gained recognition at the Toyota Motor Corporation in post-war Japan to compete with America and other countries. Lean was founded on the Toyota Production System (TPS) and has been re-labelled lean manufacturing or lean production. Toyota's leaders admit that their success is attributed to the lean philosophy and learning culture. Leaders in other industries, who have questioned Toyota's success have come to realise the value of adopting lean practices in their own organizations. A large number of service and manufacturing industries have begun learning about lean from Toyota (20).

Over the course of the evolution of lean, the early leaders have taken the best ideas from existing visionaries. Toyota adopted and improved upon the ideas of: Henry Ford (the Ford Motor Company's assembly line) and Clarence Saunders, (founder of Piggly Wiggly store - the first American self-serve supermarket where shelves were restocked before they were empty) to contribute to the development of lean (21).

Kiichiro Toyoda, the founder of Toyota Motors, was inspired by Henry Ford's theory on the mass production strategy. However, Toyoda was unable to adapt mass production strategy from Ford Company due to economic state of Japan after the World War II, where the demand for mass produced vehicle was low (22). This led to the development of Toyota Production System (TPS), which placed emphasis on processes involved in building models of both cars and trucks in smaller volumes with lower investment, in addition to minimizing the cost with Just-in-Time (JIT) and shortening the lead time. This theory aided Toyota in the minimization of cost, whilst maintaining the quality and providing several models to satisfy the various customer requirements (23).

TPS marked the beginning of the lean philosophy in manufacturing, this was developed further to reduce and eliminate waste in the processes within the organization. Figure 1 shows the TPS House as a symbol of lean, that was founded by Taiichi Ohno and Eiji Toyoda (24). The roof represents lean's goal which is to eliminate waste in processes to offer quality products and services to customers. At the centre of the house lays the culture of continuous improvement which involves all employees within an organization. The two pillars of the house represent the fundamentals of TPS, which include Just-in- Time (the aim of JIT is to eliminate waste through planning and controlling operation to meet customers' demand) and Jidoka (built in

quality -to detect and fix problems immediately). The foundation of the TPS house is the standardization of the processes (25).

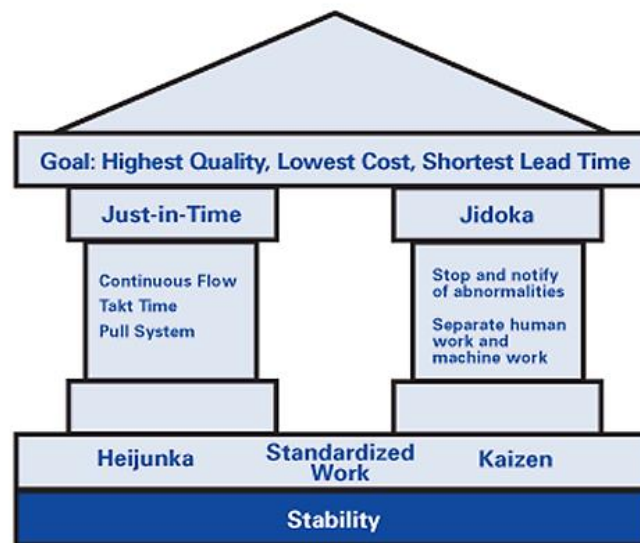


Figure 1: Toyota Production System House (26)

2.1.1. The Five Lean Principles

Organizations must focus on continuous improvement – they can do this by applying the five Lean principles to improve their operations. These principles are described by Womack and Jones, and are as follows:

- i. Specify the **value** desired by the customer.
- ii. Identify the **value stream** for each product/service providing value and challenge all the wasted steps.
- iii. Make the product **flow continuous**, by either reducing waste, which will cut the cost of a product/service, or by increasing the value-adding activities. This should allow processes to run more smoothly, freeing up time for creativity and innovation
- iv. Introduce **pull** in all steps where continuous flow is impossible – by meeting the demand from the customer and trigger events backwards through the value chain.
- v. Manage towards **perfection** to eliminate non-value adding activities from the value chain with the purpose of reducing the number of steps, amount of time and information needed to serve the customer. (25)

The aim of these principles is to improve the configuration of operational processes and promote a cultural of change that focuses on value creation. The most significant aspect of Lean is to understand that ‘value’ is defined by the customer, not the organisation (25).

The five principles were originally developed in manufacturing, but can also be applied in service. The third principle is the most important one, which emphasizes on making the product flow continuous in manufacturing. In healthcare there are seven fundamental flows that we need to consider. The seven flows of healthcare are: the flow of patients, the flow of clinicians, the flow of medication, the flow of supplies, flow of information, the flow of equipment and flow of process engineering (27).

The flow of patients through the clinics and hospitals must be continuous - to achieve this patient demand needs to be levelled by bringing services to the patient just when they are required and stopping the process when a problem occurs. The second flow is the flow of clinical staff who are the providers of the most value to the patient. Clinical staff should be allowed to deliver quality care quickly with ease to the patient.

The next four flows of healthcare are supported by the first two and are based on the JIT principle. For provision of quality care; the correct medication, supplies, information and equipment need to be provided at the right time, at the right place and in the right amount. The seventh flow of healthcare is the flow of process engineering this defines how clinical staff are free to improve and adjust the first six flows. (27)

2.1.2. Lean Tools used in Healthcare

Lean tools and techniques for service sector are developed from the adaptation of manufacturing sector. There are different Lean tools and techniques that organizations can apply (28), in this section we will focus mostly on visual management tools that are commonly used in the Healthcare sector. Visual management tools ensure that the healthcare organization goals are clear and that all the information necessary to work as effectively as possible is easily accessible. At Toyota Storyboards are commonly used precisely for this reason-as they help provide a "big picture" and gain buy into the overall strategy (29).

Visual information systems are very useful communication tool in healthcare - they are used to reduce 'information deficits', this includes information that does not exist or is not readily apparent (30). At Mary Washington Hospital some of the of visual management tools used are, Kanban, VSM and 5S. They also make use of different colours of andon lights to provide visual information about the status operations/tasks – these alert the clinical staff of abnormalities or need in the departments. Some of the visual communication aids that they use are: floor

markings in the Emergency Department to signal the path to radiology or lab and warning signals on the floor to mark door openings and other potential hazards (28).

2.1.2.1.Fishbone diagram (Ishikawa diagram)

The fishbone diagram is used to identify the root cause of a problem. The power of the fishbone does not lie in merely listing the cause and effect of a problem but, when this tool is used properly it brings together people from separate parts of the organization to come together and focus on a problem they knew was happening (and often blamed the other departments for). This activity facilitates brainstorming so that the team can conceptualize the problems, they face to allow them to see that the cause of the problem is spread all over and there is something that each one can do about it (31). By identifying the root cause healthcare organisations can utilize resources more efficiently and ensure that their problems do not reoccur because of ‘quick-fix’ solutions. In their research Taner et al discuss a case of repetition of unnecessary laboratory tests in the healthcare industry. The development of the fishbone diagram helped identify that the problem resulted from a delay in getting the results from the doctor, as well as rework. By identifying the root cause of the problem, they could then eliminate number of laboratory tests (32).

2.1.2.2.Process mapping

A process map provides visual aid that is used to illustrate work processes, it shows how inputs and tasks are linked. A process map encourages new thinking about how work is done. It highlights major steps within an operation, where problems consistently occur and who performs the steps. The aim of this is to visualize the work, document the process, point out problems, focus direction and measure the quality of care. It is essential to involve the front-line staff who are who are responsible for the daily activities when process mapping so that we build team consensus and get the accurate picture of the current state (33). The tool focuses on patient requirements using a systems perspective, linking work and information flow.

Process mapping helps in identifying areas in which a change in processes will have the greatest impact on improving quality (34). In healthcare process mapping is used as a form of clinical audit to examine the patient journey, using the patient’s viewpoint to identify problems and suggest improvements. With correct usage process mapping in hospitals and clinics can reduce the waiting time for the patients and improve on service delivery to the patient (35). This is achieved by mapping the patients journey – the end-to-end sequence of all the steps required to provide clinical care for a patient (36).

In a trauma service department at Boston hospital a team of: managers, therapist, doctors, nurses and patients, were responsible for mapping patients' journey in detail. They realized that they were offering poor service, once they began to identify the numerous non-value-added activities, errors and duplication. Over nine months improvements were made to different projects. They achieved this by: ensuring senior leadership support, standardizing the work, placing equipment and information in the right place. This reduced the length of patients' stay by 33% and inventory by 42% (37).

2.1.3. How is lean different from other Improvement Approaches

Lean is one of many process improvement methodologies. It differs from other improvement approaches in that it takes a holistic stakeholder approach to transformation. Simultaneous and congruent improvement in quality, employee engagement, delivery and cost are possible. The multi-faceted benefits aid to convince management how high the level of service can be improved. It is also effective to build tension for a better way by defining the ideal state versus the current state and then working backwards to a realistic, medium-term, future state vision. Often it is witnessed that management think everything is great, but the ideal state vision often provides a major jolt to this attitude (38).

Leading with a lean vision is different than other efficiency methodologies as it fundamentally changes the culture of the organization in conjunction with changing processes focusing on a specific value stream, adding value to the end-user, with a focus on eliminating waste. Lean works towards changing mindsets through the course of the journey, by directly engaging people in the Gemba with a lean-by-doing approach, facilitates culture shift to occur (39).

This is what sets lean apart from other transformation methodologies such as, Six Sigma. A pure Six Sigma approach entails highly trained personnel to complete statistical modelling through a software system. The modelling is consequently used to show variation and suggest changes to a process. The changes are deployed and measured to monitor the effectiveness of those changes toward eliminating variation. A lean approach is built on training the people that are directly engaged with completing the work in a given process, with simple tools and approaches such as a waste, walk, and time observations, to train their eyes to see waste in their respective processes. The direct observations of the process are then compared to process output data, such as productivity, to brainstorm possible changes to the process that will eliminate the waste. The changes are tested, deployed, and measured for effectiveness of the changes toward eliminating waste (40) (41).

Lean also differs, from approaches that use a cascading goals process (e.g. Management by Objectives) to communicate corporate objectives and develop business unit-level means of achieving them. These differences include the following:

- i. True north metrics chosen by an intensive process of data gathering and consensus building
- ii. Collaboration and give-and-take as the goals are cascaded down through the organization
- iii. Engagement of all levels of the organization (38)

The management team (leadership structure) plays an integral part of planning events, defining scope, monitoring the implemented initiatives for sustainment, and above all removing obstacles, all with the goal of moving the organization toward that ultimate vision. They need to have a sound understanding of current state and work towards continuously improving the business for the gain of all stakeholders (39).

As Lean transformations mature, management need to consider restructuring the organisation by key value streams and be accountable for the end-to-end flow of value. Lean ensures that there is alignment in both the horizontal value stream (customer needs) and vertical value streams (top- down and bottom – up management). This is a departure from traditional practices where focus is mostly on the vertical organisation arrangement by department (top- down management) which impedes the flow of value to customers (42).

2.1.4. Is lean failing?

Recently there has been rising criticism relating to the contribution of lean in improving operational performance. The two lean authors of influential books of the topic, Mike Rother and Jeffrey Liker, highlight the results of a survey they had conducted that found ‘only 2 percent of companies that have a lean program achieved their anticipated results’ (43). In the UK, the ongoing implementation of the government’s flagship lean programme at Her Majesty’s Revenue and Customs (HMRC) continues to be condemned by academics studying the effect on the workers who have dubbed it ‘Lean and Mean’, arguing that it has a negative effect on employees, their work and the service that is provided to the public (44). In North America, lean healthcare has received a great deal of promotion but has also attracted controversy. In the Canadian province of Saskatchewan, where the government paid \$51-million over three years for a lean programme, which was terminated early due to reports

claiming that lean was of no benefit to healthcare (10). These were matched by the nurses' union president saying separately that lean was 'unfortunately proving to have little impact on direct care at the bedside and patient outcomes' (45).

Elsewhere, there's been a flurry of articles that claim, 'Why Lean Programs Fail', 'Why Lean doesn't work for everyone', 'Why Lean doesn't work and what you can do about it' (43) (46) (47). All of these articles go on to tell us how to 'do lean better'; a clear acknowledgement that lean is failing. There are authors that acknowledge lean's failure as a way of promoting their approach as the right way (48), and authors who argue the failure is caused by missing some essential element, which they advocate, for example, David Mann's 'The Missing Link: Lean Leadership' (49) and Mike Rother's 'Toyota Kata' (50) .

However, the failure of lean is more fundamental, Lean's failures stem from the original errors made by Western researchers in attempting to codify the innovations of Toyota Production System (TPS) made by Taiichi Ohno's; codification of lean meant that it was destined to fail from the get go. Any attempt to 'do lean better' will prove to be in vain. Instead, the real answer can be found by returning to the man responsible for the initial innovations at Toyota, Taiichi Ohno, and understanding what he did.

2.2. Service management

In recent years the service sector has been growing in the economy, yet in terms of lean adoption, the service sector lags the manufacturing sector (51). This may be because service processes are invisible in nature and so making them more difficult to manage (52). Verma's observation was that within service processes it is impossible to determine and track material flow at any point in time - due to the nature of individual customer requirements for service or sudden changes to the requirements (53).

In healthcare, the patient is not only receiving a service they are also experiencing the process of receiving the service. The medical staff (service provider) interact directly with the patients (customer) and a series of organizational factors affect this relationship. Patients satisfaction is based on certain factors such as: waiting times, accessibility of personnel, both administrative and clinical, and their courtesy level helps to provide a sense that patients are important and respected (54). Visual management aids as well as user-friendly educational materials can aid to create an atmosphere of caring and concern (55).

Customer's perceptions of service actions have both technical quality and functional quality dimensions. Gronroos, stressed that 'what' a customer gets but also 'how' customer gets it, must be understood (56). It is important that both aspects are distinguished since customers perceive both. To promote a patient-centred culture, healthcare organisations need to focus on the patient journey and the patient interactions to build the customer experience into the end-to-end process.

Grabian noted that in the service sector processes are complex. An example of this in the South African public health sector is: the acquisition of stationery by clerical staff, requires approval from the head of department at the clinic, the CEO of the hospital, the district and the province. Managing such large process requires integrating many stakeholders from all sub-processes and getting them to map the end-to-end process to identify improvements. This requires the engagement and commitment from various levels of stakeholder (55). Since service processes are invisible, thus identifying improvements requires a high level of skill. To effectively identify improvements in services, we need to look for work-arounds and manifestations of complexity (57).

Service processes tend to be people-intensive, thus presenting the task of aligning individuals directly or indirectly related to the process improvement goals (58). Services goals consist of both tangible and intangible components – the intangible elements are reliant on people, this could add additional pressure on to service provider (55).

The service challenges listed above are similarly valid within the public health sector. Lean service improvements come with their own set of challenges, and it requires an open mind that is ready to explore and experiment.

2.2.1. Service quality improvements

The goal of service quality improvement's is to have an effective business processes that delivers satisfactory customer outcomes (59). Service quality improvement need to deliver both; a good 'process' through which customers obtain the delivery of a service and good 'results' to customers (60).

For industries with a high level of customer involvement service quality is very important, improvement should not solely be on improving internal processes but should consist of the broader perspective and embrace the results delivered to customers by processes. To achieve a stronger position in their market, organisation should concurrently pursue improvements in

both internal and external functions. Understanding the relationships between both is important and must be considered when introducing improvement efforts, this should result in bottom line improvements (61) (62).

Studies of the financial institutions found the importance for operational performance dimensions - this drives service quality improvements, customer satisfaction, and profits for a service company (63). This also applies to the public health sector and presents an opportunity to enhance the knowledge on lean as a business strategy for improving service quality for healthcare services.

2.2.2. Demand in service organisation

In transactional service organisations it is imperative to study demand – the demands customers place on the system. There are two types of customer demand namely: ‘value’ demand – the reason the service exists from the customers’ perspective – and ‘failure’ demand (‘demand caused by a failure to do something or do something right for the customer’). Failure represents a significant opportunity to reduce cost and improve service delivery (64).

In financial services, failure demand can account for anything from 20% - 60% of all customer demand. In police forces, telecommunications and local authorities it is often higher (64) (13). Failure demand represents unnecessary cost and this can cause leaders to allocate blame to departments and set targets for its reduction. However, failure demand is systemic (65).

Studying the flow of work reveals that the primary causes of failure demand are associated with the design of the system. Focusing on service-agent activity constrains the agents’ ability to serve customers; separating front from back offices leads to two different views of the customer – in back offices ‘rules’ govern what is done; specialisation of work leads to increased handovers, re-work and errors; standardisation of work results in a failure to absorb the variety of customer demand (64) (66).

These systemic features result in service organisations that deliver services according to the strictures of the provider rather than meeting the variety of needs of the customers. The realisation that failure demand is systemic is compounded by the realisation that it has been treated as no more than ‘work to be done’ – adherence to the core paradigm failing to discriminate between failure and value demand. Further, leaders see the folly of focussing on the costs of transactions; just as Ohno discovered in manufacturing the true costs are associated with flow – in this case, the total number of steps it takes for a patient to receive treatment (65).

2.2.3. Applying Lean in the Service Sector

Today, the service sector stands out for being responsible for the largest share of the world's Gross Domestic Product (GDP) and for creating jobs and wealth that grow at higher rates than in other sectors of the economy. In South Africa the service sector makes up 69.1% of GDP and 69.7% of employment rate, the service sector has been the main source of growth for the economy since the 1990s (67). Organisations are trying to increase the service quality by integrating lean principles to create a standardisable systems of service operations made up by activities that only generate value for customers and to meet their expectations (31).

The aim of the lean model is to create flow process and also to use pull systems by the customer (16). An additional contribution of lean is to empower employees and teams. The service sector has greater involvement of people, either in front office or in back office. Lean service principles must focus on: low cost to customer, standardization and ensuring continuous flow of information and resources within value streams. Lean in the service should focused on empowering employees, through involvement and training to development their capabilities (58) (31) (20).

Focus should also be place on the customer as service industries deals with customer directly on the front line (20). There are three different categories in service sector; professional service with high focus on people, contact time and process, service shops with medium focus on customization and front office and back office with low attention to equipment and customization; an example is the transportation service (68). It is important to correctly apply lean principles in the service industry to ensure that all services operate and work together to provide exactly what the customer wants, exactly where and when want it (19).

Following Ohno, the object is to engender 'understanding' by insisting that participants in the change become involved in getting knowledge of the 'what and why' of current performance. It is critical that the change is aimed at discovering and solving the actual problems in an organisation, not the problems leaders think they have.

2.3. Waste

An important aspect of studying the lean is to zero in on waste. Muda is the Japanese term used to describes wasteful practices that should be avoided to provide more value to the services (25).

Waste is everywhere and there are many ways that waste takes away the important resources from the daily business. Waste affects service delivery to the customer and often customers express their dissatisfaction and raise complaints. It is important to take these views into account as the customer can help us to identify waste we do not see (Boiled frog waste - waste that is difficult to notice as it is old, and we pass by it every day) (69). Waste can act as a virus in our host system if not treated (eliminated), it only gets more severe and has the potential to propagate through cross-functional departments (18).

Waste creates workarounds to basic processes resulting in both staff and customer dissatisfaction, as the staff is constantly searching for things that translate to delays in service delivery to the customer. This creates a cycle of failure in organisations that becomes hard to break. Figure 2 illustrates the cycle of failure.

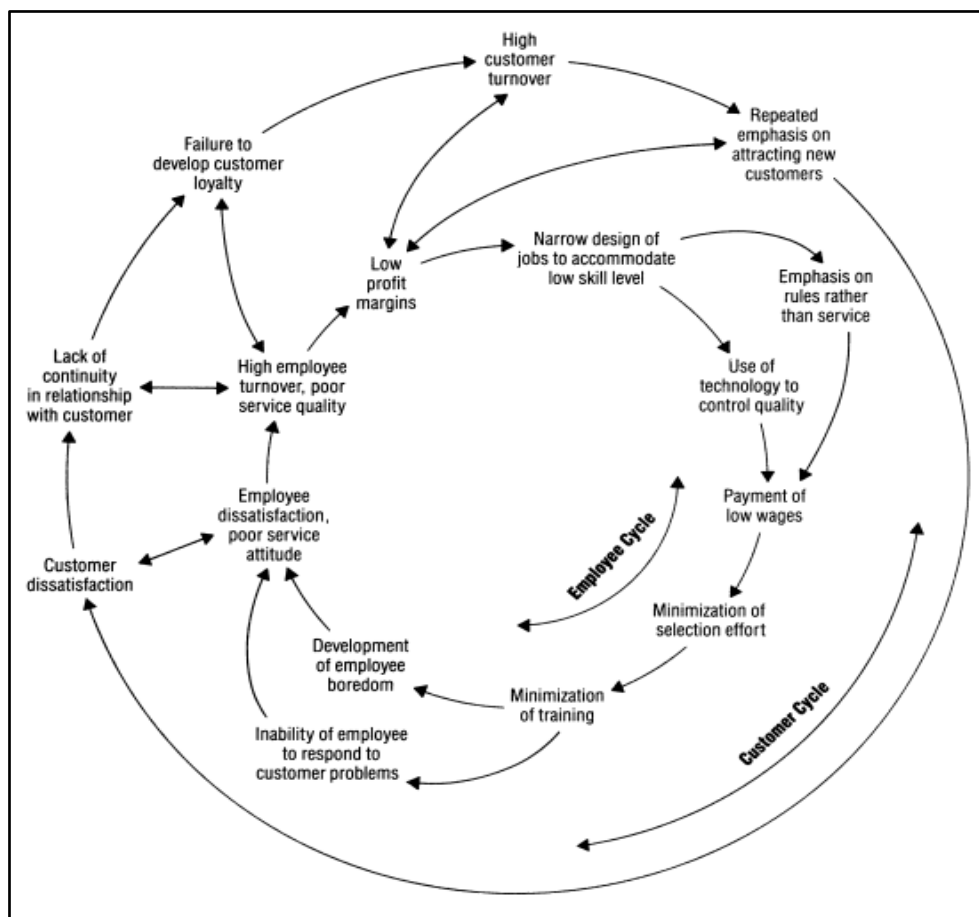


Figure 2: Cycle of failure (70)

Waste has serious financial implications; it also causes variation and imperfection in the operating processes of organisations and can lead to entire system collapse.

2.3.1. Identify and Eliminate Large Waste

As mentioned in the previous sections, the identification and elimination of waste is a primary philosophy of lean. In healthcare organisations where lean is being introduced, there is a lot of low hanging fruit. Standardized work and 5S can significantly improve the daily process operations that occur (69).

Removing the first, large layer of waste usually yields significant improvements in overall performance. To begin this activity, we start off by focussing on improvements at the individual process level, not at the level of flow-connecting processes. The continuous improvement spiral connects processes, it can have an even larger impact to reinforce motivation and to maintain the stability of individual processes (25).

2.3.1.1. Standardized Work as a Tool to Identify and Eliminate Waste

One of the most powerful uses of standardized work is to analyse and understand waste in a process. Standardized work is often thought to be mainly a set of instructions for the staff, however it is much more, once the root cause of the waste is identified, it is possible to document the standardized procedure to provide be a visual representation of the waste (opportunity for improvement) that exists. This forms part of the analysis that allows us to see the underlying image. In addition, it provides useful information for establishing balanced work flow for continuous flow. There are three elements involved in analysis of the work and identification of waste during the stability phase:

- i. Identification of the basic work steps.
- ii. Recording of the time for each step.
- iii. Drawing a picture of the work area and the clinical staff's flow within the area (20).

The aim of the exercise is to identify waste, and it is important to start with the “big” waste first. As an analysis tool, standardized work will primarily aid in the identification of the different types of waste. The process works best when we first analyse from a higher level and then work down to a detailed level.

The objective is to record what is happening in a way so that waste can be seen and understood by everyone. The level of detail for required when describing the work steps is basic and it does not prescribe how the work is to be performed; rather, it is a description of what is happening (25) (71).

When the steps have been identified, the amount of time for each step needs to be captured and recorded, into two categories: work time, and walking time. A picture of the work area can be drawn, and the location of the work steps connected– in the form of a spaghetti diagram. This drawing is very important, and visually powerful, staff will be able to observe that the work flow is not good if the drawing looks “messy” with too many lines and circles (20) (25).

2.3.1.2.Strategies to Establish Standardized Processes and Procedures

Traditional policies and procedures often work against standardization. With standardized work processes it’s mandatory that every work position be filled at all times, so when a staff member is absent, he or she must be replaced for the process to function correctly. In traditional systems, when there is absenteeism either there is no one present that can perform the task or supervisors scrambling around to fill positions without a standardized approach (71) (72).

Standardized work is different from the traditional process of creating work standards, companies have methods they call “standards”, but this is not what Toyota means. Within Toyota, the primary tool that dictates the work method is standardized work, this is used to define who, what, when, and where work is to be performed with the least amount of waste (20).

Figure 3 illustrates the relationship of the different types of standards and how they support the primary objective – to define a method to perform the work with the least waste. The model also provides detailed information to the employees about developing the a high level of knowledge and skill level possible (20) (25) (71).

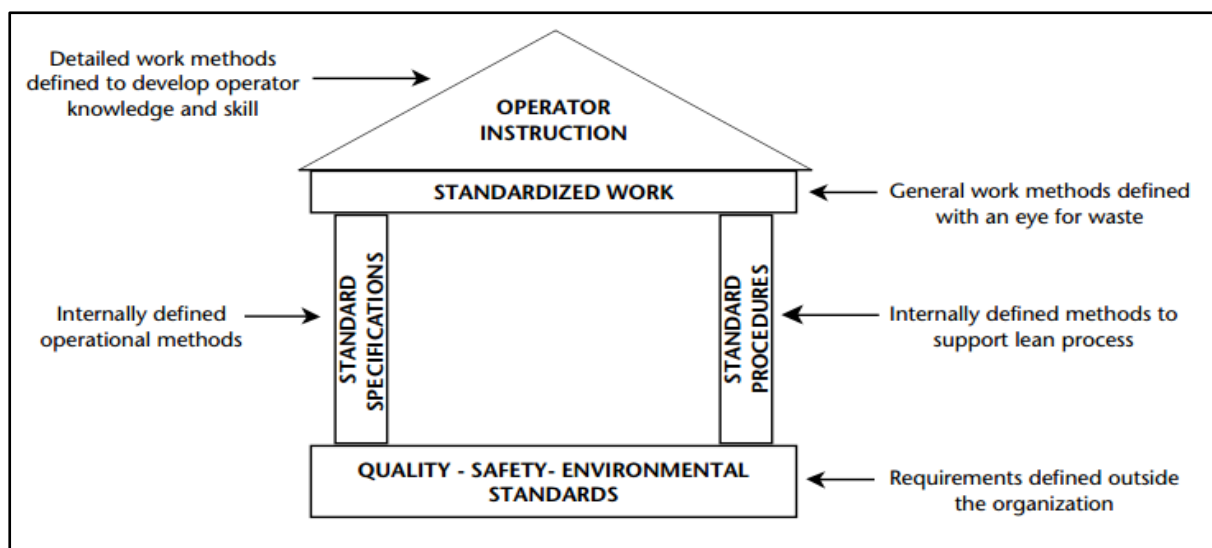


Figure 3: Relationship and purpose of standards (20)

Each standard serves a separate function, but they all must be included into the standardized work method. Standardized work document includes the work steps that will produce the desired result or achievement of another standard. The details of other standards are incorporated in operator instruction and training (20) (25) (72).

2.3.1.3. Job Instruction Training: The Key to Developing Exceptional Skill Levels

Often associates at companies complain that there is a lack of effective training to teach them the correct way to perform work, this is often left to chance. Consistent method are not used, trainers are not identified (when they are, they do not have formal training) and the requirements for performing the work are not clearly identified (20) (25).

Toyota m uses a basic method for training that is as relevant today as when it was first used in the United States during World War II. The method was developed by the Training Within Industry Service (TWI), a branch of the War Manpower Commission, in the United States. TWI material includes sections on Job Relations, Job Methods (this is the foundation for standardized work and the elimination of waste), and Job Instruction Training, which Toyota adopted as their primary training protocol (73).

Toyota uses this material to effectively train thousands of workers, it is an vital tool to use in the development of exceptional associates. All leaders within Toyota are mandated to learn the Job Instruction Training method. The course itself is structured to follow the basic training format based on 5 two-hour sessions, for a total of 10 hour. First the master trainers – someone with exceptional skills and many hours of experience- tells and shows the method, the operators then try it, and the instructor provides coaching. The operators are required to identify a practice job to demonstrate in the classroom with guidance from the instructor and other operators (73) (20) (25).

Poorly trained workers have more quality problems, safety problems, and less consistent performance overall. Employee education and training, is an investment and any shortcuts in training, will result in paying in perpetuity (73) (20).

A training aid called a Job Breakdown Sheet refer to Figure 22 in APPENDIX D is used in the training process to develop and analyse the work. There are four main steps involved in training namely; break down the Job , present the operation ,try out performance and put operators on the job and provide support (20) (73) (74).

2.3.2. Waste in healthcare

Lean identifies and attacks seven kinds of waste that are universal to all industries including healthcare. Taiichi Ohno defined the original seven wastes of lean for a manufacturing environment; these wastes have been adapted to for the context of healthcare and an additional eight wasted has been added to the list namely (18) (75) (55):

- i. *The Waste of Overproduction/Underproduction* - Producing more or less than the patient needs right now.
- ii. *The Waste of Waiting* - Idle time spent waiting for the next event/activity/process to occur.
- iii. *The Waste of Unnecessary Motions* - Movements by staff that are non-productive and unnecessary- mostly attributed to poor layout
- iv. *The Waste of Transporting* - Unnecessarily moving specimens, materials and even patients in the clinic.
- v. *The Waste of Over processing (or inappropriate Processing)* - Performing tasks that add no value to the patient OR Performing tasks that are not aligned with patients' needs.
- vi. *The Waste of Unnecessary Inventory* - Improper inventory control or excess ordering of materials such as medications and medical supplies
- vii. *The Waste of Defects* - Time spent doing something incorrectly; inspecting or fixing errors is time that could be spent on more valuable activities.
- viii. *The Waste of Untapped Human Potential* - Due to lack of involvement and accountability of improvement processes by staff and physicians. This requires a culture of trust and mutual respect by example, interest and participation.

Overproduction results from not understanding what is needed. Examples in healthcare include: printing forms that are rarely used, processing documents that sit in the queue, providing copies that were not requested or read and forwarding email unnecessarily forcing recipients to waste time reading them. In 2008, Park Nicollet Health Services (PNHS) in Minnesota reduced the number of forms from 100 to 25 by applying Lean tools. (27) (76)

Waiting presents a big problem for patients and defines the quality of care. In the worst case, waiting can be the difference between life and death. Waiting causes disruptions to work flow

through idle resources, stopping and starting, and time delays to customers (patients and staff). Healthcare operations commonly wait for service providers, diagnostics, information, equipment and materials. Bercaw, states that most service providers that work in emergency departments recalled occasions when patients clearly expressed discontentment regarding time spent in the waiting area. Staff members don't often see waiting as a waste and require training to enable them to see waste (77).

Inventory is another waste in healthcare, by using lean tools such as Kanban and andon hospital departments can signal when medications and equipment is needed, to reduce inventory which in turn reduces cost. The risk of keeping stockpiles of medications is not using them by the expiration dates. The result of lean efforts can result in millions in savings in inventory. (27) (76)

Waste of movement proves to be problematic in healthcare for clinicians and staff. A physician or staff member looking for supplies and equipment can be a waste time, any movement more than that required to create value is classified as a waste in motion. Unnecessary movement in the workplace is wasteful and can easily accumulate in the workplace. A study conducted by Bercaw found that nurses spent 53% of the time walking during their 12-hour shift from one place to the next. More than half of their time working was spent walking! He concluded that if the organization could reduce the nurse walking time across the organization by 25% (77).

Lean healthcare defines medical mistakes or errors as defects. These defects have a catastrophic impact on the patient- an example of this is errors in the patient medical records. Dr Reason explains healthcare is based on a system approach with personal focus. There is need for countermeasures as it is impossible to change the human condition, what needs to change is the conditions under which people work (78). Lean addresses through the use of tools such as – *poka-yoke* and standard work to eliminate defects. The challenge lies with consistency and lean teaches all workers never to become complacent through relentless reflection and continuous improvement. Lean empowers the people doing the work to make the necessary changes to prevent mistakes from occurring in the first place (19) (55).

In healthcare, waste in processing is caused when tests are performed when they are not needed; redundant data is collected, hand-writing information only to be entered online later, or not performing the job right the first time. Lean emphasises that things right the first time so that the little things do not the add up, anything that is unnecessary should be eliminated immediately (18).

2.4. Lean in the Public Health Sector

2.4.1. Lean in Healthcare

The healthcare sector has seen several management concepts come and go over the years. In recent years, the discussions have been centred on the potential application of lean principles in health care (79). The term lean healthcare has become the benchmark of modern healthcare management as result of the discussion in the lean and healthcare industries (80).

The definition of lean health care provided by J.J Dahlgaard et.al is as follows:

“Lean health care is a management philosophy to develop a hospital culture characterised by increased patient and other stakeholder satisfaction through continuous improvements, in which all employees (managers, physicians, nurses, laboratory people, technicians, office people etc.) actively participate in identifying and reducing non-value-adding activities (waste).” (81)

The aim of defining lean healthcare is to help to create a culture that is characterised by continuous improvements and participation. The organisations (hospital, departments, clinical staff) need to understand the drawbacks of their current culture and then they must agree to change it. This is not easy, because people involved often have to change their old paradigms (82).

The biggest potential for improvements lies between sub-processes, functions and department. People may accept poor quality, as it is not their direct responsibility if things go wrong, whilst the company management try to use ‘fire fighting’ when things start to get out of hand. What is lacking is the understanding of the root cause for problems - thus waste is related to lack of ownership/responsibility for the cross-functional processes. The patient and the hospitals suffer because of the waste present in the system. This is not restricted to the operative levels in the organisation, but also at managerial levels. Managers take on the challenge of improving the organisation too lightly, despite it being their job. Improving complex systems like healthcare organisations is a huge undertaking (55) (18) (69).

2.4.2. Lean in the public sector

By applying lean in the public sector, it is anticipated that resources should free up and the public sector will no longer be overburdened. However, there are concerns when it comes to implementation in public sector due to its service nature and complex internal structures. The contextual differences have made the implementation of Lean in public services challenging to

attain. Firstly, the patient and the Department of Health are both considered as customers in the system, which presents difficulties in determining 'customer value'. Secondly, the way public services are currently designed is based on capacity and therefore there is the limited ability and willingness to influence demand (83). Lastly is the realisation that the public sector must not only consider efficiency and cost reduction, but also effectiveness and equity (75).

Critical questions have been raised Radnor and Boaden such as, "Can Lean be applied in public services? If so, where? What elements of Lean are being applied? What lessons can be learned from the experience of others? Is Lean a panacea (addressing many of the challenges in public services) or a paradox (merely distracting public sector managers)?" (84)

2.4.3. Assessing the South African Public Health Sector¹

Public hospitals and clinics in South Africa are often very overcrowded, and patients need to wait for a long time to be seen by staff that are overworked and tend to be indifferent. A recurrent trend in different provinces is that patients arrive at Clinics to start queueing by 4 a.m. in the morning whilst the clinic opens its doors at 7:30 a.m. The patients are often outspoken; however, the change process is slow, and the situation continues to persist. A patient at Town Two Clinic in Khayelitsha (Western Cape) remarked:

"We stand here even in the pouring rain. We have been complaining for a long time. They tell us to put the complaints in a box, but they never do anything about it." (85)

At Matthew Goniwe Clinic (nearby Clinic) the situation also appeared to be similar, patients have been reported issues with regards to Clinic operations. A patient who was first in the queue reported, 'Sometimes they can't find your folder. And they will ask where you put your folder' (85). It can get very frustrating for patients in the Eastern Cape, at Lusikisiki Clinic, where clinics do not open at set time, despite staff arriving at the clinic (In article by News24 the reporter noted that 'At 08:00 staff started arriving and soon nurses could be heard singing inside the building'). A patient in the queues remarked:

"Now they are praying, so we will have to wait until they finish praying. They saw us when they arrived. They know that there are people waiting at the gate." (86)

¹ This section has been previously, in part been submitted for the course Lean Management

In a report published by Operation Phakisa (an initiative of the South African government, to fast track the implementation of solutions on critical development issues), it was reported that: 25% of incoming patients are seen in the 2 hour target they have set, 68% of the patients are seen between 2 and 5 hours and 7% of the patients spend more than 5 hours in the clinic (87).

In addition to the waiting South African Public health clinics face an array of challenges i.e. filth and neglect, resulting from lack of resources (Patients at Elim Hospital in Limpopo are left naked due to a shortage of theatre gowns), Water shortages (Patients at Tshwaragano

District Hospital in the Northern Cape bring their own 5-litre container of water to get tooth extraction) (88) (89).

2.4.4. Few Projects²

Implementation of lean healthcare into the South African public sector is still at its early stage of development, and its value stands to be questioned as most of the implementations are functional, based in departments and do not appear to be linked in any way to a programme of improvement that focuses on processes across the whole organisation. A few of the popular and well publicized lean implementation and the advocates for lean healthcare are mentioned below.

Young Achiever Award winner, Dr Logandraan Naidoo, Senior Manager of Medical Services at Grey's Hospital, conducted a study to determine the impact of Lean principles techniques, and tools on the operational efficiency in the outpatient department (OPD) at the Catherine Booth Hospital (CBH) – a rural district hospital in KwaZulu-Natal, South Africa. To reduce waiting times Dr, Naidoo and his team identified problems and wastes in the OPD namely: unpredictable demand because of no booking system, lack of patient-triage system, unnecessary and disorderly movement of staff (and patients), duplication of stationery and work, shortage of equipment, and improper processes and controls. As a part of his PhD, he is currently working on the development of a tool to predict success for the rapid initiation of lean in hospitals in South Africa (90) (91).

Professor Faull, founder of the Lean Institute Africa is also a strong advocate for lean healthcare in SA. His first healthcare improvement workshop took place in 2007 at GF Jooste Hospital in Cape Town. He remarked “The hospital had a terrible folder management issue; on average, it took staff eight minutes to locate a patient's folder, and 40% of the time they couldn't find it

² This section has been previously, in part been submitted for the course Lean Management

at all. A week after our workshop only 20% of the folders couldn't be located, and after three months it was down to 0%, taking only two minutes to find a folder – which made an enormous impact on waiting times for patients and efficiency overall". Subsequently, he worked with Non-Governmental Organisations (NGOs) to carry out 19 one-week rapid improvement workshops at 18 hospitals for the NDoH (92).

Most recently he conducted a hospital turnaround programme at Chris Hani Baragwanath, Leratong, Sebokeng and Kopanong hospitals during 2014-15. The result of his implementation were reported as follows, ' At Chris Hani Baragwanath there's been a 71% reduction in patients waiting for their patient records, from 276 minutes down to 80 minutes; in Leratong patient records there's been a 68% reduction in the patient waiting time, from 143 minutes down to 45.6 minutes; in Sebokeng there's been a 67% reduction in pharmacy patient waiting time, from 15 minutes down to 5 minutes; and in Kopanong there's been a 52% reduction in patient waiting time in the MOPD, from 44.75 minutes down to 21.3 minutes during RPI week' (93). Most of the work done by Professor Faull was extracted from external news sources; the researcher was unable to find any published works to evaluate the approach taken.

In the South African Health Review (SAHR), lean implementation has only been featured once, in their 2012-2013 review. The review features a Lean Management Case study undertaken at the orthopaedic outpatient clinic at the New Somerset Hospital (NSH) in Cape Town in 2013 by Jessica Price a Rhodes Scholar. This project aimed to reduce patient waiting times in the clinic and improve patient satisfaction. In the study, Ms Price piloted four key interventions namely: introducing new X-ray forms, additional signage, a new numbering system of patients and staggering of patient appointments. The initial results of the interventions showed a 39.4% reduction in patient waiting time after three-month follow-up, 18.2% reduction in waiting time had been sustained (94).

A major contender for lean healthcare in private sector is KPMG South Africa; they conducted a successful project with a focus on the billing process which they identified to be a priority area in need of efficiency improvement in an unnamed private hospital. They wanted to reduce the number of days' post-discharge taken to issue bills to medical schemes and private patients, from 2 to 1 day during the project period and down to zero in the long-term. They did this by eliminating non-value adding activities the impact of this was an estimated saving of R3 million per annum on the hospitals working capital (95).

2.4.5. Tool-based Approach³

The implementations discussed in the previous section mostly involve the use of a variety of tools and techniques to attain the desired result.

Dr Naidoo made use of value stream maps, 5-why analysis, A3 tools and Kaizen teams. The value stream was used to map the patient journey through the OPD, both the current and future states have been mapped and can be found in the APPENDIX A . Whilst calculating takt time for the patient journey, it was observed that the calculation was based on six care events i.e. Patient admin, patient screening, consulting room, X-Ray, Investigations and pharmacy (91). The researcher compared the value stream to the reality of patient sequence and evaluated that different patients require different diagnostic procedures in OPD. Granted that there are patients who undergo the six care events, not all patients follow the same pattern in OPD i.e. a patient could only be subject to the first three care events. In addition, it the researcher acknowledged that X-Ray is only one of several diagnostic procedures that can be carried out in OPD (Examples of other diagnostics Endoscopy, Colonoscopy, Thyroid test, etc.). It is unclear why Dr Naidoo chose to focus on the X-Ray procedure in isolation when trying to improve on the overall efficiency of the OPD as a whole.

Dr Naidoo had an external Kaizen team to help with the implementation, the result was a lack of enthusiasm from the staff in implementing decisions that were made by the teams. Taking ownership of improvement processes away from the staff does not foster staff empowerment or accountability of lean projects. The researcher's view is that to achieve successful implementation staff capabilities need to be developed.

It was hard to review Professor Faull's implementations since information on projects could only be collected from news articles. Most of this literature is aimed at the general public rather than scholars, and the information provided was over-simplified. Due to the "over-simplification" or lack of detail/content the researcher was unable to make a detailed analysis on implementations. What was emergent from the articles was that Professor Faull advocates improvement activities to support and improve processes, e.g. Rapid Improvement Events (RIEs, also referred to as "kaizen blitz" or "kaikaku" events). The problem with RIE's is that they often lead to 'quick wins', typically in the form of micro level service efficiencies (75).

³ This section has been previously, in part been submitted for the course Lean Management

However, they are not followed up on and the motivation to create and sustain change often since disappears.

In 2017 Baragwanath hospital where Professor Faull had previously carried out implementations, was labelled as the 'killer hospital', in 2016 it was reported that 4100 patients wait for a year for cataract operation at the hospital. A patient who was on the waiting list commented that:

"She had applied for the Cataract Operation at the clinic on April 25, 2016. Since then she had to come back six times, was told that she must come back on February 28, 2017, because no lenses are available." (96)

This validates the concerns of the researcher, as well as sentiments expressed by Professor Faull back in 2015:

"Lean management works. There is an overwhelming amount of research that shows this. But it has to be a rhythm of management practice: daily, weekly, monthly follow-ups and so on. It is an issue of practice and habit-formation... these principles have to become part of the daily routine, not something done once or for a few weeks and never again." (93)

From the statement, the researcher also infers that perhaps there is a need to incorporate improvement and coaching kata practices when applying lean in healthcare develop capabilities and to enable an understanding that, lean it is dynamic and open to multiple interpretations, interests and logics.

Finally, the approach taken by Ms, Price was reviewed, the approach taken by KPMG was not reviewed since it was undertaken in the private sector and the scope of the study limited to the Public Sector. In the New Somerset Hospital case study Ms Price, in corroboration with a Lean Team including all the key stakeholders in the Orthopaedics Outpatient Department (OOPD) conducted a situational analysis using Lean tools. The tools used were: value stream maps, an A3 tool, root-cause analysis, fishbone diagrams and the 5 whys. It is unclear if the OOPD requested the interventions, or whether a root cause analysis (RCA) was performed to identify the four interventions. Details of RCA have not been entailed; the article mostly provides information on the state prior to intervention, one-week post-intervention and a follow-up at three months. In her results, Ms Price reported that initial results showed a 39.4% reduction in patient waiting time and at three-month follow-up, an 18.2% reduction in waiting time had been sustained (94). Over a 3-month period, the results had drastically dropped by 50%; the

researcher speculates that this trend most likely pursues, until the system reverts to its original state.

The researcher attributes system reversal to reasons discussed in failure the other projects above and other additional factors. Outcomes of lean do not depend not only on lean tools and technology but also on the negotiation context in which the planning and implementation of the Lean project occur, in the public sector. Not only does it require the top-down approach where managers study the whole system to figure out what their real problems, but it also requires the bottom-up involvement of front line staff in continuous improvement activity (97). It is crucial that flow be monitored from the moment the patient comes into the clinic to the point of discharge to ensure that flow is continuous and non-value adding wastes need are eliminated.

In conclusion, it was noted that the projects in healthcare tend towards small enclosed projects in silos rather than adopting an organization or system-wide approach and perhaps what is required systemic approach, so that lean becomes ‘the way we do things around here.’

2.4.6. Trajectory of Lean Implementations

Based on document analysis of news articles it is noted that the last time any articles were published on Lean implementation in the South African public health sector was in 2015. Whilst in the SAHR lean intervention has only been mentioned once in 2013; this shows that interest in lean healthcare has diminished in the Public sector. This could be attributed to ‘newness’ of lean in South Africa: ‘is it really new, or is it simply a recipe for repeating past mistakes in a new way?’ (98) Additional factors considered for diminishing trend in the public sector include the lack of resources to be invested, lack of management support, lack of ‘buy-in’ of staff, understanding of the process and customer requirements as being enablers, with public sector culture, lack of clear ‘customer’ focus (84).

Another trend that was observed with lean implementations and other implementation projects in the public sector is that the Check and Act steps in the PDCA(Plan-Do-Check-Act) scientific method are skipped. In industry and the public sector, it stands to question whether institutions are interested in finding out whether new projects work. The overall feeling is that often institutions say they want projects to work. However, they actions do not indicate this. Habitually what is required is a presentation and proposal plan to satisfy the concerns of parties involved so that they can move on to the next problem. Since projects are often not checked

and monitored to see if the implementation works, there is a high percentage of projects that do not work. Hence the problems persist, and everybody moves on to the next project, with no momentum in a positive forward direction.

The fundamental principle of the PDCA (iteration - once a hypothesis is confirmed), is neglected since the cycle is not repeated there is no way to learn from past mistakes and expand the knowledge base (99). By repeating the PDCA cycle, the public sector can get closer to their main goal of reducing patient waiting times. From the document analysis, the researcher views the skipping of Check, Act steps and lack of iteration of PDCA cycle as the biggest waste in the public health sector.

Every time a new project is implemented there is a lack of confidence and desire by the public health staff to participate in improvement projects. To date, it has not been determined whether Lean has been implemented because of a new “bandwagon effect” or because of a disappointment with the previous process improvement techniques (9).

2.5. Framework for Waste Identification

The proposed framework is constructed to assess measure and diagnose waste at three different clinics as a project-based framework with three phases.

- i. Identify waste in the various processes and locations at the clinics selected
- ii. Determine what the drivers for waste are by performing a root cause analysis
- iii. Ascertain the impact of the waste

Appropriate practices and decision tools have been proposed and assigned to each phase; these tools have been discussed in great depth in the previous sections of the literature review. The framework proposed is at its conceptual stage and requires further implementation to be validated. When implementing the framework, the following concerns will be addressed: the people issue, the process issue and the sustainability issue. Figure 4 below, provides an illustration of the framework was developed by, Dieter Hartmann and the researcher.

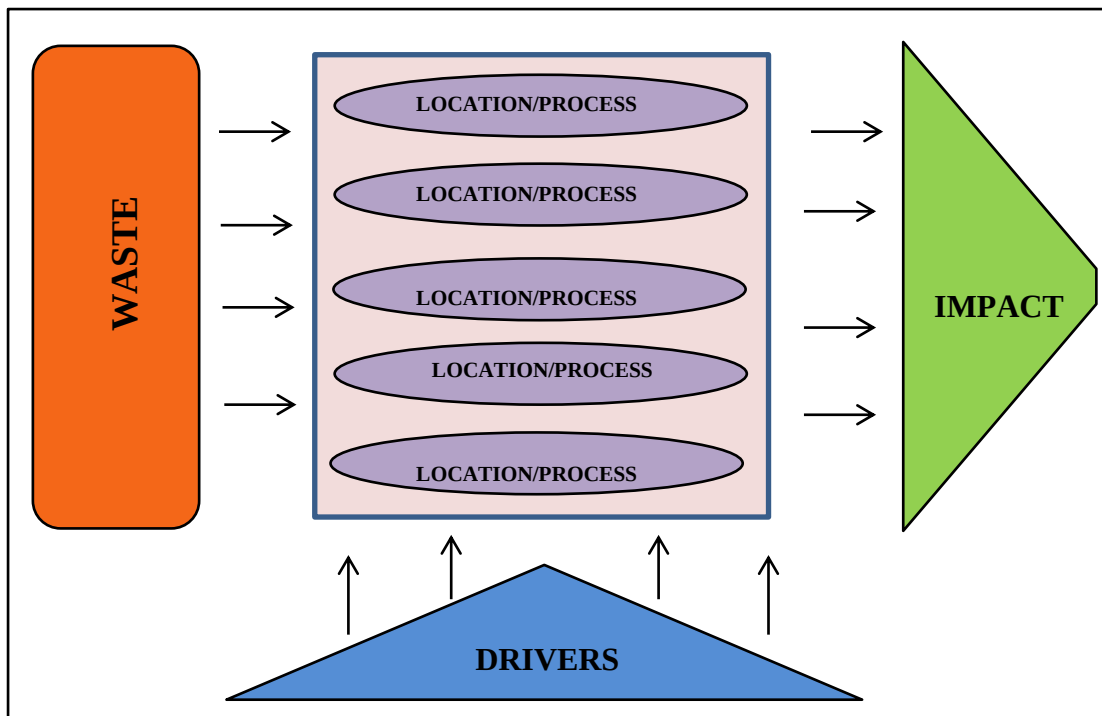


Figure 4:Framework for Waste identification

3. RESEARCH METHODOLOGY

The research aims to develop a sound and thorough analytical framework to understand what the most critical factors are that contribute to waste in the ARV Clinics in the Public Health sector. To address the research question, a three-step methodology was used to design the frameworks that have been applied. First, a framework was developed to guide the research, by delineating the input as well as the output of the project so that the variables that needed to be tested could be identified. The framework is divided into two main sections namely:

- i. *Input* - identification of different wastes (this forms a part of the method section)
- ii. *Output* - determining the drivers and impact of waste – this forms a part of the analysis and results section as shown

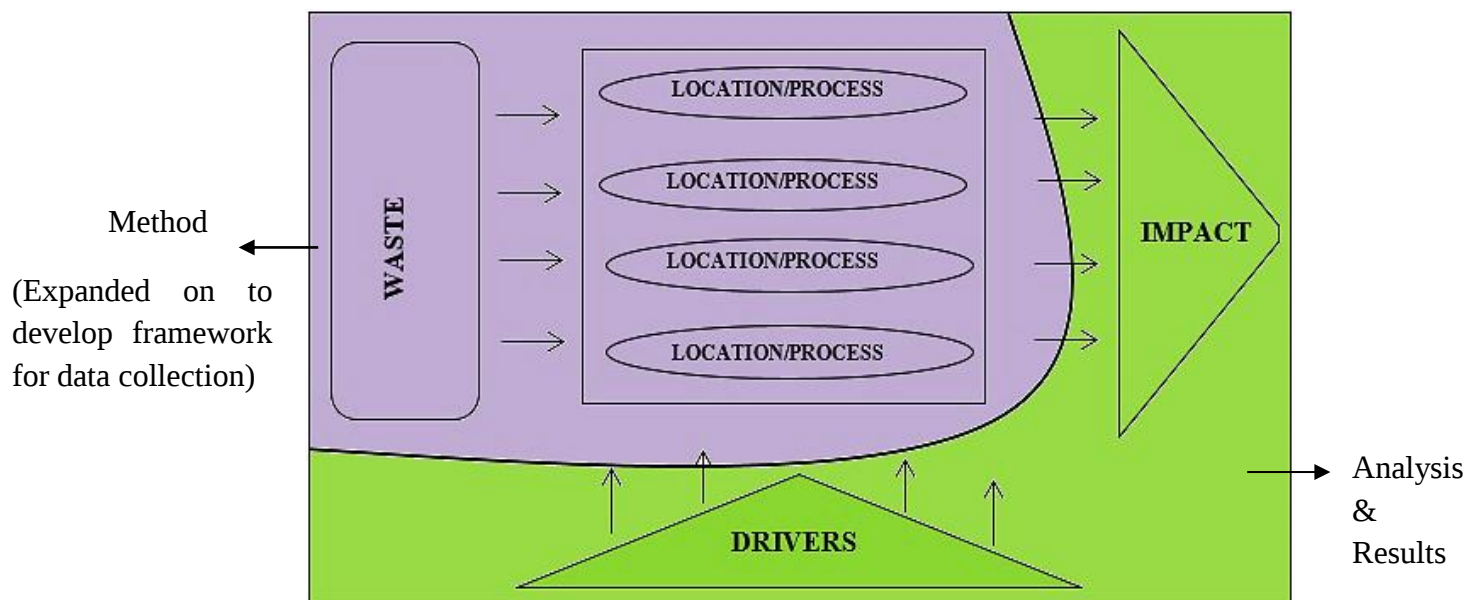


Figure 5: Framework - Input and Output

Secondly, an additional framework was developed to assist in the process of data collection. Thirdly, the framework was tested at three different ARV Clinics where the case-study was conducted.

To develop the framework the researcher examined various literature materials i.e. Public Health documents (National Department of Health Integrated Chronic Diseases Management Manual, South African Health Review Publications, Ideal Clinic Checklist), published academic literature about the lean implementations in South Africa and articles published in external media. The researcher also held interviews with members of Right to Care (RTC) on three separate occasions ('RTC are a non-profit organization who support and provide

prevention, care and treatment for HIV and associated diseases'). Several discussions were also held with the researcher's supervisor who is an avid sponsor for the lean implementation programs in the public and private sector.

Finally, a case study approach was used to test the framework (The criteria used in the selection of Case study has been discussed in Chapter 3.2.1). The case study methodology was selected as it offers an in-depth understanding of the research by allowing the emergence of patterns that lead to waste in ARV Clinics. This helps the researcher to provide an explanation of theories in Waste Management in the Public Sector by grounding them in data. The three-step method was followed as it helps the researcher attain the goal of this study which is to test the frameworks developed to understand what the most critical elements are of Lean Waste management in ARV Clinics in South Africa.

The researcher believes there is a need to move quickly beyond the rhetoric as there is budding interest by non-profit organizations such as RTC and to a lesser degree by the National Department of Health to implement Lean projects; to improve on operational efficiency of the Public Health Service Providers (Hospitals and Clinics) and to help reduce the lengthy patient waiting times. There are also concerns regarding cuts in the National Budget for Health for non-communicable diseases as of 2017 (e.g. HIV, TB), the public health systems cannot afford to waste any financial resources on change initiatives without certainty of a positive outcome.

The frameworks proposed could help pave a pathway to allow for successful Lean implementations, resolving challenges faced by the public healthcare systems to deliver better, quicker and lower cost services. The case studies investigated through the framework could provide more in-depth evidence which is needed to evaluate Waste Management in ARV Clinics in the Public Health Sector. Not only do the case studies, provide an opportunity to validate the framework, they also seek to add evidence to the literature about different types of wastes that can be found in healthcare. The researcher feels the framework provides a positive contribution to help fill a gap in the literature on Lean Health Waste. This can hopefully advance the depth and richness of research protocols to enable comparisons to be made by future case studies that adopt it or similar versions of it. The framework for data collection is shown in Figure 6.

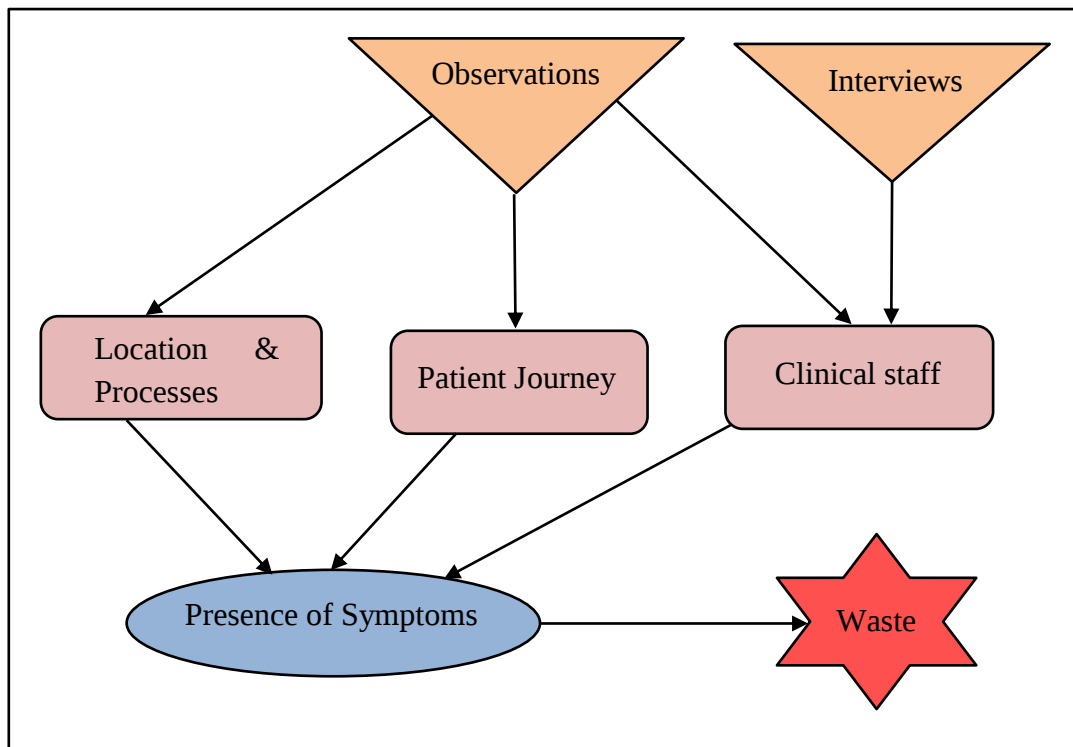


Figure 6: Framework for Data Collection

3.1. Research Philosophy

Easterby-Smith et al. highlight the importance of making philosophical assumptions before the start of the research. By being aware of certain philosophical issues, the researcher could select an appropriate research design that met the research objectives (100). The inclusion and emphasis of multiple realities and personal stories made the social constructionism a relevant as theory for this study. This does not necessarily mean that social constructionism is best theory but rather that it is a more appropriate theory in terms of the context in wherein this specific study was conducted.

A social constructionist perspective, “locates meaning in an understanding of how ideas and attitudes are developed over time within social, community context” (101). Social constructionists are interested in the normative narratives or grand narratives formed which in turn influence people and how they measure themselves. Social constructionists, honour and respect the community and the inherent voices of each individual and how their accounts can be respected within a system (102).

The research on waste in ARV clinics in South Africa is coherent with the modernist epistemology whereby the researcher, from her vantage point, is considered to be in the best position to describe the problem. Within social constructionism, the researcher's views are challenged, and the focus is turned to the clinical staff who are considered to be in the best position to describe their experiences regarding waste (non-value adding activities) within ARV clinics.

The importance is to investigate what clinical staff perceive to be waste and their experiences, relating to it. Thus, a social constructionist epistemology challenges the ways in which clinical staff view waste and their understanding of waste, this opens up new possibilities for new meanings and perspectives to be explored. This epistemology also provides the researcher with a set of lenses that enforces an awareness in which she perceives and experiences the processes and waste in ARV clinics.

A social constructionist framework enabled the researcher, to stay flexible and open regarding the experiences of both the clinical staff and the researcher. The researcher did not feel intimidated or overwhelmed by expert 'knowledge' that she did not have. She had to simply bring herself and her experiences, to enter a dialogue with the clinical staff, remaining aware of her social and cultural context as well as the personal 'biases'. The purpose of this research was not to gather facts, but rather to initiate dialogue, interest and understanding through the equal engagement of research participant and researcher as co-creators of a shared reality" (101) (102).

From a social constructionist stance, the researcher does not claim that her understanding of the waste in ARV clinics and the frameworks developed are ultimate 'truth'. The conclusions that the researcher has made is merely the understanding that she has reached after a journey of exploring the phenomenon of waste in ARV Clinics. Table 1 summarises the structures of social constructionism paradigm.

Table 1: Structures of Social Constructionism paradigm (100) (103) (104)

Social constructionism paradigm	
Assumptions	
Ontological (nature of reality)	Subjective reality and being determined by people
Epistemological (How to know it)	Researcher is involved and interacts with that being researched
Methodological	i. Inductive process ii. Emerging design iii. Patterns, theories developed for understanding
Implications	
The observer	Interdependent
Human interests	Relevant
Research process through	Gathers understanding of the situation
Concepts	Rich in data - ideas are encouraged
Unit of analysis	Includes stakeholders points of view
Sample requires	Complex
Generalisation Through	Theoretical abstraction
Preferred research methods	Qualitative research methods
Characteristics	
Aims	To invent
Entry	Meanings /values/consequences
Techniques	Converse
Analysis	Sense-making
Results	Explanation
Strengths and weaknesses	
Strengths	i. To understand people's meaning ii. To contribute to the evolution of the new theories iii. To adjust to new issues and ideas as they emerge iv. Identify how change processes over time
Weaknesses	i. Time and resources consuming ii. Analysis and interpretation are difficult iii. Difficult to control research process

3.2. Qualitative Research

A qualitative approach has been used as the key characteristics of the research are to attain an in-depth focus on Waste Management in ARV Clinics with the acknowledgement that the researcher is the instrument of the study. Denzin and Lincoln state that, "qualitative researchers study things in their natural settings, attempting to make sense of, or to interpret, phenomena in terms of the meanings people bring to them" (104), while Merriam says, "Qualitative

researchers are interested in understanding what those interpretations (of those studied) are at a particular point in time and in a particular context” (105).

The general goal of the research is to identify emergent themes, as well as to gain an understanding of why or how these themes emerge regarding the context of Public healthcare.

3.2.1. Case Study Approach

Case studies were conducted to explore and build on the concept of lean wastes in ARV Clinics in South Africa. The case studies seek to address research question: *What are the different approaches to Lean Waste Management in selected ARV Clinics in the South African public health sector?* The case study methodology was selected to provide a more detailed understanding of the lean wastes to build on and devise a possible theory relating to the waste management by ARV Clinics in South Africa.

Case study research has been described as an ‘all-encompassing’ method, and a ‘comprehensive research strategy’ by Yin who went on to say:

“You would use the case study method because you deliberately want to cover contextual conditions – believing that they might be highly pertinent to your phenomenon of study” (106)

From Yin’s description, it is deduced that the method provides a holistic, contextual and processual approach to research advocated by the two frameworks developed guiding the research design.

A case study protocol was developed provided an outline that should be followed in using the instrument (i.e. consent letters, literature on how to best conduct semi-structured interviews). This was created prior to the data collection phase, in preparation for multiple-case studies. The case study protocol developed was in line with Yin to ensure the reliability of the case study research. The protocol had the following outline:

- i. An overview of the case study project (objectives, issues, topics being investigated)
- ii. Field procedures (credentials and access to sites, sources of information)
- iii. Case study questions (specific topics that the researcher must keep in mind during data collection)
- iv. A guide for case study report (outline, format for the narrative) (106)

3.2.1.1.The role of the case study

The case study method was selected as one of the data collection instruments to examine waste management in the context of its natural setting- ARV Clinic. It is also used to test the frameworks developed in relation to approach that can be taken by the Clinics in South Africa to develop 'Eyes for Waste'. This enables the researcher to identify the different healthcare waste, and subsequently the drivers for these wastes as well as the impact of the waste (leading to detection of kaizen opportunities). The research also seeks to add on to knowledge to aid with Lean Implementations in South Africa.

The role of the case study is descriptive, aiming to describe an approach that can be taken towards waste management by ARV Clinics in South Africa. The case study is intended to provide meaningful insight into waste management in the ARV clinics with regards to the identification of waste, determine the drivers of waste and the impact of waste on service delivery to the patient and the operations of the clinics. This role provides the researcher with an insight into the reality of waste management of selected ARV Clinics in SA.

The case studies also aid to validate or disprove the findings obtained from document analysis.

3.2.1.2.Case Selection and Sampling

While deciding on the appropriate number of case studies different approaches were considered. While Dyer &Wilkins argue that, that some of the more critical studies that have advanced the knowledge of organizations involve just one case. Yin points out that with only one subject there is very little basis for scientific generalisation because of the 'microscopic' outlook, leading to the question, 'How can you generalise from a single case?' (106) (107). It is evident then that the sample size should be greater than one. When making the decision, it was decided that parameter establishment and objective setting of the research were far more important in case study method than a big sample size, and the fewer the case studies, the greater the opportunity for depth of observation (108).

When deciding on the sample size the parameters that were considered were: the role of the case study in this research, the number of cases thought to provide the depth, and the researcher's available time frame. The sample size chosen was - three, on the basis that the ARV Clinics are a part of the Public Sector and also because consent was granted by the Province of Mpumalanga in the Ehlanzeni District Municipality.

Their approach to waste management was evaluated to provide a description of: what they understood about lean waste management, if they had any waste management protocols in place and how the different clinic's operations(processes), layout and attitude towards waste differs from another. This adds a depth of analysis that is not achievable via document analysis whilst strengthens the defensibility of knowledge in the context of waste management in ARV Clinic in South Africa.

3.2.1.3. Conducting Research

Ethical Considerations

The researcher acknowledges and recognises that she had a responsibility to protect the rights and general well-being of the participants involved in the study based on the nature of the research. Codes of practice in research, which provide the guidelines that reinforce the basic principles of human rights and ethics by the University of the Witwatersrand's Human Research Ethics Committee, have been adhered to. The clearance certificate number is M160487. The research has also been cleared by the Department of Health, District Manager for Ehlanzeni District Municipality – Mpumalanga.

Whilst conducting semi-structured interviews, the topics surrounding research ethics with human subjects were also addressed in by:

- i. Ensuring respect for persons – Informed consent was acquired from the staff members who were approached and asked to participate in the study. The staff members who were interviewed: had to provide consent before starting the interview process, were not coerced in any way to participate, were provided overview of the study (it's purpose) and any questions and concerns from the staff were addressed before commencing the interview
- ii. Ensuring respect for privacy and confidentiality – the researcher acknowledges that people have a right to protect themselves from harm that could result from information that was gathered during the interview process. Pseudonym have been used in transcriptions of the interviews and names in consent forms have been censored to respect the rights of the staff for privacy and confidentiality.

The ethics clearance certificates and letters of consent can be found in APPENDIX C.

Direct Observations and 'Taiichi Ohno's Chalk Circle'

The aim of the research is to explore and evaluate the occurrences of lean waste in the daily operations of ARV Clinics, specifically in South Africa. From the literature review it is inferred that it is not easy to define 'Lean' despite it being conceptually simple. A major aim of lean is to continually improve a process by removing 'Muda' / Waste (non-value-added steps). Many lean techniques are designed to eliminate waste whilst requiring direct actions from the people autonomously and pursued vigorously to attain a real revolution. To be able to achieve this it is important to learn to see wastes and develop 'Eyes for Waste', (109) Nick Masci commented, 'Once you have that *aha* experience with lean, you see waste everywhere.' (110)

Taiichi Ohno pioneered such a culture which has been referred to as 'Ohno's Method' by his original students. One of the teaching approaches he uses in his method is standing in a circle which was later referred to as, 'Taiichi Ohno's Chalk Circle'. By employing this technique, the researcher trains the mind to observe reality by drawing a hypothetical 'chalk circle on the floor' and standing in it for several hours observing the reality - of the current state. This practice involves intensive observations to instil kaizen thinking, which is necessary before the researcher can coach clinical staff (coaching is phase 2 of the project and not a part of the scope of this Masters).

Process visibility is key to see process problems and to identify kaizen opportunities, it reveals problems to anyone, not just the researcher but also clinical staff. Visibility, 'thoughtful visibility' is a principle of TPS. However, it is not enough to observe blindly, the basic problem-solving approach taken by Ohno's was 'to ask why at least five times'. Bearing this in mind the researcher did not literally confine herself to the circle. But also sought to ask questions to seek clarity and observed the entire process from the instant a patient came entered the clinic until they left.

It is not simple to make thoughtful observations, as a result when observing ARV Clinic operations for the first time, the researcher took several hours, sometimes days to develop an initial grasp of what was occurring. Nakane and Hall have noted, 'Seeing nothing happen in many hours may be a marvellous discovery, not a waste of time' (111). Roser's technique on the different stages of observation was employed, in the method the duration and activities have been adapted from the context of an office to a clinic environment. This has been summarised in the table below (112)

Table 2: Different Stages in Observations

Step	Duration	Activity	Reason
1	<10 min	Walk through the ARV Clinic	To get a quick overview of the layout and get a rough idea of what is where
2	1-4 hours	Observe a few patient cycles	To attain an understanding of all the sequence of steps involved in the treatment of a patient. It is not advisable to make any authoritative remarks. At this stage, as observations made are incomplete (due to ethical considerations the researcher is not permitted to accompany patient whilst seeing doctor or nurse)
3	9 hours	Observe clinical staff shift	Whilst observing the staff, it became easier to notice variations, questions were asked when clarity was required. At this stage, some of the bigger problems start to get visible.
4	2-5+ days	Observe over multiple days	This allowed the researcher to observe and understand patterns in depth. The processes are simpler to understand, and it becomes clear what the Type 1 and Type 2 wastes are.

Direct Observations in Field Settings

The merits of this method were that:

- i. The researcher could record the natural behaviour of the clinicians and patients.
- ii. The researcher could gather information that was independent of people's willingness to report (not all clinical staff exhibited willingness or had time to be interviewed).
- iii. The researcher could verify the truth of statements made in the semi-structured interviews conducted.

The limitations of this method were that:

- i. The researchers personal and cultural perspectives affect how the field conditions were observed, interpreted, and reported.
- ii. The presence of an observer inadvertently affects the clinic staff, managers and patients being observed.

- iii. Not all occurrences were open to observation due to the nature of interaction that occurs between doctor/nurse and patient. Patient's right to confidentiality was respected.
- iv. It was not always possible for the researcher to observe all locations at every point in time, and to choose where and when to make field observations (106).

Interviews

Once selected the Chief Executives of the case study Hospitals or Clinics were identified, and initial contact was made via the researcher's Supervisor and Department of Health Head Office Nelspruit on behalf of the researcher. Contact was made prior to a week before visiting by email and telephone calls by the researcher to arrange access. A preliminary meeting was held with the CEO to discuss the nature of the research and to facilitate a formal introduction to the Clinical Manager that run ARV Clinics housed in the hospitals.

For each case study the researcher conducted two sets of interviews with members of staff at various levels in the organisation (e.g. Clinical Manager, Doctor, Nurses, Clerk, Data Capturer), to discuss their understanding of lean waste and to gain an understanding of the functions they performed as well as the process flow. The first set of interviews took approximately an hour each, the second set of interviews were approximately 20 min the purpose of the later was to seek clarity and expand on themes that emerged.

The researcher was granted permission at all sites in the clinic and the pharmacy to make observations. However, it was requested that no photographs be taken (Observation were recorded in a notebook). The number of interviews conducted for each case study varied depending on the willingness of staff to be interviewed. In addition, finding available time to interview Clinical staff proved to be a challenge as the staff are busy, there were staff who were kind enough to allocate time over the lunch break to be interviewed. In rare instances, language presented itself as a barrier to communication.

A semi-structured interview protocol was designed using open ended questions to guide the data collection in line with the frameworks developed. The researcher encouraged the respondents to talk freely about their experiences thus questions were not limited to those contained in the framework (designed to ensure the main lines of enquiry were captured at the same time as enabling the researcher to gain insight into the waste from the perspective of the members of staff at various levels in the ARV Clinics). The informal set-up presented an opportunity to allow the researcher and clinical staff to become acquainted with each other

(researcher is viewed less intrusive compared to Direct Observation). It also encouraged a two-way communication and clarification could be sought by both the researcher and staff during the interview process

Not all interviews were recorded, the interviews that were recorded were those given by the doctor's, staff that were not in senior positions tended to be apprehensive and agreed to be interviewed but not recorded. In these circumstances points had to be taken down to respect the wishes of the respondents. The interview protocol/questionnaire followed has been summarized in Table 3.

Table 3: Interview Protocol for Lean Waste Management in ARV Clinics in South Africa

INTERVIEW PROTOCOL FOR LEAN WASTE MANAGEMENT IN ARV CLINICS IN SOUTH AFRICA	
1. Identify the patient flow through the facility	
Please provide a brief description of the sequence of care events that the patient follows from the entrance to exiting the ARV Clinic?	
2. Identify the different Wastes in the ARV Clinic	
Type of Waste	
<i>The Waste of Overproduction/Underproduction</i> “Overproduction: Producing more or less than the customer/patient needs right now.”	How many patients on average come to the clinic daily?
	What does the overall patient flow look like in a day (Arrival rate of patients)? Are you aware of any factors that you may know of that contribute to this pattern?
	How many doctors are available per shift? What is the shift pattern in days and hours?
	What percentage of the patient that come in need to be seen by the doctor? If doctor is not around what procedure is followed?
	How many nurses are available per shift? What is the shift pattern in days and hours?
	What percentage of the patient that come in are seen by the nurse?
	Are there large empty spaces that are not utilized (e.g. floor space, cabinets)?
	Is there equipment in consulting rooms and office rooms that is unutilised e.g. Computers?
	Are medical supplies ever pulled from stores and returned unutilised?
<i>The Waste of Waiting</i> “Waiting: Idle time spent waiting for the next event/activity/process to occur.”	How many seated patients and standing patients can be accommodated in the waiting rooms?
	Is there more than one waiting room/area?
	How long does a patient take in the ARV Clinic (From the moment they come in to exit)?
	How long is the average patient waiting time in between queues?
	Have there been instances of patient spill-over to the next day? Next week? If so why?
	Is there an appointment system in place?
	Are patients seen in accordance with the appointment system?

	Do the patients who come for repeat prescriptions get their vitals taken? (Only relevant to Clinics that have high Patient Flow!)
<i>The Waste of Unnecessary Motions</i> “Unnecessary Motions: Movements by staff that is non-productive and unnecessary” (Mostly attributed to poor layout)	Is there a centralized location for printers, fax, copiers that the staff must walk to?
	Are there clear and visible visual labelling systems to direct patient flow
	Do the doctors or nurses have to come out to call patient names?
	Do the staff nurses/ doctors accompany patient to different wards/ to the pharmacy?
	Do nurses, doctors and staff have to search for medical supplies/equipment when they need to perform a procedure?
	Are medical supplies (swabs, bandages) well labelled and is everything stored in its place?
	Are pharmaceutical drugs well labelled and is everything stored in its place?
<i>The Waste of Transporting</i> “Transportation: Unnecessarily moving specimens, materials and even patients in the clinics.”	Is there approval process in the event the patient needs to be sent for a procedure (e.g. X-Ray, CT Scan)? If so, what?
	What are the steps that the patient and doctor need to follow when specialist treatment is required?
	Are the staff required to walk long distances (another office/building) to get approval signatures?
	Is there excess movement in the patient journey (back and forth unnecessarily)?
	Is the pharmacy in a different building?
	Is the phlebotomist located in a different building?
	What is the patients exiting procedure? Do patients have to return from pharmacy or OPD to return files?
	Are the number of approval signature required to perform certain operations/tasks excessive e.g. ordering stationery for clerk?

<i>The Waste of Over processing (or inappropriate Processing)</i> “Over processing: Performing tasks that add no value to the patient OR Performing tasks that are not aligned with patients’ needs”	How is patient data recorded by staff member e.g. Does nurse record on patient file? Capture data on a computer system? Both?
	Is there is an IT system in place? If yes, does it perform the function it was created for?
	Is there a data capturer? If so how many? What data is captured? How does data capturer acquire the patient files and return them to the clerk?
	Is there duplication of patient files (same patient with more than one file)? If so then why?
<i>The Waste of Unnecessary Inventory</i> “Unnecessary Inventory: Improper inventory control or excess ordering of materials such as medications and medical supplies.”	Are there patient files and administrative documents that are awaiting to be processed? E.g Files that have been batched (If so why)?
	What is the ordering procedure for supplies? Have they been delays in receiving supplies? If so then, are steps put in place?
	Is there a stock management system in place and how well does it work?
	Have there been instances whereby expired medication must be disposed of?
	Is there a file room? How many files rooms are in the Clinic? Are file rooms packed to capacity/ overflowing?
	What is filing procedure’s once file patient file has been returned?
	Are lost-to-follow patient files kept with regular patient files? Please explain the procedure for lost-to-follow? How long do these files need to be kept?
	Are deceased patient files kept with regular patient files? Please explain the procedure for deceased patient files? How long do these files need to be kept?
	Is there an archive room? When are patient files taken to archive? Moreover, what procedure must be followed for files to be sent to the archive?
	Is the file room exclusively used to store patient files?
<i>The Waste of Defects</i>	Are patient files stored in any other room in the ARV Clinic other than the file room/rooms?
	Is there medical equipment in consulting room e.g. otoscope, needles that do perform their function because of quality or defectiveness?
	Is there IT equipment in consulting room and offices e.g. printers, computers that do perform their function because of quality or defectiveness?

“Defects: Time spent doing something incorrectly; inspecting or fixing errors is time that could be spent on more valuable activities.”	Have they been instances where incorrect data has been printed/recorded on patient files e.g. name, ID number?
	Are there instances where patients have been falsely diagnosed (more often than reasonable)?
	Have there been mistakes whereby incorrect prescriptions have been issued?
	Do patients get referred to another Clinic/Hospital? If so how often and for what reason?
<i>The Waste of Untapped Human Potential</i> “Untapped Human Potential: Due to lack of involvement and accountability of improvement processes by staff and physicians. This requires a culture of trust and mutual respect by example, interest and involvement.”	Do staff attend workshops? If so how is the message communicated e.g. email, text, WhatsApp?
	How are the workshops scheduled? Moreover, do all staff attend?
	Are the staff Tapped for input/ideas?
	Are the staff sent for training to expand on job specific skill-set in a reasonable time frame?
	Is the staff trained for new implementations/projects/systems introduced?
	Are there job breakdown sheets for administrative operations?
	Is there good staff morale?
	Does a Gemba walk take place? If so how often? (Involvement by management by walking through and seeing what’s going on in the ARV Clinics: <i>receiving and providing feedback</i>)

3.3. Processing of Qualitative Data

The primary data (transcripts of the interviews, notes made during the direction observations) and the secondary data collected has been coded thematically using NVivo 11 Software. The interviews have been transcribed verbatim by the researcher, the rationale for not employing a transcriber was to aid the researcher in interpreting the data by developing intimacy with the transcript.

NVivo software is hereafter used to thematically code the primary and secondary data to compare the case studies to reveal similarities and differences that account for the type of waste that is present within the clinics and the drivers of the impact of the waste. Figure 7 displays a screenshot of the analysis in NVivo illustrating the a-priori and emergent coding employed by the researcher. These emergent codes are then summarised in the case study reports as part of the analysis and results to describe the phenomenon of waste (non-value adding activities) present within the context of South African ARV Clinics.

Data is coded under different 'themes' known as nodes

Name	Sources	References
Lean In Healthcare	7	13
SA Health System	1	1
Waste	3	3
Waste - Lack of System Ap	6	15
Waste - Management Struc	4	13
Waste - No Purpose	1	1
Waste - Overprocessing	1	4
Waste - PDCA	3	8
Waste - Targets	1	1
Waste of waiting	2	2
Waste- Transportation	1	2
Waste -Untapped Human P	5	12
Waste- Waiting	1	2
Waste-Defects	2	2
Waste - Clinic A	2	3
Waste - Clinic B	1	1
Waste - Clinic C	1	1

Each individual code can be analysed and viewed.

Incorporating all sources of data selected by researcher – primary and secondary

Summary

Reference

PDF

Figure 7: Thematic Analysis - NVivo Screenshot

3.4.Data Validity and Verification

Qualitative research requires that data be examined and interpreted to gain meaningful understanding, to acquire knowledge and allow for the emergence of 'themes' (113). To perform the analysis, the researcher followed a procedure which entailed:

- i. Finding, selecting, appraising (making sense of) and synthesising data from various texts (journals, SAHR, books, external media) – this forms the literature review section.
- ii. In corroboration the researcher used other qualitative research methods such as interviews and observations as a means of triangulation, 'the combination of methodologies in the study of the same phenomenon' (114).

Through triangulation, the researcher attempts to offer 'a confluence of evidence that breeds credibility' (115). The researcher drew upon multiple sources of evidence to seek convergence and validation of data collected from different documents (texts) and methods, consequently reducing the impact of potential biases (that could have arisen by only evaluating single study or method).

The mindfulness of personal bias assisted the researcher in constructing the context for the analysis of primary data, by acknowledging the works of others and own experiences' in the pursuit of the research question. The research question was formulated by adopting analytical construct based on available literature and prior knowledge about the context of selected documents, as illustrated in the loop shown in the figure below. (116)

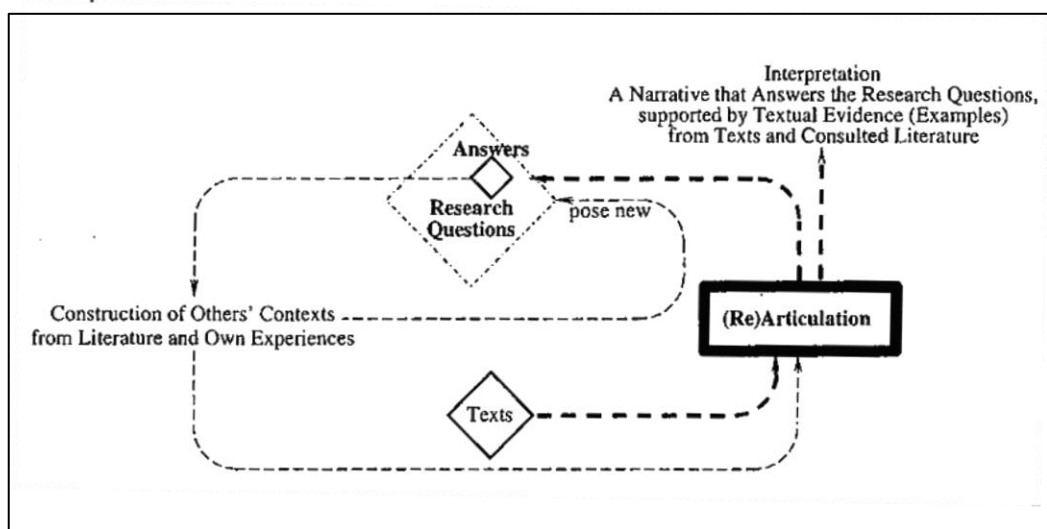


Figure 8: Framework for Qualitative Analysis (116)

4. CASE STUDY - ANALYSIS AND RESULTS

4.1.Overview of Case Study

Table 4 below provides an overview of the ARV Clinics where case studies were conducted. The researcher conducted interviews with most of the clinic staff who are involved in the daily running operations in the clinics. Two sets of interviews were conducted. The first round of semi-structured interviews took approximately one hour per person. All these interviews were one-on-one interviews except for one, that was a group interview (interview with nurses at Clinic B). The second set of interviews were conducted a month after the initial interviews, to allow the researcher time to reflect on data collected and to develop follow up question to fill in the gaps in knowledge. The interviews were transcribed and analysis was conducted using NVivo 11 software. The transcription of these interviews can be found in APPENDIX B.

Case Study 1 was conducted at Clinic A, in Mpumalanga, the clinic has 3 units: an ARV Unit, Mother to Child Unit and an In-Patient Unit. The scope of the study was confined to the ARV unit. Clinic A is a public clinic they receive an enormous contribution of their funding from the non-profit organisation. For specialist treatment patients are referred to Temba Clinic in Tshwane, Gauteng.

Case Study 2 was conducted at Clinic B, at Hospital B, Mpumalanga. For specialist treatment patients are referred to Temba Clinic in Tshwane, Gauteng.

Case Study 3 was conducted at Clinic C, at Hospital C in Mpumalanga. Hospital C is a state hospital with practical training facilities for medical internship students. Clinic C provides care to the more severe cases and issues down referrals of patients to other clinics, once patients are stable (through monitoring of CD4 count and viral load)

Table 4: Overview of case studies

	Clinic A	Clinic B	Clinic C
Number of Doctors	1	1	1 (+ 1 intern)
Number of Nurses	3	3	7
Number of Clerks	3	1	1
Number of Data Capturer	3	1	3
Number of interviews	8	12	10
Direct Observations	Yes	Yes	Yes
Average number of patients seen daily	70	50	15

4.2. Clinic A

4.2.1. General Flows at Clinic A

An in-depth evaluation of all the processes that are involved in providing care to the patients at Clinic A have been identified to understand and visualize the patients journey. A high-level flowchart has been mapped, that provides a systems perspective, linking work and information flow by showing different processes involved from the viewpoint of the patient and the clinical staff. By visualising the current state, the researcher was then able to perform an analysis to determine: existing problems and issues, identify shortfalls and process breakdowns and opportunities for improvement. To provide an accurate picture of the current state the researcher gathered information from all the front-line staff, who are responsible and the most knowledgeable about the daily activities of Clinic A. Direct observations were also made to corroborate the statements made by the clinical staff regarding their activities. In areas where there were inconsistencies, the researcher used direct observations

Clinic A is located in a farming town, access to the clinic is difficult especially during the rainy season, as the road that leads up to it is a dirt road. There is public transport in the form of taxis available for patients to use to get to the clinic. However, this is restrictive as there are only a limited number of taxis that bring patients to and from the clinic. The taxis usually bring the patients in early in the morning by 7:00 a.m. and collect patients from 2:00p.m onward. The patients must align themselves to meet the schedule of the taxis if not – they could miss their appointments in the morning when coming in and when leaving in the afternoon may have to hitch-hike if they miss the last taxi of the day.

Clinic A opens from Monday to Friday and its operating hours range from 7:30a.m. – 3:30p.m. The clinic receives about 70 patients in a day, they experience higher flow of patients, in the morning. There are 3 major patient flows i.e. the patients that come in: to collect a script, to see the nurse and to see the doctor. Majority of the patients have appointments and are repeat patients, there are few walk- ins that may have missed their appointments. There are also patients who are coming in for the very first time and these are split into two the ones that: have referral letters (this is because the patient may have moved from another location or is now stable so has been referred down by the district hospital) and those that do not have the referral letters. The discretion as to open a patient file for a patient without a referral letter is left to the doctor once she/he has examined the patient.

The patients arrive either to collect a script (these patients can go straight to the pharmacy) or for a check-up (these patients are required to have their vitals taken before consultation). Once vitals have been taken the patient is seen by nurse, who may then decide to refer them to be seen by the doctor, if the doctor is unable to treat the patient i.e. if the patient may need admission he/she is referred to Temba hospital. The doctor is the prime decision maker he/she gets to decide if the patient needs further hospital care, or can the patient safely be discharged after treatment? Clinic A is a standalone outpatient clinic and does not have the resources to admit a patient.

If it is not a critical case the doctor or the nurse issues a script - the patient, then collects the script from the pharmacy which is located in the same compound as Clinic A and returns the file to the exit clerk who provides the patient with the date of next appointment. At Clinic A there are 2 clerks:

Clerk A (arrival) – retrieves patients files when the patient comes into the clinic. She also takes files to and collects files from data capturers office once data is capture and refiles them in the file room (approximately every 2 hours).

Clerk E (exit) – collects files from the patient when the patient exits the clinic

The patient files are batched and taken to the data capturer's office every 2 hours to be captured on the IT system (Therapy Edge), by either one of the clerks.

The process flow of Clinic A can be seen in Figure 9

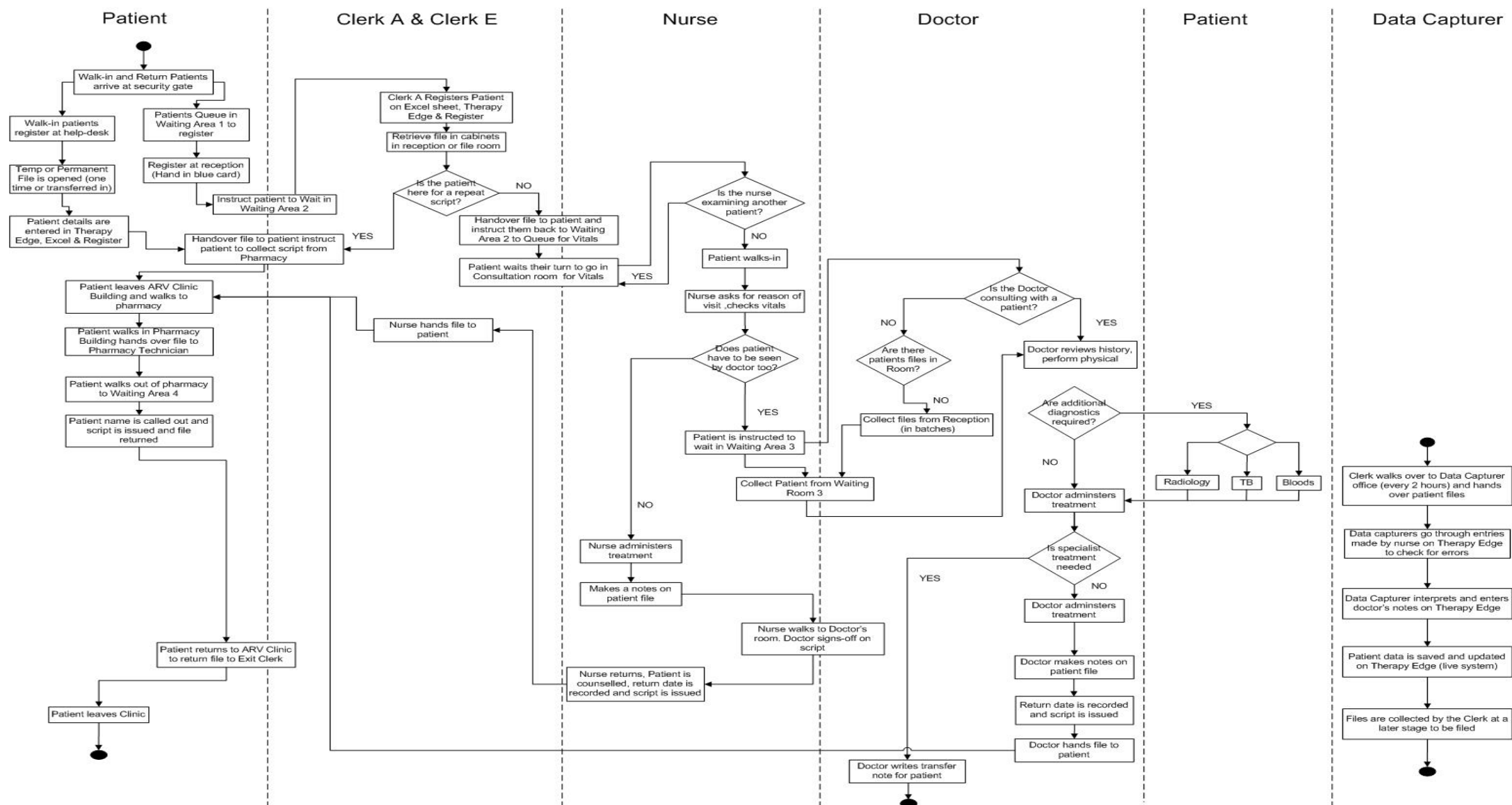


Figure 9 : Process Flow – Clinic A

4.2.2. Layout

Figure 10 displays the current layout of clinic A with the spaghetti diagram focusing on the ARV clinic. The spaghetti diagram is used to highlight the wasted journeys and effort of the patient and clinical staff. Different colours have been used to show the movements of: patient (blue), doctor (red), nurse (yellow) and clerk (green). Movements by the data capturers are not drawn as the data capturers sit in their office and the files that need to be captured are brought to them. Movements of the clinic manager are also not recorded as the researcher was unable to interview or meet the clinic manager. A higher volume of the lines indicates excessive back and forth motion. Figure 10 demonstrates that there is excessive motion that is being experienced by the: patient, doctor, the nurses and the clerk.

The patient's movements result from motion involved in – arriving at the clinic, collecting the file, taking vitals, consulting with the nurse and or doctor, collecting scripts, returning the file.

The doctor's movements result from motion involved in: moving to and from different departments, collecting patients from waiting areas, printing and collecting patient files from the reception.

The nurses' movements result from motion involved in: consulting with the doctor about a patient and getting the doctor to sign off on patient scripts.

The clerks' movements result from motion involved in: collecting and returning patient files from file rooms and the data capturers office the frequency of this motion is high as the clerk retrieves the files one at a time.

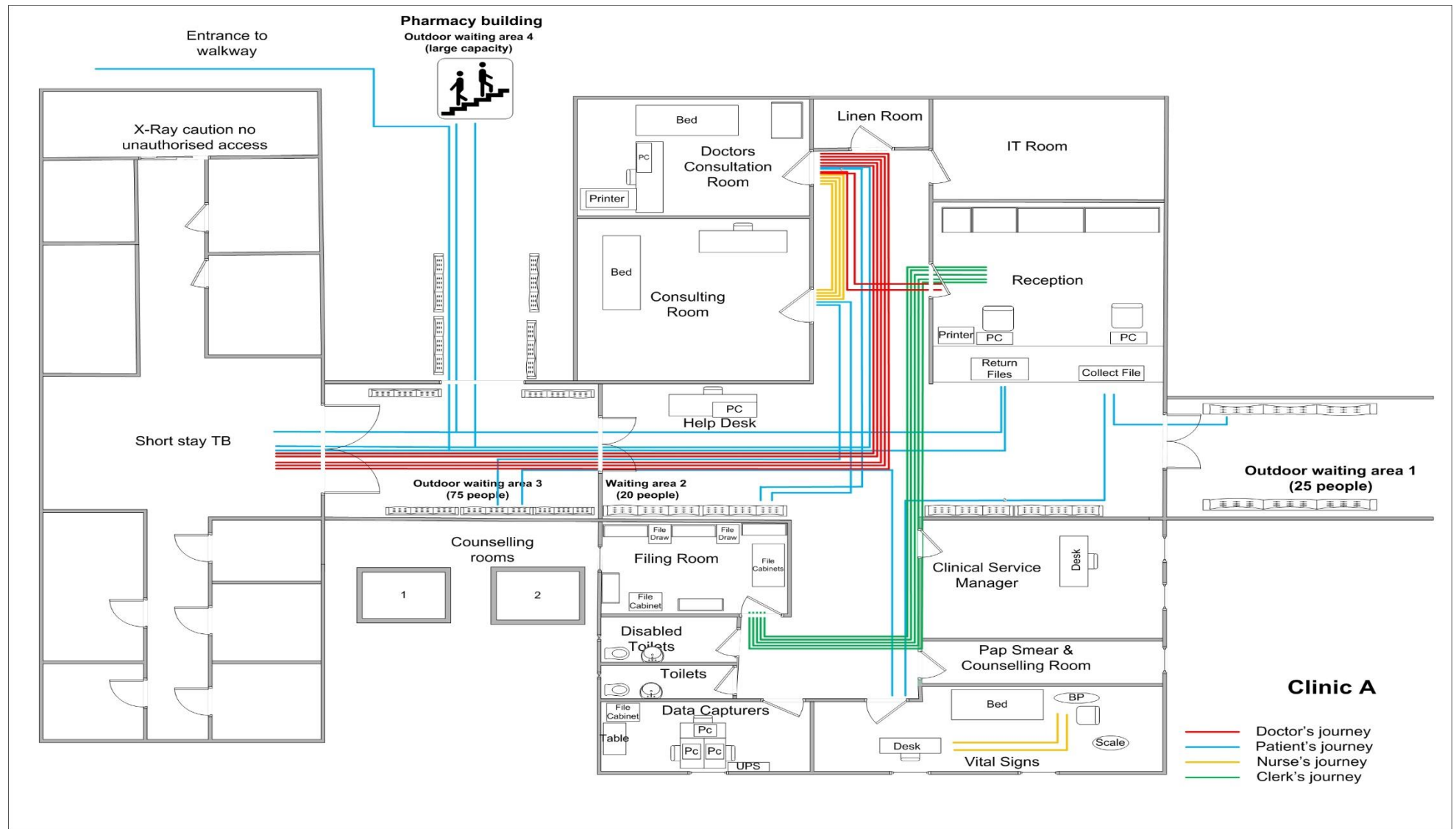


Figure 10: Current Layout - Clinic A

4.2.3. Waste Breakdown

Table 5 lists the occurrences of waste and their resultant impact; these have been extracted based on the responses obtained from the semi-structured interviews as well as direct observations made at Clinic A. The entries with asterisk symbols indicate instances whereby there was a discrepancy in what was observed and the responses obtained. Direct observation entries have been recorded in these cases as they portray a more accurate description of the daily workings of the ARV clinic. Possible reasons for the discrepancies are expanded on in the section that follows (4.2.5 *Evaluating Drivers of Waste*). Not all clinical staff participated in the interviews, mostly because they were too busy (interviews were conducted during normal working hours of a shift) and in some cases, consent was not provided. The staff that were interviewed included the: doctor, clerks and data capturers. The staff that were not interviewed included: the clinical manager and the nurses.

Table 5: Waste Breakdown – Clinic A

Waste	Occurrence	Impact
Waste of Overproduction/Underproduction	-	-
Waste of Waiting	Patient queues: to receive files, queues to take vitals and see nurse, queues to see doctor, queues for additional diagnostics(X-Ray), queues at pharmacy	Increase in time spent by the patient in clinic
	Patients can wait for up to 2 months to see external specialists	Poor service delivery to patient
	Doctor waiting to receive blood results (sent to the laboratory at Hospital C)	Patient has to come back for diagnosis on a separate day
Waste of Unnecessary Motions	Clerk walking to file room to collect patient files	Increase in time spent by the patient in clinic
	Clerk walking to file room to file back patient files	Unnecessary strain on clerk
	Clerk walking to data capturer room to hand in files to be captured and retrieve files	Unnecessary strain on clerk
	Doctor walking to reception to collect patient files	Increase in time spent by the patient in the clinic. Unnecessary strain on doctor

	Doctor walking to waiting areas to call patients*	Increase in time spent by the patient in the clinic. Unnecessary strain on doctor
	Doctor walking to reception to print*	Increase in time spent by the patient in the clinic. Unnecessary strain on doctor
	Doctor walking to short-stay and mother to child unit	Increase in time spent by the patient in the clinic. Unnecessary strain on doctor
	Patients walking up steep stairway to access pharmacy	Patients walking around structural layout
	Patients walking from ARV Clinic to short stay for diagnostic procedure and back again to ARV	Increase in time spent by the patient in clinic
Waste of Transporting	Bloods sent to laboratory at Hospital C	Patient has to come back for treatment on a separate day
	Movement of patient file from clerk – data capturer – clerk – file room	Increased risk of file damage or loss
Waste of Over processing (or inappropriate Processing)	Nurse records patient data on patient file and IT system (Therapy Edge)	Time wasted that could be used to see the next patient
	Multiple audits: by data capturer and doctor	Time taken from other administrative tasks
Waste of Unnecessary Inventory	-	-
Waste of Defects	Patient sent to Temba (Tshwane) when doctor is away	Failure demand
	Patients leaving on rainy/cold days	Patient has to come back for treatment on a separate day
	Patients at risk of hospital acquired infection (TB and HIV waiting are in the same)	Poor service delivery to patient
	Incorrect script entry	Poor service delivery to patient and rework
	UPS in data capturer room not functional	Information loss and rework
	IT system down for multiple days at a time	Data capturers overburdened when system comes back on
	Cardboard holder and that hold patient files the patient files tearing	
	Incorrect TB diagnostics	Poor service delivery to patient
Waste of Untapped Human Potential	-	-

4.2.4. Cause and Effect Diagram

Cause and effect diagrams (sometimes called fishbone diagrams or Ishikawa diagrams) are one of the basic Total Quality tools. These tools are very applicable in healthcare and are used to fully understand an issue and to identify possible causes (help identify root cause). The cause and effect diagram was constructed by putting the 'effect', which is the problem at the head of the fishbone. In the study this was identified as poor quality of care delivered to patients at Clinic A.

Through interviews and brainstorming with the front-line staff the fishbone diagram was created (this was done with an open mind so as to work as a team to discuss what each process is doing). The 6M's mnemonic has been traditionally used to categorise fishbone diagrams in the production environments or 6P's in office environment. However, for healthcare these categories have been adapted by several authors to include the patient, clinical staff and the different departments responsible for delivery of the service to the patient (e.g. lab) (69) (117) (118) (119). When Kaoru Ishikawa developed the cause-and-effect diagram, he stated:

“Cause-and-effect diagrams are drawn to clearly illustrate the various causes affecting product quality by sorting out and relating the causes. Therefore, a good cause-and-effect diagram is one that fits the purpose, and there is no one definite form.” (120)

To display the factors that involved in poor quality of care to patient the researcher used the categories: Patient, Doctor, Nurse, Clinical manager, Clerk, Data Capturer, IT department as shown in Figure 11. The researcher chose to specifically use these categories because she wanted:

- i. To help each team member (clinical staff) understand how each one of them contribute to the effect and that there are many causes linked that result in poor quality of care to the patient.
- ii. To enable the ease of use and construction of the cause and effect diagram without having to teach and introduce new terms.
- iii. To graphically displays the relationship of the causes to the effect and to each other - to identify areas for improvement (69) (117) (118) (119)

The slanted lines that extend from the categories to the backbone are considered as main groupings of causes. Determining the causes was accomplished by asking “Why?” until a level

of detail that can be measured was reached. The cause and effect diagram provided a way to see all the problems in Clinic A at a glance.

The fishbone diagram was a great tool for collecting, categorizing and root-causing feedback from staff. In addition, it helped to provide an understanding of the root cause of the problem, by identifying root causes at Clinic A, the researcher was then able to design and recommend suitable solutions that would allow for the correction of the problems. This is essential in preventing problems from reoccurring within Clinic A, B and C and it ultimately improves the overall processes that are involved in delivery of the service to the patient, as well as improving the quality of care.

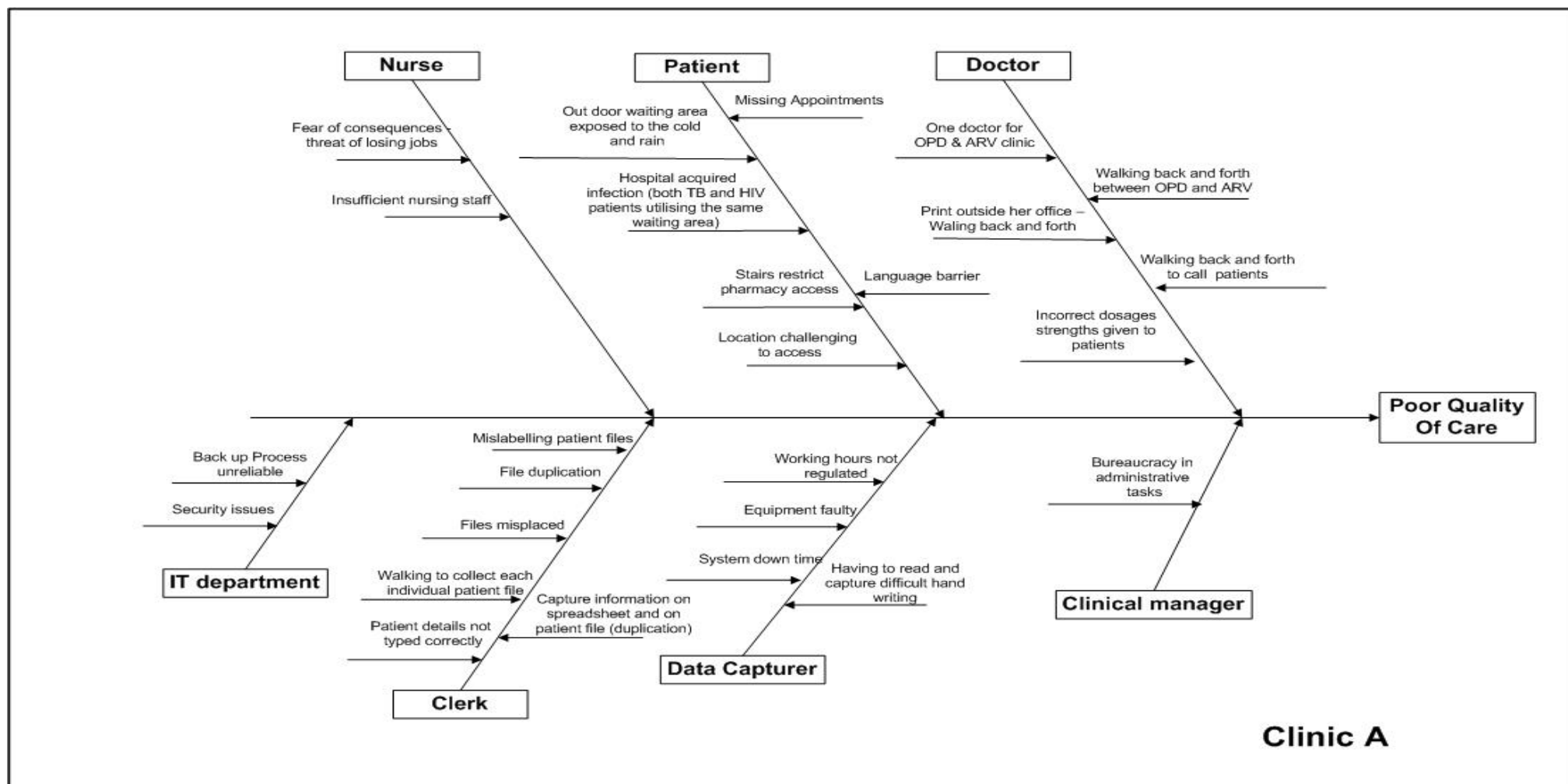


Figure 11: Cause and Effect Diagram - Clinic A

4.2.5. Evaluating Drivers of Waste

4.2.5.1. *Poor Layout and method of design*

The main causes of the waste of unnecessary motion at Clinic A was attributed to poor layout and method of design of processes. The time consumed by unnecessary motions can be used more productively i.e. time lost that could be used to treat patient and perform administrative functions (20). This can end up creating a negative experience for the patient. In addition, excess motion by staff leads to fatigue, which can cause some of the defects that are mentioned in Table 5. At the clinic, the waste of motion was identified as the most serious waste due to the increased frequency of its occurrence. From the interviews, it was assessed that all the clinical staff do not recognize this as a waste, the assumption that is often made is that motion is a part of their daily jobs.

Although the amount of unnecessary motion by the patient and clinical staff is over small distances in the clinic, these small motions add up, increasing the cycle time (patient journey). A new layout has been proposed in Figure 12. The proposed layout is used to demonstrate how the rearrangement of the facility can drastically reduce unnecessary motion and improve resource utilization. From the Figure 12, it can be observed that:

- i. By doing away with IT room (reason expanded on in the section 4.2.5.2 *Functional Evaluation*) and breaking down the wall separating it from reception, space can be created. The available space can be used to introduce tall shelf racks that make better use of space and hold more files than the wide drawers that are currently in place. This does away with the file room and unnecessary motion by the clerk who goes to retrieve a single file from the file room each time a patient comes into the clinic (refer to APPENDIX D for the standard procedure of clerk obtained at the clinic). It also helps to save the patient and clerk's time, as the registration process flows better.

(Note: Due to high patient volumes loss of time over the day accumulates – waste of time lost amplified)

- ii. Relocating the data capturer's room opposite the reception area and creating an opening/window for file drop-off eliminates the motion of the clerk walking to the data capturer office to drop-off files that need to be captured. This also frees up the exit clerk, who can be allocated to perform the function of a data capturer (the clerks are trained to used Therapy Edge - Computer system, used to capture patient data)

- iii. Helpdesk clerk (who opens only new patient files) can now be housed in the reception area that was occupied by exit clerk previously. This helps reduce confusion by patients who are coming into the clinic for the first time.
- iv. Relocating all the nurses' consultation rooms to the bottom block of the clinic utilizes the U-shaped layout to create better patient flow.
- v. Permanently relocating the doctors' consultation room to Short stay (there are available consultation room, in short-stay that can be used; most diagnostic procedures are performed in Short stay) eliminates unnecessary motions back and forth by the patient & doctor.
- vi. The creation of a buffer in front of the doctor's consultation room can be used to direct patient flow i.e. as a patient exit the next enters. In addition, it is proposed that patients should be allowed to hold on to their files as they progress to see the doctor. This should take away the need for the doctor to have to go collect files and come out to call patient names. This creates better patient flow, eliminates unnecessary motion by both the doctor and patient and frees up time that can be used more productively to see more patients.

The doctor coming out to call patients presents additional problems, from observations it was noted that there were instances where patient wondered off in the facility and sometimes left. The doctor would come to call the patient because she would have collected the patient files, not knowing that the patient had left. This was one of the entries whereby a discrepancy was noted. When asked about motions the doctor had commented:

“The guys who came in to assist with the issues had said we don't pay you to walk we pay you to work... we have a system in place to reduce amount of walking where patient exiting calls the next patient meaning that less time wasted by walking patient to the door then requesting the next patient to come in.”

At some stage, within the past year, the clinic had an external consultant come in to make improvements. There was an overall sense of unease exhibited by the clinical staff during the visit; the clinical manager asked if they were in trouble on arrival. The staff felt that the researcher was there to catch them doing something wrong and perhaps this was why the manager and nurses did not want to be interviewed. However, this was not the purpose of the study, in line with Deming's '94/6 rule' (that 94% of the problems lie with the process or system, only 6% with the people) it was evaluated that the layout was indeed the problem.

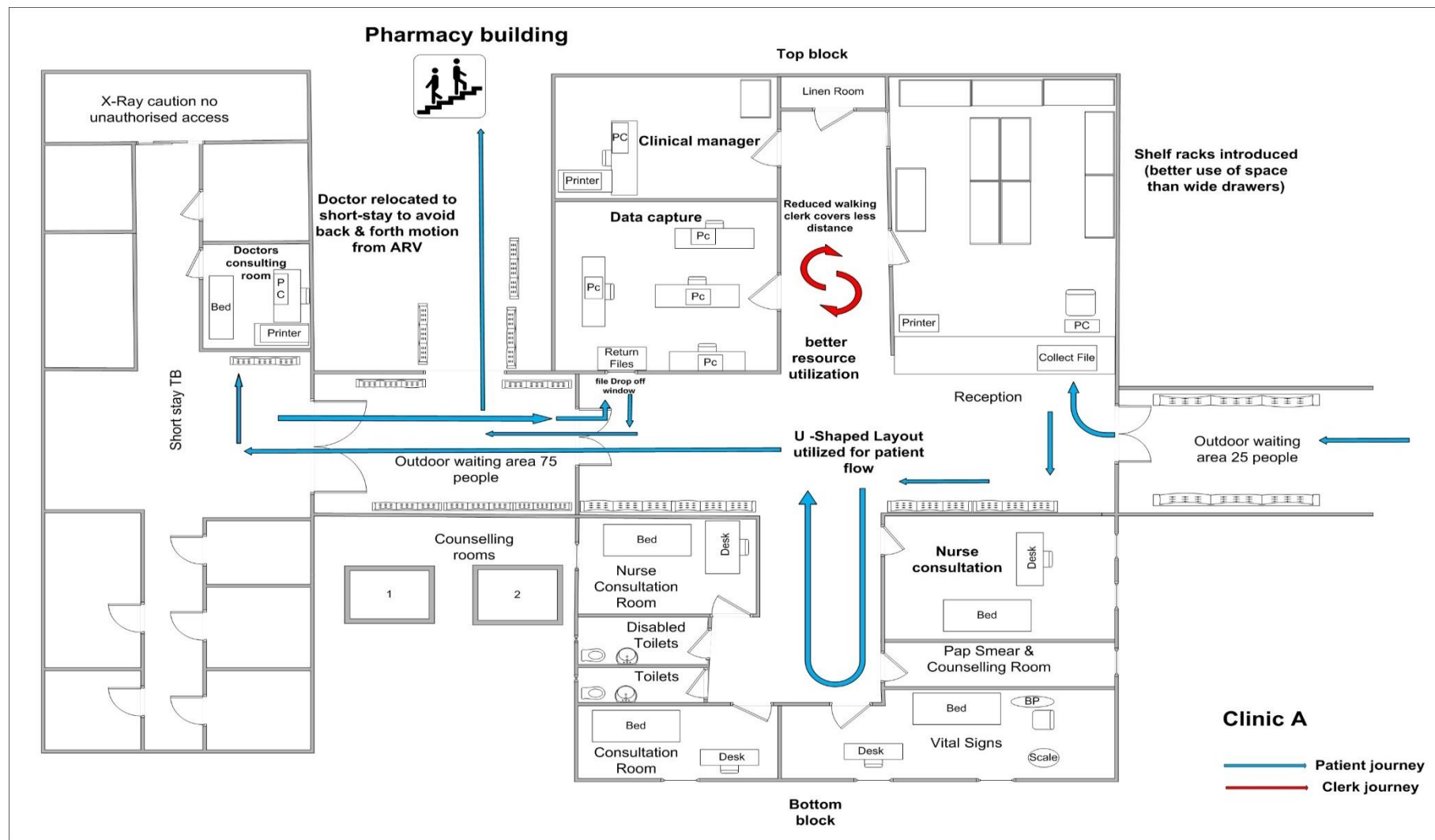


Figure 12: Proposed Layout - Clinic A

4.2.5.2. Functional Evaluation

If the purpose of the IT system is to facilitate a live interface, then, in analysis of the process flow, it was observed that this purpose is not met. There are delays in entry of data capturer, as the doctor does not have enough time to make entries on therapy edge by constantly logging-in and logging-out off Therapy Edge in the different locations (ARV Clinic and Short stay; this also possess a security threat, in the past the doctor had forgotten to log-out as and as a result documents were printed from her account log-in). The files are then batched once they have been returned to the reception and taken to the data capturer.

In essence the system is not live. Other than the fact that patient history was accessible throughout the country through the Therapy edge interface, there were no other benefits noted. When investigated it was observed that the system presented a significantly higher number of drawback namely:

- i. It poses a high security threat
- ii. System volatility due to poor internet infrastructure due to the geographical location of the Clinic A.
- iii. Lack of reliability regarding back-ups.
- iv. Results in Defects – rework by data-capturers in the event of a power outage and inaccessibility to the system (data entry, which causes a backlog for up to 2 days) when internet connection was lost.

The IT room houses networking equipment that it is costly, sensitive and requires an air-conditioned environment for optimal functionality. It was deduced that the IT technician at Clinic A deals with software related problems only; since the data capturer had reported the breakdown of UPS over the past year and to-date this has not been addressed. The researcher belief was that there was no need for a live system as it was not performing its function and was causing the waste of waiting and defects. The researcher proposes that Clinic A should consider running their domain on an offline system, that synchronises and updates at scheduled times during the day. This would allow the data capturers to continue working independently of whether there is a connection or not.

4.2.5.3. Redundancy Analysis

A redundancy analysis was conducted to determine the processed that are duplicated by the clinical staff, in doing so non-value adding activities can be eliminated. This would help to eliminate the waste of over-processing in Table 5. To perform the redundancy analysis, the data entry functions carried out by the clerk, nurse and data capturer were identified.

- i. Clerk – enters patient data on Therapy Edge, register and excel sheet
- ii. Nurse – enters patient data on Therapy Edge and patient file (on days of high patient influx nurses record data on patient file only)
- iii. Data Capturer- checks and corrects the entries made by clerk and nurse, and enters doctor's notes (summary) on Therapy edge

The time spent by the clerk and nurse entering patient data on Therapy Edge could be spent on value adding processes i.e. registering the next patient and treating patients respectively. Due to high patient volumes loss of time resulting from over-processing accumulates through the day (waste of time lost is amplified). In addition, over-processing slows down the registration and consultation processes increasing the queue lengths in these areas.

In this section and section 4.2.5.1 *Poor Layout and method of design*, the researcher discussed how time could be saved in operation performed by the clerk. To take it a step a further, the purpose of entering the patient data on a register and excel was investigated. The register and excel sheets were for auditing purposes by the National Department of Health (NDoH). There are a vast number of statistics that get collected at clinics. However the researcher discovered that there was a lack of visibility and oversight of targets being reviewed. Collecting statics in multiple formats (i.e. Excel and register), was considered unnecessary and it is proposed that the clerk record patient data in one format either or Excel or register.

4.2.5.4. Rethinking the Boundaries

There were 3 problems that the researcher could not solve namely:

- i. How to separate queues in waiting area 3, there is a high probability of a patient acquiring opportunistic infections (TB and HIV patients share the same queue –“TB is the most common opportunistic infection associated with HIV and a leading cause of death among people with AIDS” (121)).

- ii. What to do about the patients who leave as a result of the rain and the cold (waiting area 3 is an outdoor waiting area – all patients who want to see the doctor are directed to this area)
- iii. How to make the pharmacy accessible to the elderly and ill who cannot climb the steep staircase.

Much time was spent time to evaluate the current operations with the current layout and process design. Answers did not present themselves within these boundaries, and the researcher concluded that the solution for these waste lies in understanding the value of the right service and rethinking the solution on a clean sheet with no boundaries. The researcher proposes that new capabilities should be systematically be built in the design of the clinic by analysing flow to determine the right configuration and replenishment actions.

4.3.Clinic B – Hospital B

4.3.1. General Flows at Clinic B

A high-level flowchart of Clinic B has been mapped as shown in Figure 13, it provides a systems perspective, linking work and information flow by showing different processes involved from the viewpoint of the patient and the clinical staff. To provide an accurate picture of the current state the researcher gathered information from the front-line staff, at Clinic B. Direct observations were also made to corroborate the statements made by the clinical staff regarding their activities. In areas where there were inconsistencies, the researcher used direct observations

Clinic B is housed within Provincial Hospital B (public hospital) in a town centre. There is ease of access to the clinic as it located nearby main roads. There is public transport in the form of taxis available for patients to use to get to the clinic - this is free flowing throughout the day, regardless of this Clinic B still experiences higher patient flows in the morning hours.

Clinic B opens from Monday to Friday and its operating hours range from 8:00a.m. – 4:00p.m. The clinic receives about 50 patients in a day with are 2 major patient flows i.e. the patients that come in to see the nurse and to see the doctor. When a patient comes in the clinic, he/she reports to the clerk who then retrieves their file and directs the patient to wait in the queue to see a nurse. All patients coming in to the clinic are required to get their vitals taken, even if they are coming in to collect a script unlike at clinic A, where the patient would head straight to the pharmacy to collect their prescription. Once the vitals have been taken depending on the course of treatment and condition of the patient the nurse, may then decide to refer them to be seen by the doctor.

The doctor can then determine the course of treatment and determine if the patient needs to be referred to another department within the Hospital B for further diagnostic treatment e.g. Radiology. If specialist treatment is required, the patient is referred to Pretoria as there are no specialists in the province. The doctor is the prime decision maker he/she gets to decide if the patient needs further diagnostics, specialist care or can the patient safely be discharged after treatment? If it is not a critical case the doctor or nurse will issues a script and provide the patient with their return date. The patient, then collects the script from the pharmacy which is located within Hospital B and returns the file to Clinic B, by placing it in the drop off area located at the reception. The clerk and data capturer share the reception office - to capture the

patient data on to the IT System (Tier 1) the data capturer collects the files from drop off area. If the Clinic is not experiencing heavy patient flows, then the data capturer assists the clerk to refile patient files

Majority of the patients coming in to Clinic B have appointments and are repeat patients, there are few walk- ins that may have missed their appointments. There are also patients who coming in for the very first time and these are split in two as in Clinic A i.e. the ones that: have referral letters (this is because the patient may have moved from another location or is now stable so has been referred down by the district hospital) and those that do not have the referral letters. The discretion as to open a patient file for a patient without a referral letter is left to the doctor once she/he has examined the patient.

The process flow for Clinic B can be seen in Figure 13.

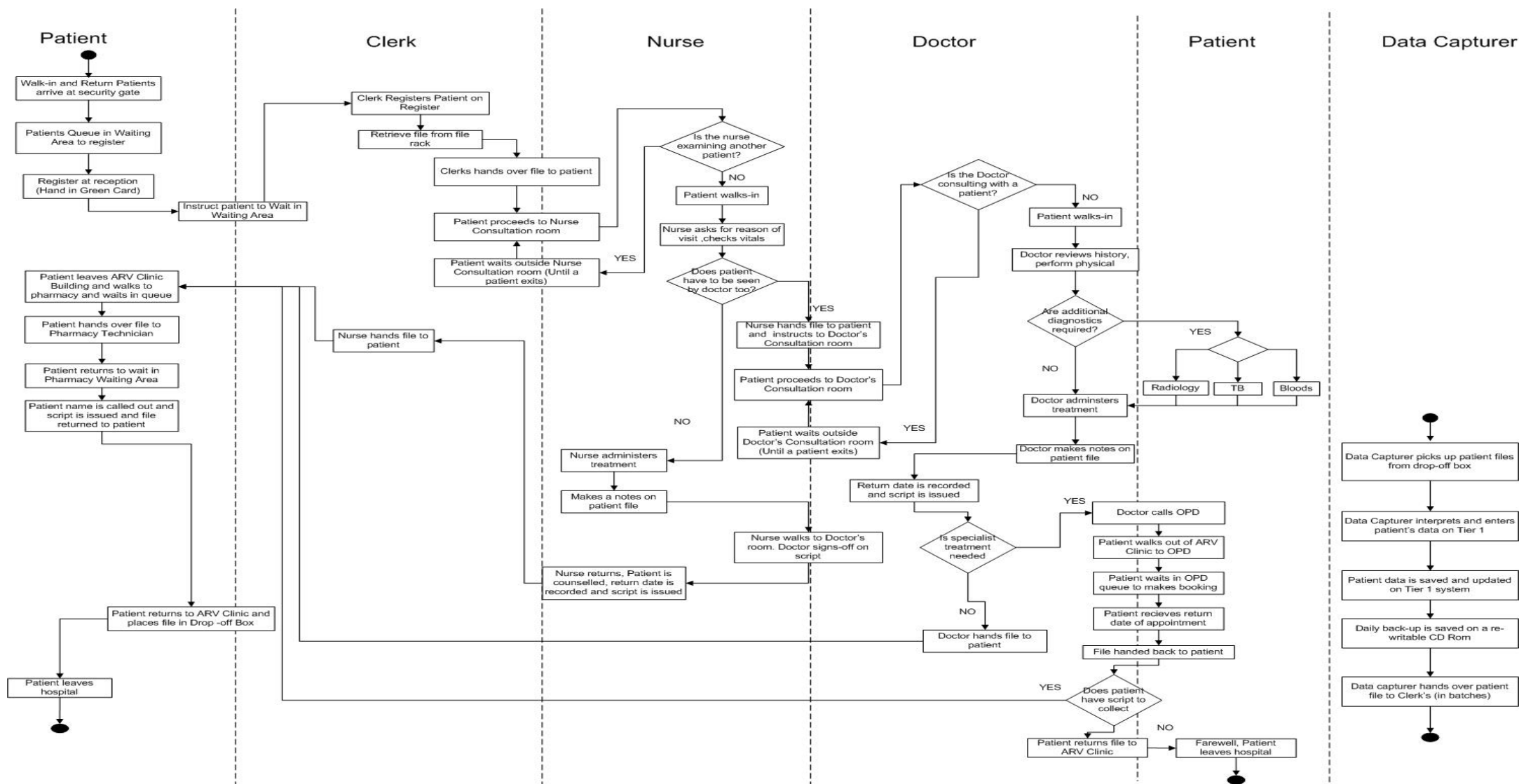


Figure 13: Process Flow - Clinic B

4.3.2. Layout

Figure 14 displays the layout of Clinic B with the spaghetti diagram showing patient and clinical staff flows. The spaghetti diagram is used to highlight the wasted journeys and effort of the patient and clinical staff. Different colours have been used to show the movements of: patient (blue), nurse (yellow), clerk (green) and data capturer (orange). Movements by the doctor is not drawn as the doctor sits in the office, patients that are seen by the doctor are brought to the doctor's office by the nurse – if the doctor is attending to another patient the he/she will have to queue until the doctor is done. Once a patient leaves the next patient then proceeds to the doctor's office. Movements of the clinic manager are also not recorded as the researcher was unable to interview or meet the clinic manager. A higher volume of the lines indicates excessive back and forth motion. Figure 14 demonstrates that there is excessive motion that is being experienced by the: patient and the nurses.

The patient's movements result from motion involved in – arriving at the clinic, collecting the file, taking vitals, consulting with the nurse and or doctor, collecting scripts, going to Out-patient Department (OPD) for any diagnostic procedures that may be required and returning the file to drop off area at Clinic B.

The nurse's movements result from motion involved in: taking patients that require additional diagnostics to OPD, consulting with the doctor about a patient and getting the doctor to sign off on patient scripts.

The clerk's movements result from motion involved in: collecting and returning patient files from file racks within the reception area and walking to and from the management block to get approval to order stationery.

The data capturer's movements result from motion involved in: collecting patient files from drop-off window within reception area.

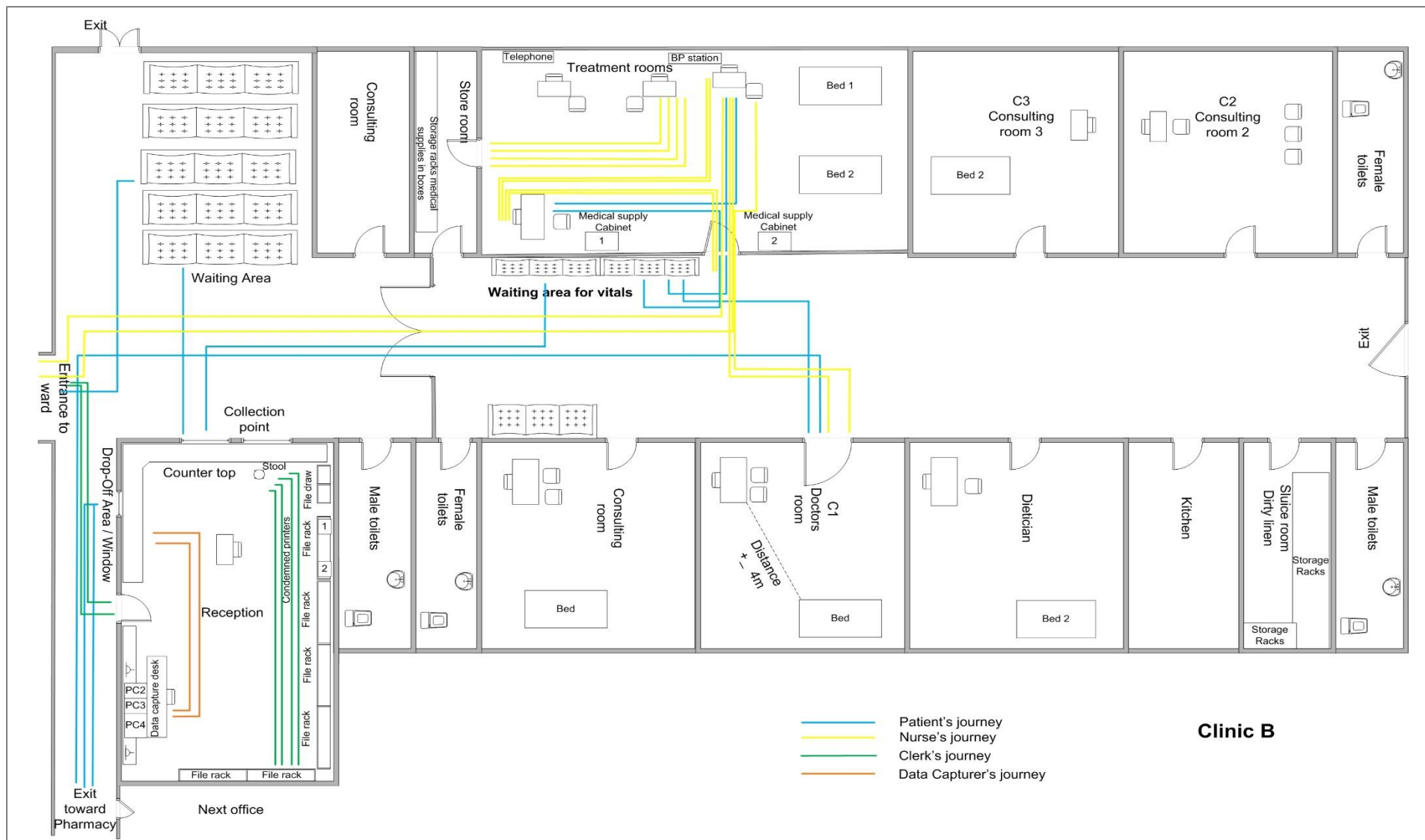


Figure 14: Layout of Clinic B

4.3.3. Waste Breakdown

Table 6 lists the occurrences of waste and their resultant impact; these have been extracted based on the responses obtained from the semi-structured interviews as well as direct observations made at Clinic B. All clinical staff participated in the interviews, except for the clinical manager who was busy with administrative tasks and did not provide consent to be interviewed.

Table 6: Waste Breakdown – Clinic B

Waste	Occurrence	Impact
<i>Waste of Overproduction/Underproduction</i>	-	-
<i>Waste of Waiting</i>	Doctor waiting to see patients who need to see him (patient stuck in vitals queue)	Doctor sitting idle
	Patient can wait for up to 2 months to see specialist in the hospitals	Poor service delivery to patient
<i>Waste of Unnecessary Motions</i>	Nurses walking to laboratory to log onto system and collect results	Waiting times increase for the patient & doctor. Unnecessary strain on nurse
	Nurses walking to management block to print	Waiting times increase for the patient, doctor. Unnecessary strain on nurse
	Clerk walking to management block to print	Waiting times increase for the nurse, patient & doctor. Unnecessary strain on clerk
<i>Waste of Transporting</i>	Blood sample collected by laboratory staff (in hospital)	Necessary Type 1 waste
<i>Waste of Over processing (or inappropriate Processing)</i>	Clerk ordering a 6-month supply of stationery	Mitigate for delays in stationery delivery (delays of up to 6 months)
	Clerk explaining each item on ordering list to manager	Reception area left unattended
	Duplication of patient files	Rework & combining of files once found at a later stage by clerk
<i>Waste of Unnecessary Inventory</i>	Three computers in reception by data capturer & clerk (unused)	Waste of resources

Waste of Defects	Government issue patient cards out-of-stock	Make-shift cards printed on normal paper (these are easily damaged and frequently lost)
	Patients return if Doctor cannot get a hold of Rob Ferreira on the phone for feedback & referral	Poor service delivery to the patient.
	Cardboard holder files tearing and plastic holder often breaking (monthly)	Additional time spent by clerk taping and replacing holders monthly
	Patient records (e.g. blood work), in wrong patient file	Extra time spent by clerk auditing files
	Nurses unable to attend workshop	Gaps in information & knowledge
	Patient returning from pharmacy, to issue new script (script not issued in required format)	Poor service delivery to the patient. Patient journey prolonged
Waste of Untapped Human Potential	Clinical staff not tapped for ideas	Nurses feel under-pressure and sit with their problems. Overall sense of fear

4.3.4. Cause and Effect Diagram

The fishbone diagram was constructed by putting the 'effect'- poor quality of care delivered to patients at Clinic B. Through interviews and brainstorming with the front-line staff the fishbone diagram was created - this was done from a social constructionist stance. Figure 15 displays the fishbone diagram for Clinic B that lists all the reasons for poor quality of care have been categorized in accordance to the clinical staff and the patient. The slanted lines that extend from the categories to the backbone are considered as main groupings of causes. The cause and effect diagram provided a way to see all the problems in Clinic B at a glance.

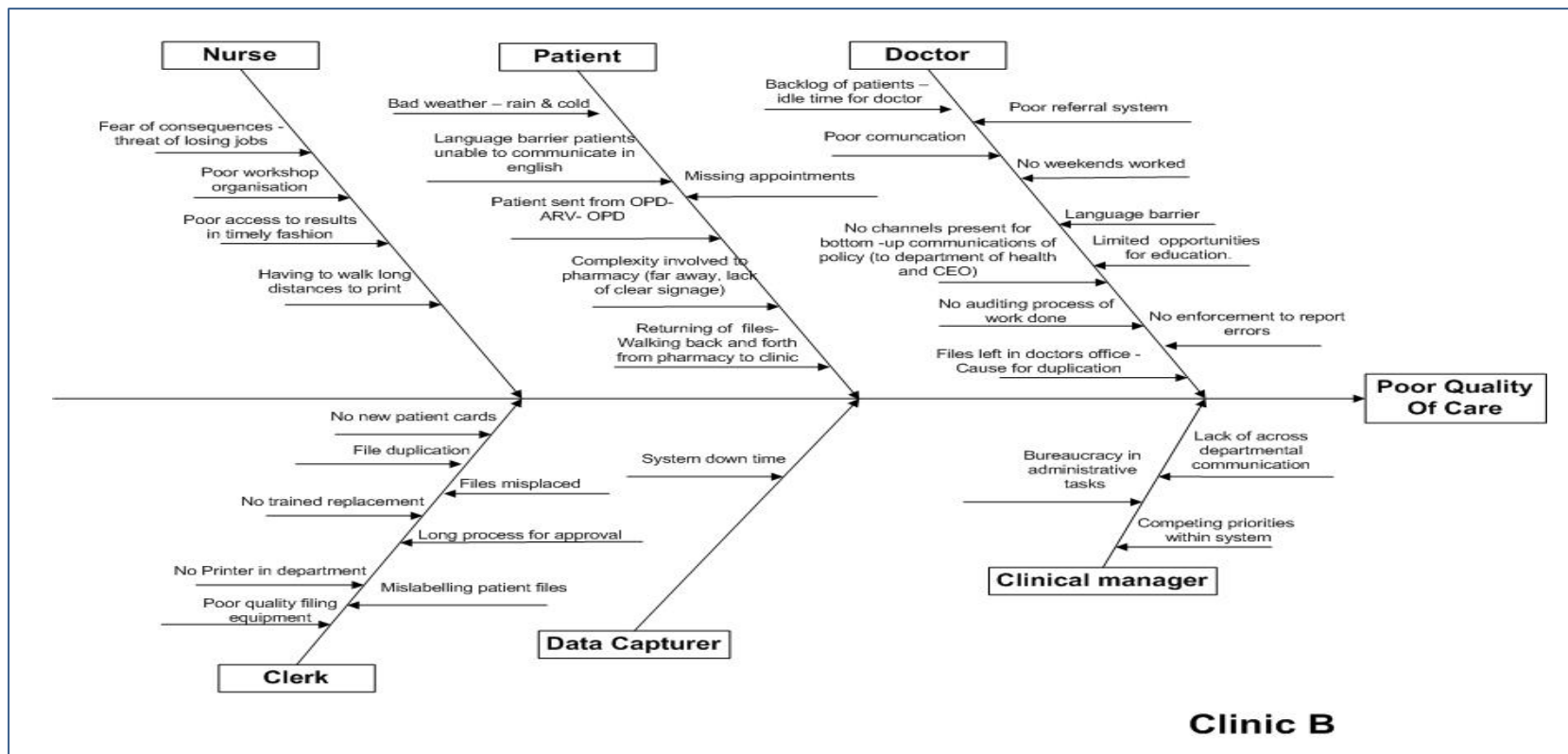


Figure 15: Cause and Effect Diagram - Clinic B

4.3.5. Evaluating Drivers of Waste

4.3.5.1. Talking to the People – Understanding the problem

Clinic B, allowed the researcher to fill in the gaps of knowledge regarding the duties that are performed by the nurse. This came with the realisation that it is not possible to truly understanding the problem (i.e. *RQ: What are the different approaches to Lean Waste Management in selected ARV Clinics in the South African public health sector?*), without the involvement of all the staff members.

In a study like this all levels of staff must be involved from the clerk to the top-ranking administrator. They are people in the ARV clinics who know, about their particular jobs and the problems they face better than anyone else and it is important to incorporate their knowledge.

This helped to provide an in-depth understanding of the process that are performed in the ARV clinic by different staff members and how the different parts fit together to make the whole. The researcher begun to ‘see’ the waste present in the functions performed by the nurses and how this waste affects, the different paths in patient journey. A new waste of over-processing was identified (i.e. the nurses would walk to the doctor’s consultation room so that he could sign-off on the patient script. The nurses would write up the script, however due to legislative regulations, the nurse had to acquire the signature of the doctor. This wass for patients, who are stable and do not need to see the doctor). Whilst the motion by nurses was observed at Clinic A it was never recorded, despite the benefits of direct observation it is impossible to understand current state without speaking to the staff on the ground. The researcher believes that when conducting lean waste management exercises, it is crucial to get the involvement and ‘buy-in’ of the staff at every level across functions and even the different departments to help the researcher and staff see how the complete ‘value stream’ works from end to end, and where the waste is (97).

“You need to create a shared, joint view of what is going on,” said David Ben-Tovim. “This is very important because, for example, in hospitals doctors find it hard to listen to anyone else. If they want to, doctors can stop things from happening. And we need them on board” (122)

4.3.5.2. Giving autonomy to decision makers

Most of the waste of over-processing occurred because decision making was transferred into the hands of those who were either in administrative positions, detached from the daily running operations of the clinic or those who were considered better placed to interpret and act upon referral options (123). Examples at Clinic B were identified in the following processes:

- i. The clerk was required to explain each item on ordering list to manager – while it is accepted that there was a need to have checks in place for inventory control, the approach that was employed added complexity and additional unnecessary steps. If the clerk was provided with the authority to order what was needed and have the ordering list audited at a later stage to have the ordering list audited the additional unnecessary steps could be avoided. (*Note: There was only one clerk at the clinic, not having the clerk at the reception leads to chaos.*)
- ii. The doctor required the approval of radiology department at Hospital C for CT Scan (they do not have the equipment) - if doctors were provided with authority to make decisions over diagnostic tests it would avoid the need to call Hospital C (who do not always pick up calls, as a result the patient must come back). It is proposed that the doctor should issue a referral note and bypassing the approval process. This would help eliminate failure demand and improve service delivery to the patient
- iii. The nurses required, the doctor's signature on all prescriptions – if nurses were provided with the right training and in time, the authority to be able to sign off on patient scripts, it would eliminate not only the waste of over-processing but also unnecessary motions. The nurses would be able to manage some patients directly within primary care thus reducing the demand on the doctor

4.3.5.3. Eradicating fear

There was a natural fear of management by the nurses. The leaders in the ARV clinic (doctor and clinical manager) and hospital leaders (from head of departments to CEO) needed to create a culture of trust to wipe out the fear. The clinical manager at Clinic B was in the same room as the nurses, during the interview (she opted not to participate) and the researcher felt that there was overall sense of fear. The answers provided by the nurses were: short, redirected or remained unanswered. It was also observed that when, one the nurses tried to elaborate on certain points, she was nudged and promptly silenced by the other nurses. If there is any hope

for problems and in turn waste to be uncovered for improvements to be made and sustained, fear must be eradicated.

The nurses fully understood the ‘direction that needed to be presented’ about where the ARV clinic and hospital were heading. They were so afraid to fail, say the wrong thing and possibly be fired, that they could not sufficiently contribute to the interview process. There must be medium ground to emphasize the importance of commitment from clinical staff without creating an environment of fear. In the clinic, fear and anxiety should be removed to instil the trust needed by clinical staff so that they could positively contribute to the lean waste management exercise.

Fear is the enemy of risk and the change ahead that is required for successful lean implementations. (124)

4.3.5.4. Processes not aligned – Horizontal Value streams

The doctor at Clinic B clinic remarked:

“... decreases our effectiveness in the clinic...another example for this is an ultrasound so they might need one urgently but will only be booked for one in two months’ time, for information that you need now. So, the fact is if you need a specialist, there are no specialist in the province. We then have to refer patients to Pretoria and majority of the time we manage patients from advice over the phone, getting the best advice for patients is very important”

In hospitals, like Hospital B (where Clinic B is housed), ‘Disconnects’ like these were common - processes were organised around departmental silos. It was identified that disconnects were compounded by cultures of expertise where specialists operated in separate islands and everything else was invisible to them. Disconnects were almost built in to how the systems of patient care operated. The end-to-end journey of the patient from admission through to discharge was not experienced by anyone else other than the patient and it was no-one’s responsibility and job to manage this journey as a whole.

In Hospital B, value streams flowed horizontally across many departments and even across different hospitals. The value streams were supported by the other activities and support processes that enabled value creating work to flow. It was evaluated that these systems were designed to optimise individual activities rather than the whole. The only way the horizontal

structure could work was if the individual silos worked together to align their processes, so that waste could be eliminated.

4.3.5.5.Implementing triage

The care sequence at Clinic B follows the sequence shown in Figure 13 when the patients come in they have to: register, proceed to have their vitals taken by the nurse, see the doctor if they need to (not all patients coming to the clinic need to see the doctor), collect drugs from pharmacy, return the file back to the ARV clinic and finally depart. The sequence of events caused the waste of waiting for the patient who needed to see the doctor but were stuck waiting in the line with patients who were returning to collect scripts or see the nurse. The doctor was the deciding factor in the progress of the patients' care delivery—the so-called bottleneck and he should have never been without work (125). The problem was amplified on the days that the clinic experienced a high influx of patients, the doctor who is considered as one of the most valuable resources in the clinics would sit idle on these days, while they were patient waiting to see him. The doctor remarked:

“On a quiet day, we see about 15 patients but on busy days we see about 30 patients and some might be complicated cases, so on those days there's a backlog of patients to be seen while I'm sitting waiting here, waiting to see patients. I think the patients that do need to see me, should be doing their vitals and those coming for scripts should be aside”

This raised the question if there was a need to take the vitals for the patients who were coming in to collect scripts. At Clinic A, it was observed that patients who were coming to collect return scripts, collected their files from the clerk and headed straight to the pharmacy to collect medicine. It was investigated why the step of taking vitals was performed for patients coming to collect scripts at Clinic B. “I do understand that when doing these vitals, we pick up things like hypertension so yes that's a positive” said the doctor. By taking vitals of all the patient, the clinical staff monitor the patient's condition to make better decision on course of treatment, thereby improving on the quality of care that is provided to patient.

On further introspection, it was evaluated that it was not possible to perform the step of taking vitals at Clinic A, due to the sheer volumes of patients that they see. The doctor at Clinic A never sat idle, if they performed this step they would have a spill over of patients daily. This was also validated by the doctor's remarks at Clinic B when he pointed out the problem only occurred on busy days.

To find the right balance between eliminating the waste of waiting and maintaining quality of care to the patient, it is proposed that the clinic implement triage at reception. Clinical staff are familiar with triage, it is not a practice that would require to be trained for. Patients who come in the clinic can be asked by the clerk if they need to see the doctor. These patients should be triaged, so that they can have their vitals taken and not have to wait in the same queue as the ones coming in for return scripts. Implementing triage at reception should help speed up the care delivery process, maintain quality of care and allow for better resource utilisation (doctor) (126).

4.3.5.6.Improving visibility and developing mindsets

At Clinic B, the clinical staff were aware of a lot the waste that was present, but the nature of healthcare is such that the staff are busy trying to get by, which is to see the patient and keep clinic operations running. In the public sector, especially it was observed that, when policies are rolled out the ARV staff want to know what is required of them and what metrics will be measured, so that they can be rewarded by being left alone to get on with their jobs. The doctor remarked:

“No there’s nobody from management that’s actively coming down to find out how we are about job satisfaction and what’s being done for the week, there just assumptions that what we are doing is right and that we happy”

This was the classic management by objectives environment, that was obviously not working for them, as staff morale was low. The staff were unsure of how to tackle their problems and there is no visibility or dialogue that takes place with policy makers. Within the clinics, there is visibility in the horizontal value stream, all staff members in the clinic know the sequence of care events, however there was no constructive and proactive dialogue that was taking place with all the staff members from the clerk to the clinical manager. The researcher believes, if there was proactive dialogue taking place, the staff would have eventually thought of implementing triage by the clerk. To help create proactive dialogue, the researcher proposes that the clinic can make use of Figure 16 below.

Key Observation Work Sheet – Fill in each observation - 1 per page and summarize findings on Key Waste Summary Sheet								
Overview								
Waste Observation Number	Process Owner	Person Assigned Task		Standard Work Updated (If Applicable)	All Employees Trained if Applicable	Persons Involved in Solution	Supervisor Sign Off	
Detailed Findings								
Waste Discovered - Enter Text Here					Waste Discovered – Draw picture here			
Enter Cause and Highlight Root Cause					What is a fix you can implement			
Enter Action(s) to be taken, Responsibilities, Due Date and Follow Up Date					After Picture			
Action to Be Taken	Responsibility	Due Date	Follow Up Date	Status				

Figure 16: Waste Observation Sheet (18)

The waste observation sheet was extracted from Protzman et al based on the Toyota's basic tool of the "problem-solving sheet" (19). The document can be placed on a board that is visible and accessible to all staff members. The waste observation sheet was created to help clinical staff solve problems by visualizing thinking at every stage of the plan-do-check-act process. The aim is to allow the clinical staff to formulate their problems more finely, seek the root cause, come up with a smart countermeasure and study the impact of this countermeasures. By putting the thinking on paper, clinical staff make their problems (i.e. waste in the ARV Clinics) visible, so that they can reflect on their own analysis process and improve their reasoning skills about their work problems. The aim of the waste observation sheet is not to teach problem solving rather to make sure that problems get solved and the backlog of problems and ideas are handled. The system created by writing the waste down matters more than the content of the thinking.

The underlying assumption stems from Toyota's organic idea that "if everybody understands their job better in how it connects to customers(patient) and colleagues (clinical staff) by solving problems one by one, the process will perform better". (20)

This would help to create the kind of work environment in Clinic B where the staff have space to think and are encouraged to work more mindfully, paying more attention to every job, even if it's routine, and coming up with more improvement ideas to sustain a dynamic state of improvement, which is the underlying engine of performance. The fundamental idea is to create a visual workplace to encourage thinking, not to pressure people to solve all their problems (39).

4.3.5.7.Collaborative meetings – avoiding separate meetings

To maintain dialogue and visibility, it is important that the 'individual group' weekly meetings that take place amongst the staff at Clinic B should be avoided. E.g. nurses meeting. During the interview, one of the nurses remarked "... we have a meeting every Friday morning, all the nurses in the ARV clinic, the matron does sometimes come and see...". For these meetings to be effective, it is necessary for all the staff in the clinic to be present. In collaboration meetings, they could discuss the comments made in the waste observation sheet in Figure 16 the progress they have made and the challenges that they face in greater depth.

The objective of the meetings would be to share knowledge, choose between different alternatives, and resolve the problems that they face. For example, if the doctor discovers a problem/waste during the week, he can note it down on the waste observation sheet, the other

staff members can start thinking of possible causes, which would end up being the discussion topic for their collaborative meeting on Friday morning. In the meetings, they can write down their improvement ideas, the fix they want to implement and appoint individuals amongst themselves to be responsible for the implementation process. The exercise should help build teamwork and foster a long-term view of continuous improvement. It is recommended that frontline staff should be engaged in all stages of the problem-solving process, this would give the staff ownership of implementations. Which would empower them by providing them the accountability and responsibility for decisions. It also provides them with the sense of making a difference and they are in the best position to make that difference (127) (128) (129) (130).

4.4. Clinic C - Hospital C

4.4.1. General Flows at Clinic C

A high-level flowchart of Clinic C has been mapped as shown in Figure 17, it provides a systems perspective, linking work and information flow by showing different processes involved from the viewpoint of the patient and the clinical staff. To provide an accurate picture of the current state the researcher gathered information from the front-line staff at Clinic C. Direct observations were also made to corroborate the statements made by the clinical staff regarding their activities. In areas where there were inconsistencies, the researcher used direct observations

Clinic C is housed within Provincial Hospital C (State hospital) in a town centre. There is ease of access to the clinic as it is situated in a corner where two main roads cross. There is public transport in the form of taxis available for patients to use to get to the clinic and this is free flowing throughout the day, regardless of this Clinic C still experiences higher patient flows in the morning hours.

Clinic C opens from Monday to Friday and its operating hours range from 8:00a.m. – 4:00p.m. Majority of the patients coming in to Clinic C have appointments and are repeat patients, there are very few walk-ins. There are also patients who come in for the very first time and these are split into two as in Clinic A i.e. the ones that: have referral letters (this is because the patient may have moved from another location or patients who have complicated cases so have been referred to Hospital C) and those that do not have the referral letters. The discretion as to open a patient file or to examine a patient without a referral letter is left to the doctor.

The clinic receives about 15 patients on a normal day—since Hospital C as, they only administer to patients with serious conditions, once patients are stable they are referred down to other clinics. On Wednesdays Clinic C receives approximately 50 patients – these mostly include patients' that are brought in from the state prison. There are 2 major patient flows i.e. the patients that come in to see the nurse and to see the doctor or intern. When a patient comes in to the clinic, he/she reports to the clerk who then retrieves their file and directs the patient to wait in the waiting area. Once the clerk has retrieved the patient file he/she takes the file to the nurse's consultation room. If the nurse is consulting with another patient she will first finish her consultation, then come out to the waiting area to call the patient. All patients coming in to the clinic are required to get their vitals taken, even if they are coming in to collect a script, this

is an important step as all patients coming in to Clinic C, are in serious conditions and therefore it is crucial to monitor their vitals. Once the vitals have been taken depending on the course of treatment and condition of the patient the nurse, may then decide to refer them to be seen by the doctor or the intern. Clinic C was the only clinic that the researcher visited that had an intern - this is because Hospital C is the largest hospital in the district with practical training facilities for medical internship students. However, the intern is not permanently based in Clinic C, he/she shares time between Clinic C and other departments within Hospital C.

The doctor or intern will determine the course of treatment and determine if the patient needs to be referred to another department within the Hospital C for further diagnostic treatment e.g. Radiology. The doctor is the prime decision maker he/she gets to decide if the patient needs further diagnostics, specialist care or can the patient safely be discharged after treatment? If it is not a critical case the intern or doctor will issue a script and provide the patient with their return date. The patient, then collects the script from the pharmacy which is located within Hospital C, the pharmacy will retain the patient file – the patient is free to leave hereafter.

The data capturers at Clinic C collect patient files from the pharmacy every morning. All out-patients files from different departments within the hospital are left at the pharmacy once the patient collects their script – this causes problems, sometimes files from different departments get mixed up (each department has a separate box where the pharmacist places the file after issuing script). The data capturer will then return to Clinic C where he/she will capture the patient data onto the IT system (Tier 1). After capturing the patient data, the data capturer returns the patient files to the clerk who files them away – this is done in batches.

The process flow for Clinic C can be seen in Figure 17.

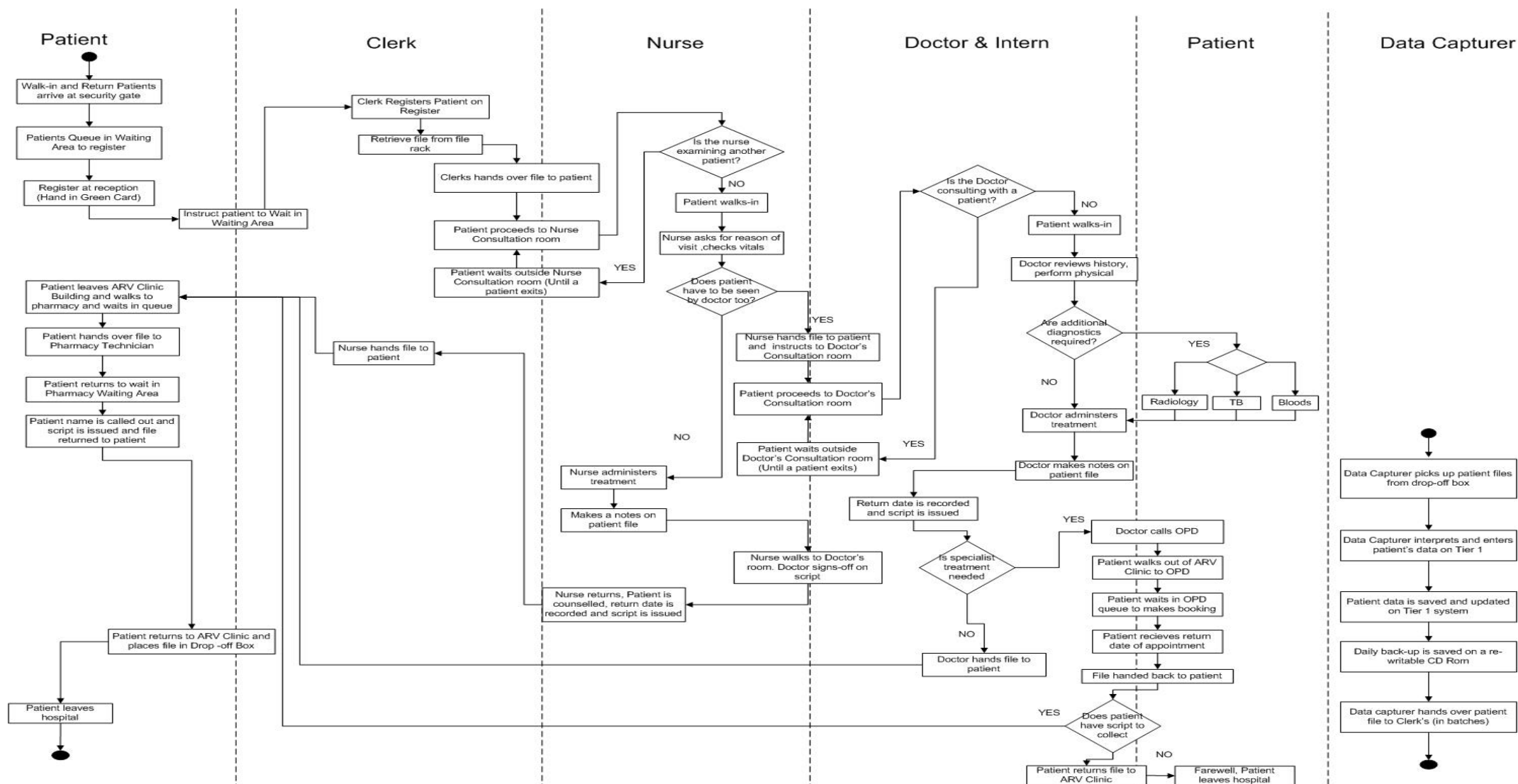


Figure 17: Process Flow - Clinic C

4.4.2. Layout

Figure 18 displays the current layout of Clinic C with the spaghetti diagram showing patient and clinical staff flows. The spaghetti diagram is used to highlight the wasted journeys and effort of the patient and clinical staff. Different colours have been used to show the movements of: clinical manager (purple), patient (blue), intern (red), nurse (yellow), clerk (green) and data capturer (orange). Movements by the doctor is not drawn as the doctor sits in the office, patients that are seen by the doctor are brought to the doctor's office by the nurse – if the doctor is attending to another patient the he/she will have to queue until the doctor done. Clinic B and Clinic C follow the same process in this respect and once a patient leaves the next patient then proceeds to the doctor's office. A higher volume of the lines indicates excessive back and forth motion. Figure 18 demonstrates that there is excessive motion that is being experienced by the: patient, the nurses and the clerk.

The patient's movements result from motion involved in – arriving at the clinic, collecting the file, taking vitals, consulting with the nurse and or doctor or intern, going to OPD for any diagnostic procedures that may be required and collecting scripts from pharmacy

The clinical managers movements result from – walking to and from Management block for meetings and to print.

The clinical interns movements result from – walking to and from OPD and consulting with the doctor about a patient.

The nurse's movements result from motion involved in: collecting patients from the waiting area, consulting with the doctor about a patient and getting, getting the doctor to sign off on patient scripts and consulting with clinical manger with regards to administrative issues.

The clerk's movements result from motion involved in: collecting and returning patient files from file room within the reception area and walking to and from the consultation rooms to hand over patient files to the nurses.

The data capturer's movements result from motion involved in: collecting patient files from pharmacy located at Hospital C.

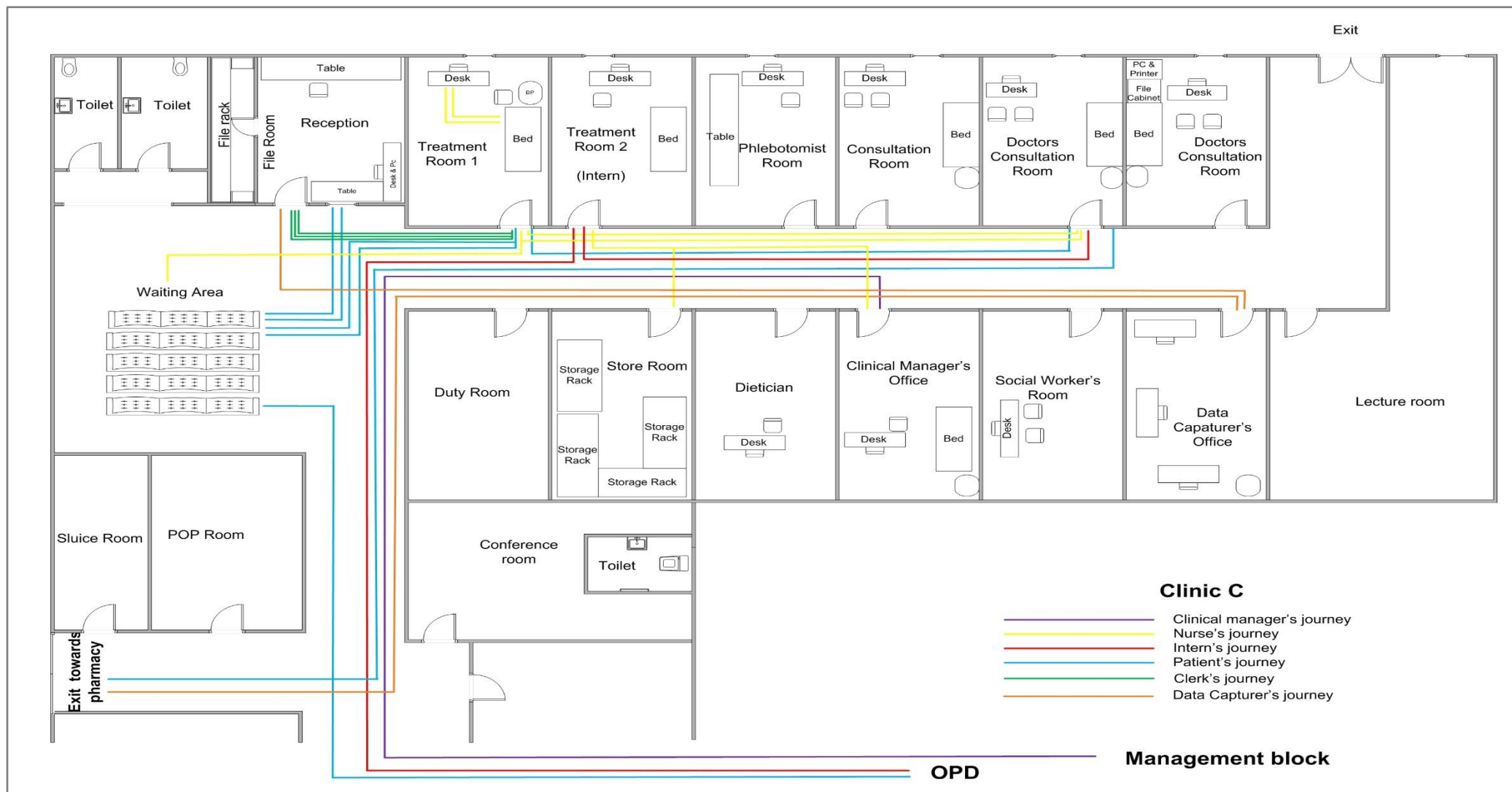


Figure 18: Layout of Clinic C

4.4.3. Waste Breakdown

Table 7 lists the occurrences of waste and their resultant impact; these have been extracted based on the responses obtained from the semi-structured interviews as well as direct observations made at Clinic C. All clinical staff participated in the interviews except for the nurses, some of whom were busy, and the others did not provide consent to be interviewed.

Table 7: Waste Breakdown – Clinic C

Waste	Occurrence	Impact
Waste of Overproduction/Underproduction	-	-
Waste of Waiting	Patient can wait for up to 2 months to see specialist in the hospitals	Poor service delivery to patient
Waste of Unnecessary Motions	Nurses walking to doctors' office to sign-off on scripts	Waiting times increase for the patient. Unnecessary strain on nurse
	Doctor looking for nurse to interpret (language barrier)	Waiting times increase for the patient. Unnecessary strain on intern
	Clinical manager walking to management block to print and access staff email	Time taken away from seeing patient & administrative duties. Unnecessary strain on clinical manager
	Patient walking from OPD to ARV clinic back to OPD	Poor service delivery to the patient. Patient journey prolonged
Waste of Transporting	Blood sample taken to laboratory	Necessary Type 1 waste
Waste of Over processing (or inappropriate Processing)	Clinical Manager requires approval from matron – CEO – Department when placing orders	Responsiveness slow, delays result in poor service delivery to patient
	Doctor requires approval to send patient to OPD	Delays result in poor service delivery to patient
	Doctor require approval for CT Scan from consultant who is not always available	Doctor writes note on patient file, which later causes problems at Radiology, patient may be forced to return to ARV Clinic

	Duplication of patient files	Rework & combining of files once found at a later stage by clerk
Waste of Unnecessary Inventory	Patient files from 2016 & 2017 sitting on the desk in the front office – no space in file room	Lack of organisation makes it harder to find files
	Monitor screen in intern office (unused, function unknown)	Poor use of resources
Waste of Defects	Patient returning to Clinic because doctor not available (Off for the day)	Poor service delivery to patient
	Patient records (e.g. blood work), in wrong patient file	Rework by clerk at a later stage
	Incorrect entries of patient name and ID on Patient file	Problem persists (Boiled frog waste)
	Otosopes in intern's office has no ear pieces making the equipment redundant	Poor use of resources
	Government issued pink needles blunt	Intern collects needles from OPD. Piles of pink needles remain unused – Poor use of resources
	Email server problems (@mpuhealth.gov.za), system down whole of Jan 2017	Disruption in communication flows
	Patients getting sent from OPD (e.g. Orthopaedics) to ARV and back again to OPD due to stigma	Poor service delivery to the patient. Patient journey prolonged
	The printer in clinical manager's office sits idle. Ink is no longer provided – budget cuts	Poor use of resources
	Clinical manager and nurses unable to attend workshops	Gaps in information and knowledge
	Patient files lost when retrieved from pharmacy	New files opened
Waste of Untapped Human Potential	Ideas and complaints put forward, but feedback is often not received	Staff morale low

4.4.4. Cause and Effect Diagram

The fishbone diagram was constructed by putting the 'effect' - poor quality of care delivered to patients at Clinic C. Through interviews and brainstorming with the front-line staff the fishbone diagram was created - this was done from a social constructionist stance. Figure 19 displays the fishbone diagram for Clinic B that lists all the reasons for poor quality of care have been categorized in accordance to the clinical staff and the patient. The slanted lines that extend from the categories to the backbone are considered as main groupings of causes. The cause and effect diagram provided a way to see all the problems in Clinic C at a glance

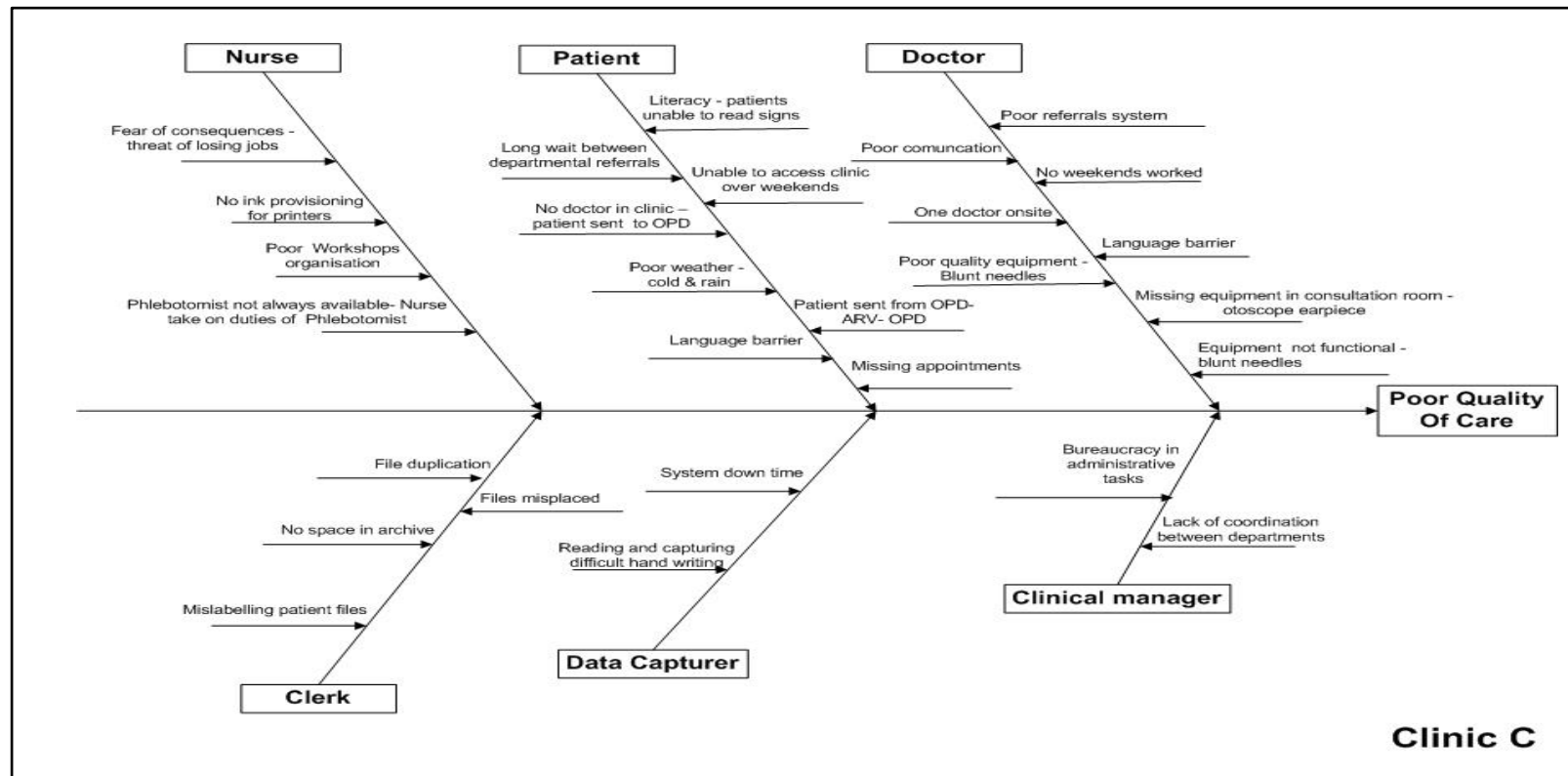


Figure 19: Cause and Effect Diagram - Clinic C

4.4.5. Evaluating Drivers of Waste

4.4.5.1. Visibility in vertical chains

Whilst evaluating the drivers of waste at the other two clinics, the researcher had mostly focused on looking down at the operations performed in the ARV clinics to determine what were the vital wastes if eliminated would have the greatest impact on service delivery to the patient and deliver result to the clinics. However, after talking to the Clinical Manager at Clinic C, the researcher begun to realise, to eliminate a lot of the waste in the ARV Clinics the biggest potential lied at the top in politically charged battlefields, where policies and budgets are rolled out that affect what happens to the clinics. The clinical manager commented, that due to new budget cuts, she was informed that she should stop using the printer in her office, as they will no longer be providing ink, which leads to the waste of waiting and motion as she was forced to walk to the management block to print. What was astonishing was that other than the printer, there were other equipment in the clinic e.g. computer screens, needles that were rendered obsolete. The doctor in the interview had also remarked:

“... we have otoscopes but no ear pieces making that piece of equipment redundant, the bed is broken, viewing boxes most of them are there but there are no globes in them. But yes, we have enough space in the rooms... another example, the government will get pink needles on tender, but they blunt so nobody uses them, so you have boxes that are sitting not being utilized”

This in turn leads to the waste of defects, which can be attributed to lack of visibility through the vertical value streams of: the clinic, the hospital, the district and the department, all these bodies operate in silos. The current structures related to funding, commissioning of services and the regulation of services through government means that it is difficult to influence or control the delivery of services beyond the individual organisation.

It's also about the illusion of control and optimisation of resources, when you look at how the assets are being used, they are usually not producing the intended results and the resource utilisation was poor, because there was no discipline in the integration of steps to force the actions that would improve the utilisation of the whole process. Resources are misused, the information flows are chaotic and there is no visibility or feedback. The information flows driving decisions are chaotic, because of internal reasons and not because of the clinic or the patient (131).

This raised strong concerns about the bureaucratic failures in hierarchically organized healthcare organizations.

4.4.5.2. Autonomy of decision makers

At Clinic C the clinical staff faced similar problems as Clinic B, i.e. because decision making was transferred into the hands of those who were either in administrative positions, detached from the daily running operations or those who were considered better placed to make referral options (123) This led to the waste of over-processing - the observations of these wastes were identified in the following processes:

- i. The doctor required the approval of a consultant for a CT scan, that is performed in the hospital. The doctor remarked:

“If I wanted to do a CT scan I’d need approval from the consultant, many a times they are not here so we have to call them and discuss the patient. If they approve, then we just write on the form that consultant has approved the procedure. But then we get flak from the guys in X-RAY department because they want a signature for administrative purposes”

The complexity in the sequence of activities made it difficult to create value in a continuous flow. It also resulted in the waste of defects, as patients get sent back to the ARV clinics due to self-imposed complexities that have been created by administrative process. The waste is compounded, when we consider that the occurrence is not only taking place in the ARV clinic but also in different departments at Hospital C. With several different sequences occurring simultaneously for different patients in the hospital it is proposed that the doctors should be provided with authority to make decisions over diagnostic tests to avoid the need to call consultant (who is not always available – creating waste of waiting). This would allow the doctor to focus solely on treating the patients that are coming in for the day – real demand, rather than avert time to consult with patients that are sent back – created demand. It would also help improve service delivery to the patient and drastically cut down on the time spent by the patient in the hospital.

- ii. The nurses required, the doctor’s signature on all prescriptions – as explained earlier this was due to legislative reason. What was interesting was that the doctor at Clinic C had already identified this a waste and had a solution in mind. The doctor said:

“if they could train a nurse to rewrite scripts for patient, given there are no issues and treatment is going well, that would be very helpful, but legislation won’t allow it”

This also goes to validate the points made in the section *Visibility in vertical chains*.

4.4.5.3.Complexities imposed - Phlebotomist

Whilst speaking to the clinical manager she commented, that due to a new program and policy that has been implement by the hospital, they have had to allocate a consultation room to the phlebotomist in the ARV clinic (this is one of the recommendations of the ideal clinic programme spearheaded by Operation Phakisa (132)). The aim of having the phlebotomist in the clinic is to lighten the load on the doctor and nurses – the function of the phlebotomist is to draw blood of the patient.

The idea behind it was noble, however in reality it was causing the waste of waiting and poor resource utilisation at Clinic C. The phlebotomist was not only responsible for drawing blood of patients in the ARV clinic, but also for the patients from the Out-patient Department(OPD). When the phlebotomist went on leave or had to go to the maternity department to draw blood, there was no replacement. This was a point of frustration for the clinical manager because patients would continue to come in from OPD and she couldn't always turn away patients or ask them to wait indefinitely. One of the nurses in clinic was then allocated to perform the function of the phlebotomist. She stressed that there was no need to have a phlebotomist in the clinic as they were not seeing high volumes of patients and the nurses were already trained to perform this function. At Clinic A though, having the phlebotomist did provide the intended benefit – to help reduce the load on the doctor and nurse due to high patient volumes. Also, because the phlebotomist was allocated to the specific clinic and not shared amongst several departments.

The aim of the phlebotomist was to improve resource utilisation, but it was performing the opposite function at Clinic C. The lesson learnt was that; when implementing new programs at clinics and hospitals there was a need to consider the current state of operations of the clinic and its specific needs. What might work for one clinic, may not always work for the next.

4.4.5.4.Scheduling Workshops and departmental meeting

Another concern that was expressed by the clinical manager at Clinic C and the nurses at Clinic B was that they desired to attend the workshops, however, they are unable to do so. This is not because there are no workshops that have been set up to help them further their knowledge, but because they are too busy in the clinics and must make a choice to stay and treat the patients or go for the workshop. Most of the times the clinical staff take turns to decide who gets to go

to these meetings and workshops. This doesn't always work though, there are times when they are too busy and cannot afford to not have a single staff member leave. This created gaps of knowledge and information flows, it is also a waste of resources. The clinical manager remarked, that once she has missed a departmental meeting it's almost impossible to get information on what was discussed, because she must go find someone from the other department to relay the information to her and she just does not have the time to do so. The researcher proposes that these workshops and meeting need to be scheduled in a better format, so all the staff member can attend. In addition, the minutes that are taken down during the department meetings should be sent to the department heads if they were unable to attend for unavoidable reasons.

4.4.5.5.Lack of Standardized procedures

Language barrier was a problem that presented itself in Clinic C. This created the waste of motion and waiting as the doctor had to comes out in the middle of a consultation to look for an interpreter. The intern remarked:

“Having to find an interpreter can at times be a problem, there are enough sisters around but then I have to leave my consultation room to find them and sometimes they are also busy, so it's a bit of waste there.”

Another problem that is faced by clinic is that patient records are misfiled, creating the waste of defects. “I have seen this occur maybe once or twice in the past (patient details) and in fact it's not just that I have found the blood results of one patient in the file of another and we corrected it”, said the doctor.

To be able to deal these problem, it is proposed that the clinic can implement the use of standard work- set of activities and associated behaviours that the clinical staff perform in the event of an occurrence like the one mentioned above. The clinical staff need to devise, what steps to be follow when a patient who comes and cannot speak English and what steps to follow when placing diagnostic results in patient file. Standard work should become a way to ensure that the clinical staff focus on value creation to the patient.

Standard work should not be used as a set of instructions, rather it should serve to help the clinical staff to strive to improve their work. It should not be created in isolation by external experts, instead it should be created by the clinical staff who will use these steps in their daily operations. Team meetings with all the members in the Clinic C can be used as platform to review standard work and gather feedback to foster a commitment to continuous improvement.

The opinions of the staff during the meetings should be used to make improvement changes to standard work in real time when required (133).

By using the Training Within Industry (TWI) method, the Clinic C can develop and hold standard work (refer to APPENDIX D for TWI job breakdown sheet). In the job breakdown sheet, it is recommended that these processes should not be described in more than one page. Considering the length, some of the members of staff may scan it or just forget it altogether and there is no value if it is not understood and followed. Process documentation is worthless if no one pays attention to it. Standard work should represent an agreement between the staff that, this is the way they will get the work done until a better way is found. The TWI method should help sustain this - the inability to hold standard work is one of the major reasons why initiatives stagnate instead of progressing on toward autonomous, daily improvement (134).

4.4.5.6.Addressing Stigma

The reported effects of stigma and discrimination regarding HIV patients in South Africa are: blame, denial, difficulties in adhering and acquiring treatment (135). An observation that was made in relation to this at Hospital C was that HIV patients who came in to seek treatment at the OPD, were sent straight through to Clinic C. The clinical manager commented that often patients go to OPD, because they need to be treated for problems that are not related to the provision of anti-retroviral treatment. An example of this was that the patient would go to the Orthopaedic Out-patient department(OOPD); from the sticker on the patient file the clerk at OOPD would identify the patient had HIV and send back the patient to the ARV clinic, before the patient could consult with the specialist.

The patient would come back to the clinic and either the doctor or nurse would have to call OPD, after which the patient would then go back. This results in the waste of over-processing, defects, waiting and unnecessary motions. The clinical manager stated that the issue has been discussed in department meetings, however it continues to persist.

The pervasiveness and persistence of stigma in areas with high HIV prevalence remains an important yet difficult area of research. It calls for the public health community to be creative in designing and implementing HIV/AIDS anti-stigma interventions (136).Clinic C could also benefit from implementing its own creative solutions e.g. doing away with the stickers on the patient file that acts as an identifier that the patient is from the ARV Clinic.

4.5. Summary and implications for research

This chapter has evaluated the different approaches to lean waste management in ARV Clinics within the public health sector. This was done via a multiple case study approach to investigate waste in ARV clinics from multiple viewpoints facilitating the development of new insights relating to waste management practices which may be generalizable throughout healthcare organisations in the public health system.

The case study data provided a detailed picture into the current state of operations within the ARV clinics. To perform the current state analysis the following steps were taken:

- i. An in-depth process flow was drawn to provide a systems perspective, linking work and information flow by showing different processes involved from the viewpoint of the patient and the clinical staff at Clinic A, B and C.
- ii. The layouts of the clinics were constructed with spaghetti diagrams to highlight the frequency of motion and the wasted journeys and effort of the patient and clinical staff.
- iii. A waste breakdown table was formulated – in the table the different types of waste were identified and categorized. A brief description of the impact of waste has been provided for each waste identified in relation to the operations of the ARV clinic and service delivery to the patient. This addresses sub- question 1:

SQ 1: How can the different types of waste present in the South African public health system be identified and categorised?

- iv. A root cause analysis was performed to identify the ‘root causes’ of the waste identified through interviews and brainstorming with the front-line staff - this was done from a social constructionist stance.
- v. A narrative has been provided pertaining to the evaluation of the drivers of waste within Clinic A, B and C. This addresses sub- question 2:

SQ 2: What are the key drivers of the waste identified at the ARV Clinic in the South African public health system?

One of the key principles that was observed when performing case study analysis was to treat all the participants involved in the study with respect. The purpose of the waste management exercise was not to make staff redundant it was to deliver better service delivery to the patient, by utilising resources more efficiently. As a result, the ARV clinics should be able to do more to improve patient care with existing resources. Taking into account all the factors that have been discussed in the section above, ARV clinic should be able to attain operational excellence.

However, it must be acknowledged that although there are certain wastes that are present in all the clinics, the clinics are also unique— it is not always possible to copy what another clinic did to eliminate waste, it may or may not work depending on the conditions that govern the operations of the clinic.

5. EVALUATING HEALTHCARE WASTE IN ARV CLINICS IN SA – DISCUSSION OF FINDINGS

5.1. Over- processing in healthcare

Over-processing was identified as the most severe of the eight wastes in healthcare as it resulted in the creation of other waste. In the processes of the ARV clinic, over-processing occurred when tasks were performed that added no value to the patient and clinic or the tasks were not aligned with patients' needs. The waste of over- processing, resulted due to nature of administrative processes in healthcare that require approval from those who were either in administrative positions, detached from the daily running operations or those who were considered better placed to make referral options (123). The value driven purpose – the 'True North' of ARV clinics is to provide value in the services that they delivered to the patient, but this value must also deliver results to the ARV clinics. The waste of over-processing was steering the direction of the ARV clinics way from their 'True North'.

The approvals process came with its own set of challenges, it was observed that the people who had authority to provide approval were often not reachable. This would cause the waste of defects – the patients would have to come back to the clinic, which would delay the treatment process, resulting in poor service delivery to the patient. In most of the approval processes, because they are broken they generate a lot of 'created demand' 'unnecessary demand', which is often overlooked.

There are a few people in the clinics and hospitals who 'see' these wastes but do nothing about it due to boiled frog syndrome. (*"If a frog is thrown into a pot of boiling water, it will jump out. If the frog is placed into a pot of water and one slowly turns up the heat to a boil, we will have "frog legs" for dinner"* (69)). The clinical staff have been performing the same sets of processes for so long that, it has become part of their job description to seek approval, and even if they want to do something about it they can't because it is built into policies and protocols.

In his book, *Systems Thinking in the Public sector*, Seddon indicates that in the public-sector failure demand can account for 80% of the total demand (137). Hospital systems are not designed to eliminate waste and if left unchecked could cause 'Muri'.

What was surprising was that even when approval was granted i.e. over the phone at and noted on patient file at Clinic C, this was not enough. The patient would still have to return to the clinic because of the lack of signature, in addition causing the waste of unnecessary motion

and waiting. Hospitals are being run like grade schools, where the student (doctor) must raise their hand to ask a question (seek approval) and if the teacher(consultant) doesn't pick you or acknowledge you, then it's too bad. However, unlike a grade school, the decisions of hospitals have a far greater impact – a patient not receiving the help they need in time can result in death.

5.2. Visibility in Value stream

5.2.1. Decentralisation

The biggest cost saving can be traced backed to the National Department of Health, because of the potential of creating better policies and protocols. Often, we look down at the operations for all the cost saving and improvement, however the biggest savings are at the top, in these politically charged battlefields. The South African health system is mostly centralised to achieve economies of scale through the government rather than through the market. The complex structures lead to the creation of operational islands that do not communicate with one another, it's essentially about the top management and the illusion of control and optimisation of resources (138).

The vertical value streams are not visible -the chains of command are not flexible or responsive to be able to meet the needs of the ARV Clinics. As a result, resource utilisation is poor, because there is no integration of steps to improve the utilisation of the whole process and those individual assets (e.g. hospitals and clinics). The information flows through the value streams are chaotic and as a result the policies and protocols that are created do not meet the special requirements of the ARV clinics and the hospitals. This results in several wastes in the clinic, that cannot be eliminated since there is no feedback loop.

The result of this model is that there is no transparency, it's all about political negotiation at the top, that creates instability because the no input is obtained from the clinics. Problems are not solved systematically because, before we can begin to understand where the root cause of those problems lie – a new policy is implemented.

Focus is not placed on the end-to-end understanding of the total cost of delivering value through all the activities in the value stream. In the 2014/2015 version of SAHR the authors discussed the how the decentralisation of health care services in South Africa can make a phenomenal impact on the quality and access to much-needed health services for the most vulnerable populations (139).

5.2.2. Breaking down Silos

It is necessary to break down silos within the different departments in the hospitals and between clinics and referral hospitals, they all need to work together to foster collaboration and improve patient flow. Efforts on improving patient flow need to involve the entire hospital, as patients, staff and information travel between departments. Optimizing flow in the ARV clinics does not necessarily improve overall patient flow if the different support functions do not coordinate with each other. This was observed at all the three clinics, the patient would leave the clinic, to go to OPD or to the referral hospital, but only be booked to see the specialist in 2 months time. While the doctor required that information to decide on the course of treatment for the patient at that point in time, the resultant impact is poor service delivery to the patient.

Coordination between the ARV clinics and the different support functions would enable ARV clinics to align their overall direction to get closer to the 'True North'. By breaking down silos the plan of work becomes visible, to allow the clinics to schedule and synchronise the sequence of the support activities. One of the key mindset changes that would be necessary to break down silos is moving from a focus on immediate needs to a focus on key operational defects that create waste. Hospitals need to start to consider the functions within the entire organization to make and sustain improvements in that they make to eliminate waste (140).

5.3. Use of Lean Tools and Practices

Lean practices and tools from manufacturing can be developed and applied to the ARV clinics, the use of standard work, a waste breakdown sheet and TWI have been discussed in the section -CASE STUDY - ANALYSIS AND RESULTS. Whilst the researcher opted to use process maps as the tool for mapping and analysis, value stream mapping can also be used to eliminating waste. The purpose of the waste management exercise was to create a pathway for the introduction of a culture in the ARV clinics where looking for waste and solving root causes of problems becomes a way that things are done.

By using lean practices and tools ARV clinics can start to embody the use of techniques to visualise the service delivery process by representing information, material and patient flow. Visual management tools can be used to highlight the waste in the clinics processes, solve problems of process invisibility and help to streamline communication. The goal of visual management is to make waste, problems and abnormal conditions clear to clinical staff and managers (109).

Fujio Cho, honorary chairman of Toyota says, “One of the worst situations is not being able to tell whether things are standard or out of standard (*normal or abnormal*)” (141). ARV Clinics need to be able to identify and expose problems, so they can be fixed, as opposed to the old approach of hiding problems to make things look good. Taiichi Ohno once said, “Having no problems is the biggest problem of all.” (142)

Visual management is a mindset and should not be used as a primary tool for posting performance measures or signs throughout the ARV Clinics - a chart on the wall is not necessarily visual management. Real-time visual management is much more effective than waiting for monthly reports and metrics to measure the performance of processes in the ARV Clinics.

Other tools such as standard work also prepare the clinical staff to instil practices of what needs to become a daily discipline, which would ensure process stability and sustaining improvements that are made to eliminate waste. The task of continuous improvement is then to improve upon these established practices, and the improvements are then incorporated to form a new set of practices. Standard work provides a launching point for true and lasting innovation (19).

The same tools that have been applied in manufacturing can be applied to healthcare services. To ensure successfully transition emphasis should be place on understanding the concepts and tools to determine how they can be adapted for the ARV clinics (37).

5.4.Developing mindset

5.4.1. Applying the scientific method

To eliminate waste in ARV clinics, we are going to have to fundamentally develop completely new ways of managing healthcare with focus on value to the patients. In the ARV clinics, most of the problems that the patients and clinical staff faced were situational - they are specific and complex. To be able to eliminate these problems need to be developed are not basic laws, but the practice of the scientific thought process- the Plan-Do-Check-Act (PDCA) cycles that have gone through many iterations when using lean tools and concepts to eliminate waste. This should enable the clinical staff to better understand the problems they face so that they can develop a much richer set of hypotheses about what might be the solution to the problem (99).

The aim of the scientific method is not to solve the problems that are being faced by the ARV clinics today rather it is the ability to better solve tomorrow and the next day’s and so forth. If

the clinical staff can learn how to practice problem solving daily in every aspect of the operations that are being performed, they should be able to adapt to any changes that occur. much more readily to find solutions.

Global IT companies have started using this method and so can the ARV clinics, the PDCA method has been adopted and categorised in four different levels namely: the individual level, the program level, the department level and the organisation level. ARV clinics and the hospitals as a whole can review their overall performance from time to time, to ensure that they achieve holistic improvement by eliminating waste (143).

5.4.2. The ‘4P’ model

There are great risks when attempting to revolutionise healthcare organisations as they lack stable culture on which to build. The ‘4P’ model, in Figure 20, provides a framework strategy for ARV clinics and the hospitals they are housed in to achieve innovative excellence (144). To build and sustain excellence, four categories are factored in namely: people, partnership/teams, processes and the products/service

The 4P model takes into account the awareness of human resources (clinical staff) and their roles in the context of the hospitals and clinics as the basis for improvement activities. The model highlights that to attain excellence and eliminate waste, hospitals and clinics need to develop the capabilities of the staff, as they are the essential foundation for improving partnerships, processes and the provision of service. It is fundamental to understand that to develop capabilities, health organisation need to have a profound knowledge of people and psychology in terms of human nature, needs and environmental and contextual factors of human behaviour (145).

When deploying the ‘4P’ strategy the top down approach must mirror the bottom up and should be linked end-to-end. However, to some degree the model is intended, to be hierarchical, with higher levels building on lower levels. Without a long-term philosophy, ARV Clinics and the hospitals they are housed in cannot do all the things the other P’s suggest. The technical process provides the setting in which to challenge and develop capabilities, if there is any hope to achieve a true learning focused on continuous improvement through problem solving.

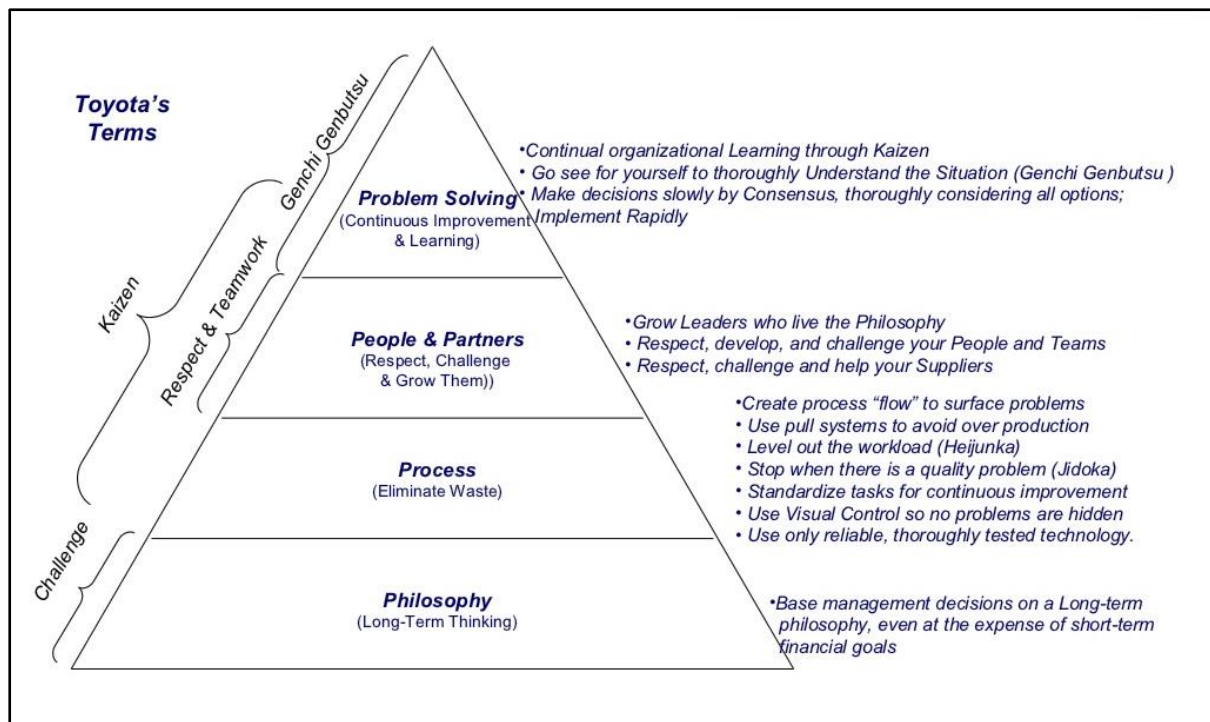


Figure 20: The '4P' Model (20)

5.4.2.1. Gemba

Going to the gemba is one of the most important aspects of lean – this has to be a visual workplace and that ‘should talk to you’ by making problems immediately visible (146). Going to the Gemba provides an opportunity for executives at the different Hospitals and Clinics, to develop capabilities of the staff by reinforcing organizational priorities and encouraging them to think through the problem-solving process (55).

This is done by the executive going to the different departments within the hospital and seeing what is actually happening at the frontline. Gemba walks allow the clinical staff to see the commitment of the executive team and vice versa. They can communicate on issues that are affecting them on a very real day-to-day basis. This nurtures an environment of transparency, through which trust can be gained – by encouraging clear, concise, open and honest dialog where all suggestions are accepted, and feedback is provided directly (enables flow of communication both upward and downward) (55) (31).

This was lacking at all the Clinics that the researcher visited, and it needs to become an essential practice since, to eliminate waste, you first must see it. Leaders at all levels in the hospitals and the clinics need to spend a significant amount of time at the gemba. It is also imperative that the executive be among the patients, as they are the primary customers of the system. They can

provide valuable feedback on the things that are working and not working in a very direct and meaningful way. John Toussaint Executive Chairman at Catalysis, formerly ThedaCare Centre for Healthcare states, “If a leader is not spending at a minimum of at least 20% of the day at the gemba, the leader will never learn or be able to apply lean”. (55)

There is a strenuous journey that lies ahead for the ARV clinics and the hospitals they are housed in - it is going to be difficult to break down the traditional healthcare notions that everything is done by committee. What must become clear is that, it is the clinical staff (nurses, doctors, clerk etc.), who actually understand the problems and can craft the best solutions. The more often executives go to the gemba, the less time they are firefighting, which leaves more time for improvement in quality, safety, and cost.

5.4.2.2. Respect for people

Lean is rooted in two key principles: continuous improvement and respect for people. The people perspective at Toyota, emphasizes that the development and utilisation of workers’ capabilities is as important as the removal of waste - an important aspect is to ensure that workers can operate safely and efficiently to develop and grow as individuals (19). However, at the hospitals and the ARV Clinics where the study was conducted there was evidence that employee-driven problem solving, and continuous improvement was not widely practiced.

Lean initiatives in healthcare start by involving clinical staff in daily improvement activities – when it comes to developing standard work or mapping processes. ARV Clinics need to bring together all the key groups and individuals who are critical to improving processes. Through every day work, clinical staff can learn and gain valuable knowledge about the prevailing conditions and opportunities within their environments and translate this into concrete ideas for improvement (continuous improvement must be systematic and integrated into the daily operations). The people using the tools, and how they use them, is what creates motivation and ensures success in the waste management exercises - which in turn brings lean to life (tools are just tools) (20).

Nevertheless, nothing will happen until an enabling and supporting structure for involving clinical staff in improvement work is established. The improvements can then be put into action with active participation from staff. In a lean healthcare organization, the clinical staff are considered as the most important resource for productivity improvement, they need to be respected, challenged and developed (146).

6. CONCLUSION

This study set out to evaluate waste in ARV Clinics in the South Africa. Following a review of the literature, a research question was identified, and a research method developed to address these wastes. The research question and a brief description of the findings are presented below:

RQ: What are the different approaches to Lean Waste Management in selected ARV Clinics in the South African public health sector?

Using a qualitative analysis approach (with multiple case studies and through collection of secondary data) from a social constructionist stance, the report offers key contributions to knowledge which include; classification of waste present in ARV Clinic in 8 different categories, identification of the different drivers of waste and the resulting impact of waste on ARV Clinic operations and service delivery to patients

The research provides a contribution to knowledge in three key areas: firstly through the development of frameworks that aid in measuring and assessing waste, (to identify and resolve challenges faced by the ARV Clinics in public health sector to deliver better, quicker and lower cost services); secondly through the validation of the frameworks via multiple case studies ; and thirdly a set of propositions that provide a narrative that explain the link between waste - overall performance of ARV Clinics and the quality of service to patients.

Whilst the framework has been developed for ARV Clinics, it is anticipated that the approach may be generalizable to all departments within a hospital, particularly in the public health sector. Analysis revealed that the major contributors to waste vary across the different ARV Clinics, however there are certain drivers of waste that were common across all the clinics namely:

- i. Over processing – resulting from the nature of administrative processes in healthcare that require multiple approvals
- ii. Lack of visibility in both vertical and horizontal value streams – the result of this is that there is no transparency, hence the value streams are not flexible or responsive to be able to meet the needs of the ARV Clinics or its patients.
- iii. Lack of a stable culture on which to build – there is a need for a long-term philosophy, that provides the setting to challenge and develop capabilities, if there is any hope to achieve learning focused on continuous improvement through problem solving

ARV Clinics and the hospitals they are housed within need to articulate their True North which is to provide value in the services that they delivered to the patient and this value must also deliver results to them. Once they have done this they can work towards ensuring process stability and sustaining improvements to eliminate waste - all improvement activities need to be aligned to the True North at every level across departments.

7. FURTHER RESEARCH

The aim of the research was to identify the ‘eight wastes’ present in ARV Clinics (adapted from Ohno’s ‘7 wastes’) and to evaluate what the key drivers of waste were. At Toyota, waste is interpreted in a very broad way – the three types of wastes are: muda (waste), muri (overburden) and mura (unevenness). The scope of the research was limited to muda, further research is needed to account for how muri (overburden -when demand exceeds processing capacity) and mura (unevenness- caused by variability and imbalances of workload of clinical staff) affect the operations of ARV clinics and service delivery to the patient.

A multiple case study approach was employed for data collection – observations and semi-structured interviews were used to elicit a detailed picture of the current state at each clinic. This aspect of the research was successful in creating a greater depth of understanding of the waste management practices in place at ARV Clinics and can help add to existing literature. However, the case study research contains two major limitations. First, only three case studies were conducted, and this was confined to the province of Mpumalanga. This represents a very limited overall sample in terms of the total number of ARV Clinics within the country. The research findings would be strengthened if the sample size and the geographic outreach of case studies had been increased. However, to have increased the number of case studies in this way would have been beyond the scope of the master’s research. Second, interviews were limited to the clinical staff in ARV clinics and thus the views and experiences of those who are directly involved in the support function of care (e.g. Pharmacist) and the policy makers are not represented. These perceptions may shed further light on what the key drivers of waste are and how to eliminate them. Further research might look at the perception from the view of those on the periphery, to take a systems approach when it comes to transformation.

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APPENDIX A

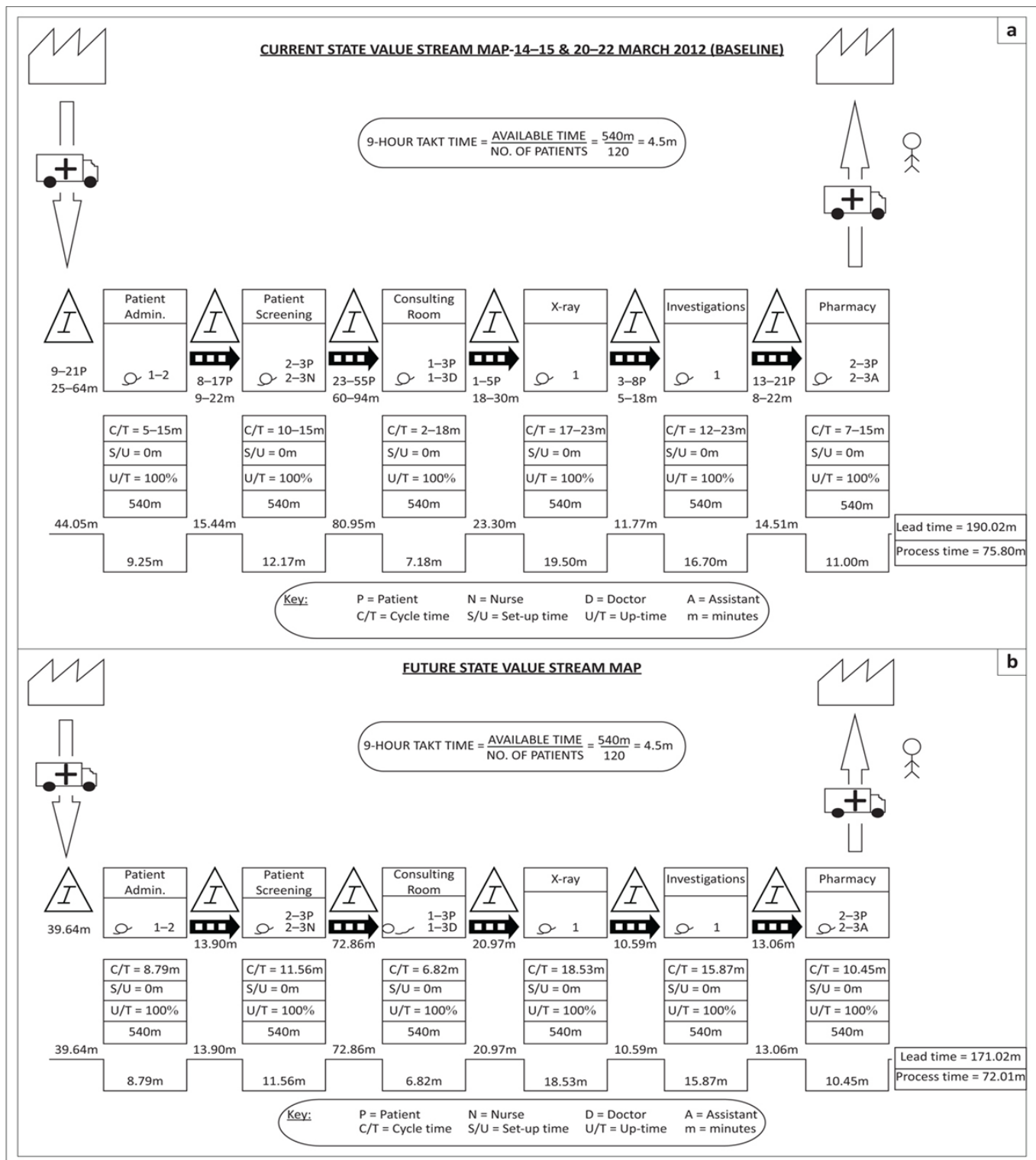
7 WASTES IN HEALTHCARE AND THEIR SYMPTOMS

Over Production Symptoms	Waste of Idle and Wait Time Symptoms	Waste of Transporting Symptoms	Waste of Too Much Processing Symptoms	Waste of Excess Inventory Symptoms	Waste of Wasted Motions Symptoms	Waste of Defect Symptoms
Unbalanced staff scheduling	Idly watching equipment operate	Having multiple information systems	Asking the patient, the same questions multiple times	Complex tracking systems	Inconsistent work methods	Mistakes made in patient care
Unbalanced material flow	Idle people or machines	Inappropriate bed assignments on admission	Placing OR scheduling information in multiple systems	Multiple forms, multiple copies, multiple weeks' supplies	Long reach/walk distances	Patients returns (or readmit)
Having more than we need of anything, supplies, beds etc.	Outpatient lab draw results take 1.5 hours	Placing multiples calls to transport	Excessive duplication in OR. SPD. Pharmacy nursing Units	No standardization of supplies	Centralised printer's copiers, fax location	Frequent rescheduling of office appointments
Not notifying food service of diet changes and discharges	Surgeons waiting in between surgeries	Excess patient transfer/movement	Multiple signature requirements	Long turnaround times on the floor beds	Searching for anything e.g. equipment, multiple patient hand-offs	Adverse drug events
Extra floor space utilized	Unbalanced scheduling! workload	Departments Backed up	Performing services patient doesn't need. for example, lab work	Unused appointment slots		High infection rates and falls
Backups between departments	Numerous and large waiting rooms	Numerous storage locations	Manual distribution of report copies	Empty beds	Long lead-times	High incidence of bill rejects

Surgical supplies picked and returned to shelves	Reduced productivity	Walking intermittent samples to labour going to get prescriptions multiple times	Sorting, testing and inspection	Extra rework/hidden problems	Convoluted facility and workplace layouts	Utilization review infection control, legal and risk management inspections
Instruments picked and not used need re-sterilisation	Patients wait between multiple appointments	Staff copies patient chart for transfer between facilities	Duplicating physical assessment at triage and treatment areas	Duplication of supplies in temporary storage areas, patient rooms, closest e.tc	Prolonged pre-op testing times	Inappropriate communication of patient transfer model with order entry
Scrap or waste food	Techs move patients between departments	Finish patient chart walked to drop off	Punching holes in papers to place the in-patient chart		Poor workplace layout for patient services	Pharmacy refilling “multiple dose” medications

Table 8: Symptoms of the 7 wastes

VSM MAP FOR OPD AT THE CATHERINE BOOTH HOSPITAL



Source: Authors' own work

FIGURE 1: Current and future value stream mapping for outpatient department.

Figure 21: VSM map for OPD at the Catherine Booth Hospital (91)

APPENDIX B

INTERVIEW: CLINIC A (DOCTOR)

(S: Sabrina W: Doctor)

S: The first waste identified is the waste of over production or underproduction, (over/under production is producing more or less than what the patient needs) if we look at the layout, we can see that there is just wasted space so that would be waste so do you think that at this clinic we have layouts where there is wasted empty spaces? Or do you think that they make good use of space?

W: I think that we make good use of space but it's based on the amount of staffing that we have on hand as they come and go some of the offices may be left unused, but since then we have had increases in staff numbers so those spaces are in use and I think we are using the spaces well. The layout has changed since December to Jan. We no longer have an Operational manager the entire upstairs of that building not the one that you know the other one, is now unoccupied so there has been a change less office space is being used in that building, but overall, I think we are using the space well.

S: Are there Medical supplies ever pulled from stores and then returned unutilised? On that note is the medical supply store just like the medicine? Whatever supplies you need are in the office or do you have to go pull them from the stores.

W: we got like a mini casualty, and that we stock from pharmacy, pharmacy will keep the stock for us in their kind of store rooms. so its stored and we order and use so we don't waste, there will be stuff that is wasted e.g. (blood tubes that expire for example but don't know what those quantities are I don't know) but we don't get something out unless it's to be used.

S: with regards to the pharmacy is it in the same compound?

W: Yes, it's just up the stairs

S: I When the patients have to go collect the medication, do they collect from here of the pharmacy?

W: Pharmacy

S: Okay

W: We have a fulltime Pharmacist onsite, fulltime Doctor onsite that's what makes us different to other ARV clinics in the area.

S: Sometimes the problem that exists is that once the patient leaves the clinic they need to be directed, when going to the pharmacy, even with the visual signs. How does it work here?

W: The new patients somehow know where to go, and if they need help there is signage in place but we also have a help desk or they ask at one of the following stations for assistance, if they are new patients they need to Do blood tests and sputum so they ask there as well. And we all help out or direct.

S: Since we talking about blood collection does blood collection also happen here?

W: Yes

S: Do you have a separate phlebotomist

W: Yes, we do have a phlebotomist with a room of her own

S: At Robb Ferreira the nurse say they don't want the phlebotomist because it just causes confusion asserting that they know how to draw blood they don't feel that it's necessary to have this office. Why exactly have you created this office?

W: Why we created the office for phlebotomist? In the past we didn't but, we had done an Ideal Clinic Assessment and it was prerequisite to have one so we did it. It's basically the benchmark clinic for the country, they trying to make the ideal clinic and we were applying for that. And as such one of the requirements is that the phlebotomist is in a phlebotomy room and that's how it works in private as well.

W: The reason is firstly privacy secondly safety your dealing with needles your dealing with blood you don't want it to be done in front of everybody or to avoid and limit risk. e.g. (psychiatric patient walking down the row or an incoming emergency more risk of needle stick injury to themselves or patients and lastly privacy again)

S: I was under the impression that they just draw blood during the consultation.

W: No, we would never get through the load if that's how it worked. Way too many patients daily. If we had to do sputum's and blood and dispense it would not be possible I suppose that's why we function very differently to the government

S: Sputum collection is for the TB do you also do blood for that?

W: No that's just Sputum

W: Most of the time the patients suspected of having TB have HIV so if they not then there is still some blood work that id do to check for inflammatory markers, and other items to aid diagnosis because it could be pneumonia Bacterial or viral can be TB can be COPD, so I use other investigation tools as well.

S: So, from the phlebotomist it goes to the Lab?

W: from the phlebotomist, it goes to the Lab the Lab comes here to collect every day between 12 and 1pm each day. I get results from the NHS website within 24 hours.

S: where is the Laboratory's location?

W: Robb Ferreira

S: Is there a staff schedule and is it balanced

W: you mean a staff schedule for covering phlebotomy and covering our short stay, Yes, we do have one and yes, it is balanced. It's managed by the person in charge of that aspect of things she rotates a monthly roster.

W: With the exception of the phlebotomist she remains at a fixed station as that's her area of speciality, unless she's on leave then changes would be fitted into accommodate.

S: So, no problems with that aspect of things it seems to run well.

W: yes

S: is there anything that you think is less or more than the patient needs that you think could be as a result of the system, I think that in most cases it's the system that fails us.

W: I would say the biggest problem that we face is our patient waiting times. That's mostly due to being under resourced and that's human recourses, we have a good drug supply, we have a pharmacist onsite and good stock control we are aware of possible drug shortages and stock up months in advance to mitigate such events.

W: we have worked very hard in the past year and a half to really streamline everything, but if we have one staff member on leave and just one ill staff member the waiting times get pushed up and that's our only real concern so nothing under or over as such.

S: The next waste is the waste of waiting defined as idle time spent waiting for next event, activity or process.

S: Can the waiting rooms accommodate more than 50 patients seated and standing?

W: Yes, we do accommodate more than that as some patients wait outside.

S: Do a lot of the patients stand while waiting?

W: No there are seats provided and a lot of patients seat themselves on the grass

W: We have three small waiting areas (1) reception to register than receive their files (2) vitals (3) us, so if 100 patients arrived at once we might have an issue but that's never happened before normally patients come in batches of 50 or 60 thereafter in ones and twos or a generally slower influx.

S: I asked if patient average waiting times were roughly an hour, I had spoken to one of the patients, and she said that she is done in an hour or two hours max.

W: That's what we really been working hard on in the past year and a half, we were on 4 hours then we reduced it to an hour and a half average, some patients moving faster than others depending if they going to see the doctor, going to see the nurse or if their problems to be seen to.

S: That's really good

S: Then we discussed multiple ques between stations and it's been established that it has to be like that.

S: Have there been instances of patient spill-over to the next day? So, if they weren't seen today they have to come back the next day.

W: No, it's never happened here, we have a policy that means it never ever happens.

S: At Hospital C, I know that there is only one doctor. And you have told me that it's the same here there is just one doctor onsite. So normally after vitals with a repeat script they can just go straight to collect their drugs, but in some cases, they have to see a doctor and they not around the patient will have to come back.

S: Is there always a doctor available at this clinic?

W: No not always if I go on leave for a week it's almost impossible to find a replacement, or if I have to attend a meeting in Nelspruit then no there's no doctor, but I am usually available telephonically for any questions and I have trained the nurses as well.

W: We have a record of who's coming for a follow up and I know who's coming for the follow up the next day and I can pull out the file the day before, I can check make notes and give directions to everyone, or they will try and manage the patient.

W: If the patient is sick they will send them to Temba or a hospital if he needs admission, or they come back the following week when I have returned.

S: So that problem exists, it's a waste you know in a way

W: It's a waste that's a lesser of two evils in a manner of speaking, it's a bigger waste to have two doctors onsite rather than having one doctor onsite who's unavailable for a week due to leave or meetings, with being organised and knowing when I am on leave I can arrange the doctors follow up patients not to come during that week.

S: So, coordination beforehand helps to smoothen out that process for you.

W: Yes

S: Do you know why they have implemented the one doctor per clinic rule? Is it perhaps a budget related?

W: Yes, its budget related for us being a NGO doctors are expensive, if you want to be in line with the government, they are not in agreement with having doctors in clinics, they don't like this kind of set up which poses a problem, but for us it has been more of a budget constraint being a NGO and also having to find the right person for the job is another a challenge we face.

S: Is this institution fully private?

W: No, we have a SLA (service level agreement) with Government so they cover all the drugs and blood, and then we are all employed by right to care.

S: Waste of motion is my next waste and defined as (Movement of staff that's non-productive and unnecessary)

W: again we have worked very hard on this aspect coming in on weekends documenting unnecessary movements, (how many times walk to go get files, how many time to go see TB patients then back here then to go see a primary healthcare patient and back again) in so doing we have really reduced on that wasting of time moving back and forth.

W: the guys who came in to assist with the issues had said we don't pay you to walk we pay you to work.

S: Was the reason for your walking due to the fact that you were a single doctor on site? Or was it for other reasons?

W: No that wasn't the reason for my walking, it would be due to the fact that they don't want us to do batching. So, they had wanted me to take single files and once done to return to collect the next file, that was soon identified as a waste of time as all files have to be seen by the doctor and I am the only doctor onsite, so I'd see each file in any case. So, I take a batch of files at once.

W: we have a system in place to reduce amount of walking where patient exiting calls the next patient meaning that less time wasted by walking patient to the door then requesting the next patient to come in. in so doing I can orient myself with the file in meantime Reducing waiting times and walking less.

S: So, having to go to the TB department, is that due to the fact that you're the only doctor.

W: Yes, the TB department that's something that cannot be avoided likewise with having to go to primary care patients.

S: Another question that I had relating to the waste of motion would be centralized location for printers, do you have your own printers or make use of centralized printer system where you have to walk to collect printed documents.

W: No, we have our own printers, they brand new I make use of mine every day.

S: Do you have ink as well and paper?

W: Yes

S: Do Nurses, Doctors or Staff ever have to search for medical supplies when conducting procedures. So, if you had to conduct a procedure would everything you need be in the same room.

S: If you're doing a different procedure everything you need would be in that room

W: Generally, yes, unless we are doing something abnormal, in that case we would go get it from pharmacy, but otherwise the routine stuff that we do often make use of, the supplies are in their places.

S: Are there clear visuals labelling systems to direct patient flow and secondly clear visuals for drugs

W: Yes

S: So that's in check, okay and drugs (swabs bandages everything is also in place?)

W: Yes, they are, and well Labelled

S: Pharmaceutical drugs I'd guess are the same well labelled

W: Yes, they are, we have a pharmacy, so they have to conform to the rules outlined by the council

S: Can I see the pharmacy once we done here?

S: Next was waste of transporting defined as unnecessary moving specimens, materials and even patients.

S: I think one of those is the blood samples having to be collected and returned from the lab, but that are also as a result of the system/financial constraints. Sorry I hadn't mentioned that we have type one waste, it's a waste that doesn't add value but its waste that necessary. So, I would say that's a type one waste.

W: That they have to drive here to fetch it?

S: Yes, opposed to it being processed here but it's just necessary

W: yes, in the past we use to have a lab onsite, but they have since closed down many years ago TOGA they worked out of a container, it was brilliant you took your sample they processed it and you were done.

S: Do you know why they closed down?

W: Yes, I do they closed down due to financial reasons

S: Has management here thought of getting in a lab?

W: yes, they had but it's too costly, so we are using NHLS its way cheaper that way.

S: Are there multiple hand offs with regards to administrative documents and files for approvals of ordering stock

W: it will be different for everyone the pharmacist has the responsibility to sign off on all their orders and here I sign it off.

S: So, it's not multiple signatures being required then.

W: no generally just one

S: excessive patient movement during a consultation.

W: please explain the question

S: from the moment they come in do they have to do a lot of walking?

W: not if they fit, if your sick it is a bit of a problem because it's quiet a steep hill, so the stairs are not accessible to everyone and if you don't go to the stairs that also quiet a steep slope if your wheel chair bound or if your elderly it becomes a challenge. So, they have to come with someone because even getting here is an issue as taxi is costly to pay two sets of fares, but if they here alone we will assist.

S: is there a transport service here? Because I know some hospitals have them some don't.

W: No there is no transport service at Clinic A, we just have the ambulance.

S: on the topic of approvals are there any items you might need approval on? Or are you the final authority.

W: No, I am not the final authority up until last year we had an operations manager and she was top of the food chain. She has since left and they not going to replace her, due to the fact that no other clinics have an ops manager, she had left of her own volition in December, so we don't really know how things are working at the moment.

W: My boss is in Nelspruit is offsite and, in the event, that I need any major approval then id contact him for approval on large budget items or financial decisions as his the regional for Mpumalanga area.

S: any other wastes of transportation that you know of?

W: no but we do have some vehicles used for home-based care of TB patients and also the maintenance cars.

S: next would be waste of over processing or inappropriate processing which is performing tasks add no vale to the patient, or that is performing tasks that are not aligned with patient needs,

S: are patients put through multiple unnecessary diagnostic procedures?

W: No but I do audits of the files so if something seems out of order with the files, I call everyone in and find out what's going wrong or if more training is required etc.

S: can you give an example of this

W: if someone is doing UNE's on all patients and there's no indications to do UNE's unless there is an indication because it's not a routine blood test t that you do, so if I notice the same person is carrying out these tests, I will ask the individual why they are performing these tests and unless there's a valid answer I will remove them we follow procedure and if there's anything more than that requiring testing for there has to be a reason for it. And I do look for unnecessary testing

S: how you do look for those kinds of events or errors?

W: By manually going through the files, auditing them randomly at random times looking for discrepancies, so it can be done while I am seeing the patient. Once I have finished all of my work I go collect a batch of files to check up on patients who might not yet be due to see the doctor yet but too ensure that the scripts are correct and that the blood work is done on time and that the correct bloods are being ordered along with previous notes in the file.

S: Do you find that sometimes the incorrect scripts are issued?

W: yes, it is an occurrence, so we try the safety net where we check they check and often they pick up the mistakes, we had one today where I had written the dosage incorrect I said daily when I was meant to be bi-daily.

S: So, do you have instances where the dosage in terms of Milligrams was wrong either stronger or weaker?

W: yes, we definitely have such incidences

S: IS there duplication of patient files?

W: only if we have lost the first file, it has happened that we are unable to find the patient files at the time of looking for it but it comes up a few days or a week later, but then we put them together. Due to Therapy

edge we print the file summary and we able to view the entire history medication and notes from virtual copies.

S: what do you think is the reason behind files going missing?

W: generally, it's due to the follow up date being set for soon after the visit and it hasn't reached the filing room as yet or filed incorrectly or I have kept the file aside to discuss with my senior.

W: new system in place means files are returned to filing room within following 24hours so as to limit amount of missing files and reception has a list of the files I have with me at all times.

S: Duplication of hard and soft copies, but you have said you have the data base that you make use of does this database allow for the capture a monitoring of other conditions closely related to HIV such as Diabetes, Hypertension and TB? Or is your system limited to just HIV?

W: Yes, we monitor the other ailments as well though we are primarily a HIV clinic we address the other all under the same roof, we have to update all the other conditions otherwise it seems as if we not treating them.

S: do you have problems where the patient will come and yes, the patient is HIV positive but the problem they may have could be a general problem. Do you still attend to them or are they sent off to another department?

W: definitely not we are primary health care and no longer a HIV clinic so whoever sees the patient will deal with it, we never chase the patient away, even in the past we would still attend to the patient, we have a pharmacy onsite, so we have always had the capability to assist and did so.

S: Could you explain the reasons behind having both soft and hard copies of patient files?

W: It should all be electronic, there should be no reason why we still paper based we were trying to move to a fully electronic system but with the shortage of staff and a few other things not being in place it's not been possible for us to implement it like at Themba Lethu.

W: It's not going to be possible to implement it here with the amount of hands we have on deck at the moment, I had been to Themba Lethu to try and see how we could possibly implement it here and it not possible yet, our set up is different

S: So, you don't think it might be because of lack of training? Training of the front-end staff maybe

W: No not training, I have been to training I know how to use it.

W: They do use the system it's primarily the clinicians who require training, it's the flow or should I say the lack of flow that would occur due to it, would cause huge backlogs we would never get through our load in one day.

W: We been looking into it for a long time but it doesn't work many have made suggestions of just doing it but it's complicated.

S: Where do you think the system breaks down?

W: firstly, when you come in the vitals should already be in the system. complaints and everything should be in there, so you have to do all the nurses vitals complaints you have to do your notes then you got to correct all scripts that they have done, and the scripts are entered by the data capturers on therapy edge but you have to make corrections.

W: We not just an HIV clinic we have to like Themba Lethu, we prescribe hypertensives, diabetics all sorts of medications so it takes a lot longer so now as a result printing takes a lot longer. And if you print it you have to sign it. And you have to print your notes and our back up system is not as efficient as the system at Themba Lethu either, so if your system crashed we can't just say oh well we lost all our notes so medical legal. I was not happy to just say my notes aren't there. So, I wanted it to be printed because these are notes signed by me I have signed these notes.

S: so, it creates accountability

W: yes, absolutely I don't want anyone else printing on my name for security as this has happened here in the past, but what if my notes are lost or tomorrow the system is down and I need access to my notes I have always thought that until someone tells me that I don't need to keep proof of anything or that I don't need to print then I won't open myself to the risk.

W: I have tried to implement but the amount of time that it took to see a patient took me so much longer I tried repeatedly.

S: So, do you suppose it's because the typing takes long or what do you see the hold up being?

W: No not the typing I am a really fast at the typing but the system itself is slow to print its slow to get to the change in interface, between therapy edge and the pharmacy page to get the drugs to print takes time.

W: Often I am seeing patients in different locations so I have to come back and start inputting patient information to the computer start printing then go back to the patient. I am seeing the patient I am there I need to write down pharmacy and go.

S: So not all places have computers?

W: All places do have computers about a year ago every clinician had a pc and if I was to see someone in TB there's a pc there as well but it's still slow, I would have to log off the current user and log back in with my own profile and wait for the system in between those 2min intervals add up to hours lost in the day when I have to attend to 60/70 patients in a day. I don't just see patients I have other responsibilities as well like reports. But I had identified the items that need to be in place to make it work and reduce the time that it takes.

S: Next was waste of unnecessary inventory, improper inventory control ordering excess materials, such as medication and medical supplies.

S: one that we had already covered was the blood tubes that sometimes expire

W: It's not often that something like that will happen but It does sometimes happen, I think you should ask the pharmacy about the drugs they might better answer you.

S: Next was the waste of defects, time spent doing something incorrectly fixing errors, like having to correct prescriptions and procedures as you had aforementioned

S: have there been instances where incorrect data has been recorded on the files like ID numbers name or surname

W: I am sure there is but we do try and make sure that any errors have been corrected by asking the patient to confirm details every time they come in.

S: Have there been instances where the patient has been falsely diagnosed

W: Probably I am sure there have been instances where the patient might have been diagnosed with TB who don't necessarily have TB where the sputum tests negative but the chest x-ray are suggestive and clinical symptoms are suggestive, but you still don't have something saying this is definitely TB.

S: Is that due to the processes that are currently on hand, there aren't any technological measures that indicate 100% positive for TB as yet

W: that's correct, as for HIV it's very sensitive and very specific so no not regarding HIV

S: Have patients been referred to the incorrect departments, or wrong referrals from other clinics or institutes.

W: No not really if a nurse wants me to see a patient that means she's not really comfortable seeing that patient so no.

Are there any other wastes that you could think of that perchance haven't been discussed?

W: Nope

S: But one of the other issues was files being within other larger files

W: we can retrieve a file within 30 seconds so it very simple and fast we also restrict access to files and file rooms to prevent any issues

S: next was waste of excess information accumulated through excessive administration and ineffective use of IT systems.

S: Is there a room full of files

W: Yes, the filing room

S: Is there an IT system and if so does it perform all the functions or does it further complicate things

W: Yes, the system is therapy edge, the current system that I was meant to be using, it's brilliant system.it very simple

S: Is there a large number of emails sent from the department or at administrative level, sometimes they send out unrelated emails

W: No, we get what we need to know generally good email etiquette

S: Do you get reminders of meetings via email, text or any form of media.

W: We get reminders via google alerts, and email notifications

S: Do you think the system works

W: Yes, it works well because I might not be in the office and a notification comes through on the phone, so yes it fine that way.

S: do you know how it works with the loss to follow patients what the procedure is for handling the files?

W: we do try and reduce that, so first time visitors to the clinic don't get a file.

W: if you bring a transfer letter a file is opened for you or if it's your second visit then we will open up a file for them.

W: if the lost to follow up then it comes up on the system it picks up 14 days as well as 28 days after their dates.

S: what happens to the files of patient's files that are lost to follow up?

W: we will call them and find out what happened and why they not coming for check up's and medication, sometimes you find out that they deceased or no longer live in the area.

S: so, what happens to the files of the deceased patient files?

W: we keep them for five years thereafter I am unsure as to the procedure but they have to be destroyed.

S: next one was the waste of untapped human potential due to lack of involvement and accountability in improvement processes by staff in positions, this requires a culture of trust and mutual respect by Example interest and involvement

S: Are staff tapped for input and ideas

W: Yes, they are

S: Is there follow through though on the input given by staff.

W: Yes there is, the former operational manager was very involved and she had a system whereby there would be a yearly assessment of staff satisfaction for all employees, mapping their goals, ambitions, what kind of training they felt they needed to better do their jobs.

S: Are staff trained when new implementations, projects or systems are rolled out.

W: YES

S: Is staff moral within the clinic good

W: yes

S: Is there anything that you feel you might need and or would like to happen that's not taking place in your opinion.

S: Does it ever happen that you have workshops that clash with each other.

W: It happens but those can't always be avoided

S: Are there many meeting that held that might be seen to be wasteful

W: No, we have minutes and at end of each meeting after discussing the issues we have one accountable individual and at next meeting we have feedback from that individual so accountability is enforced.

S: how long are those meeting

W: 2hours each Wednesday

S: waste for time, time spent by doctors or nurses on urgent rather that important activities can be an indication of an out of control system

W: yes, there is triage

S: any waste of time spent on appointment dates

W: yes, we have collection date and appointment dates so we have the files being pulled the day before for all pharmacy patients, so as to allow them to collect files and go straight through to the pharmacy to collect the repeat prescription.

S: do they do that for appointments as well not just pharmacy?

W: we use to do that I am not entirely sure if they still do because if you have a large number of patients who aren't coming on the dates, it then creates a waste of time spent pulling all those files and having to return them at the end of the day.

S: waste of communication, do you ever lose the statistics due to transfer or discharge.

W: No, we have someone who sits and is dedicated to the stats, we collect the stats she compiles them, once a month I check the stats and sign off.

W: We don't lose stats because this clinic functions as one big data collection pool each individual collects their own set of stats.

S: Does transfer between departments go smoothly, for both patient as well as staff

W: Yes, it does there is no duplication just a small amendment to include the TB if they have been sent to the TB department

INTERVIEW: CLINIC B (DOCTOR)

(S: Sabrina D: Doctor)

S: The first waste identified is the waste of over production/underproduction, (over production is producing more or less than what the patient needs) if we look at the layout, we can see that there is just wasted space so that would be waste so do you think that at this clinic we have layouts where there is wasted empty spaces? Or do you think that they make good use of space?

D: Yes, we have enough space here.

S: Do you ever have any issues where you need medical supplies and you don't have them on hand

D: No, we don't have any issues or we haven't had any in the past few months I have only been at this ARV clinic for the past three months.

S: Next was the waste of waiting defined as time spent waiting for the next activity or process

S: Do you have to wait for things that you wish that you don't have to?

D: For all patients that come to this clinic they have to do their vitals and they have to test urine, that might be a national rule set out by the department. when in actual fact these are patients who just need to come, and collect their medication and do their vitals, if a patient is well controlled they only really need to be seen by me in six months. But I do understand that when doing these vitals, we pick up things like hypertension so yes that's a positive.

D: We should have system that in place to speed up the flow of patients just coming for repeat scripts. Maybe having the files out ready waiting so they go straight to pharmacy.

S: Do you think that where you have a balanced flow and you don't have too many patients coming in that's things run smoothly, and when the system is under strain that the system grinds to a halt almost breaking down?

D: On a quiet day, we see about 15 patients but on busy days we see about 30 patients and some might be complicated cases, so on those days there's a backlog of patients to be seen while I'm sitting waiting here waiting to see patients. I think the patients that do need to see me, Should be doing their vitals and those coming for scripts should be aside to stream line me seeing the ones who actually need to be seen to by the doctor.

D: Another item that wastes time is the fact that the pharmacy won't issue medication if script has been written in a certain format even though it's on the same page just and it constitutes a waste of time when patients come back because they couldn't refill their scripts.

S: Is there a reason for them wanting it in a certain format

D: Just as part of the medical legal cover

S: Next was waste of unnecessary motions, movements by staff that is non-productive or unnecessary

S: Do you ever have to get up and go call the next patient

D: No that's not an issue here

S: Do you have a centralised printer, our system is rather well organised here and all the blood test have been printed and placed back into the files by the time they get to us or when the patient arrives.

S: Are pharmaceutical drugs well labelled and clearly marked and well stored in place. Can you easily find your supplies when you require them?

D: Well it's the typical hospital setup here, but we do have everything available we just have to find it I wouldn't say it decreases our effectiveness in the clinic

D: Being in a district hospital investigations that we need are not available here and I think that's the standard across SA, so if I need to do a CT SCAN we don't have that equipment available to us so we have to call Hospital C and at Hospital C we have to call the neurosurgeon and they normally give the go ahead but then we get blocked at radiography because they get to decide if the patient deserves a scan and when to scan so they could give you a date for the next day or in two weeks' time if they so desired.

D: Another example for this is an ultrasound so they might need one urgently but will only be booked for one in two months' time, for information that you need now. And we have only one person who does ultrasound in the whole of Mpumalanga.

D: So, the fact that if you need a specialist there are no specialist in the province and we then have to refer patients to Pretoria and majority of the time we manage patients from advice over the phone, but getting the best advice for patients is very important and can't classify that call as a waste of time as such

S: Next was the waste of transporting unnecessary moving of materials specimens and even patients at times.

S: Are there multiple hand offs with regards to files

D: Everyone at the ARV clinic have their own files so it does happen that at times we require the OPD file as well at times, but it's a good idea that they have their own files for accountability and ARV history

S: Do patients with more than one condition have more than one file one for HIV and one for each department the visit?

D: No, it's just a logistical thing to keep this clinic running smoothly

S: Are multiple calls made to different departments?

D: Sometimes you would call Hospital C and the switch board doesn't answer their phone so eventually the patient leaves and that delays the service or help they need until the next visit so roughly about a month delay.

S: Next was waste of over processing or inappropriate processing, performing tasks that add no value to patient or performing tasks that are not aligned with the patients' needs

S: Are patients put through multiple diagnostic procedures they don't need?

D: No really, anyone can get over investigated but not probable.

S: Next was waste of untapped human potential, untapped human potential is the lack of involvement and accountability in improvement processes by staff and physicians this requires a culture of trust mutual respect by example interest and involvement.

S: Are staff tapped for input and ideas

D: I think it's a well-oiled machine here everyone has been working here for a while and everyone here knows their rolls.

D: The HIV guidelines are always changing and sometimes the national guidelines are not always brought out, example the test and treat but there are no clear guidelines, so there has been an issue around that and there still no guidelines out yet so we developed our own system with the sisters to implement it.

S: Does the blood work take while to be returned?

D: We have our own lab onsite but with the HIV patients we basically act on the results a month later just for the reason that we will do the blood test but things won't change drastically in a month's time, and we don't want patients coming back so often to the clinic. Unless its urgent.

D: The blood test that we perform in the clinic for our HIV patients is more to see the side effects of the medication because the tablet that they get affects your kidney function so we test that at intervals along with the viral loads.

D: There no real delays on our blood tests No

S: Are there any false positives regarding the blood tests?

D: No not that I know of the test has a secondary stage to confirm and rule out a false positive

S: Is the staff sent for training to expand on job specific skills?

D: No, they don't other than CPD meetings (continual professional development)

S: Do you think the department should be sending doctors to do the diploma in HIV management?

D: There's a lot that can be done and taken from these courses but at the same time there are drives coming from RTC (Right to care) but internally there's not much in the way of education.

S: How do you receive notifications for your meetings and workshops? Text email or social media such as WhatsApp?

D: We get a text with name date and guess speaker, it's internal

S: Do you find that the workshops are useful and beneficial?

D: Yes I 'd say so not at a doctor's level but yes definitely beneficial for other staff who were present.

S: Are there Job break down sheets, with the steps and descriptions detailing what and how to perform a procedure.

D: Yes, they have a protocol but it's not audited so it's at your own volition.

S: Do you have a manager come in and find out how things have been going and if there any issues that you been facing for the week.

D: No there's nobody from management that's actively coming down to find out how we are about job satisfaction about what's being done for the week, there just assumptions that what we are doing is right and that we happy

S: Is there good staff moral

D: We have lunch but that's about it.

S: Do you have monthly or weekly meetings

D: Yes, we should have a monthly meeting but it's an open relationship here between myself and the sisters and doctors have meeting every Monday morning but it's a more passive process rather than active.

S: Are you the only doctor at the clinic

D: Yes

S: Do you feel this department is adequately staffed

D: Yes

S: Are there any items that might aid in streamlining this clinic in your opinion

D: No, we help most patients for all other illnesses as well so we are running well

INTERVIEW: CLINIC B (NURSES)

(S: Sabrina N: Nurses)

S: The first waste that I had was the waste of over production or under production. Defined as producing more than the customer needs or less.

S: Do you have enough space in this consultation room

N: Good use of space no empty rooms

S: What is your shift pattern like for the doctor, in terms of days on and days off?

N: Five days on two days off, depending on the schedule set out by the medical manager, because he might be on call during his days off.

S: Do you have interns who come in place of the doctor if he has to attend a course.

N: Yes, we do have helpers

S: So how many patients do you see daily specifically at ARV clinic not including OPD?

N: Roughly 50 patients for the day

S: Do you notice that there's perhaps a difference in the influx of patients' different times, days?

N: More patient come in the morning.

S: So, they miss appointment dates due to the rain or bad weather?

N: Yes, they do but some come early others come a day or two later than the date

S: How many nurses are there that help out in this department

N: Three nurses in this department working Monday to Friday 7-4 weekends off

S: Do they do the same shifts as the doctors?

N: Not always depending on if they have to be on call

S: Are medical supplies ever pulled and not returned, or do you find that you need supplies but they not here.

N: No that doesn't happen

S: So, what happens if you can't find what you need? If it's perhaps not in the clinic or in the hospital as such?

N: It hardly happens but, if we don't have we get from one of the other wards or departments

S: Does this ever effect a consultation?

N: No, we have most items that we need. But we got to CSSD two times a week to pull supplies that we might need.

S: How does the ordering process work?

N: We just look at the quantity remaining and order. We have an order book that we write in. the book that goes to the chemist every day. They collect and bring it for us.

S: The next waste I had said was the waste of waiting, defined as idle time spent waiting for the next Activity, event or process to begin.

S: First was how many patients do you have capacity for in your waiting area, and are there more waiting areas used by patients?

N: We have space for about 50 in the main waiting area and yes, we have one waiting area.

S: How long are patients in the facility?

N: It's about an hour from registration to seeing the doctor, then they go to pharmacy for medication, with new and complicated patient cases they take longer between 30-60 minutes and simple cases are faster.

S: Do you think that due to the fact that they walk in patient? So, they just trickle in.

N: Yes, and a lot of our patients are from rural areas.

S: Have there been instances of spill-over to the next day

N: No that's doesn't happen

S: Is that because it's quieter this side

N: No most come in the morning than a slow flow for the rest of the day so doesn't really happen as the lines are shorter.

S: Next on was the waste of unnecessary motions, defined as motion by staff that is not productive and unnecessary, we already discussed the having to go get needles in mid consultation can you think of any others.

S: Do you ever have to go use the printer or make copies

N: Yes, we do have to walk out of the unit to print and at times we have to go collect the blood work from the lab and manually retrieve them from the system ourselves. They don't understand that we have a lot of work to do and that we don't have much time as both patients and doctor waits for our return.

N: We had printer in the unit but it broke and has since been condemned and we haven't had it replaced in quite a while. Due to departmental policy could take a year.

S: Are there clear visual labelling systems and if so do they work?

N: Yes, the patients hardly ask for help most of the time they know where to go.

S: So, could you run me through the process of a patient coming in to see the doctor.

N: They do vitals, they test urine if patient has any complaints we send them to the doctor but if not then we check the script if it's still okay we send them straight to the pharmacy, once they have the medication they return the file and exit the hospital.

S: Do they do vitals even if they coming for a repeat script?

N: Every patient does vitals and testing the urine

S: So, once you done seeing the patient do you write the return dates in file?

N: Yes, we write the return dates on files for patients.

S: Could you shed some light on the functions of a phlebotomist

N: No, we take the blood here to help the doctor ease his load. We were trained to do this during in service but it's not our jobs to do so we just help out by doing so.

S: Are medical supplies well labelled and easy to find.

N: yes, they are marked in boxes.

S: Are there clear visual labels and signs to direct patients

N: yes

S: Do you ever have to come out to call a patient

N: Yes, but they can see that it's open and if not they wait for the next patient to leave then enter

S: Do staff, nurses or doctors have to accompany patients to different wards

N: No, we call the other department and make an appointment or inform them we have patient coming that way.

S: Are assessments of the other closely related illnesses and ailments such as TB and diabetes monitored under the same roof or are they referred to other departments?

N: Yes, we treat all related illness if they complain of anything the doctor checks

S: Next waste was the waste of transportation, unnecessarily moving materials, specimens or even patients.

S: Do you have multiple handoffs with specimens? Example blood work

N: No we hand the file to doctor then patient takes file to pharmacy and returns it

S: Do you ever need any approvals for procedures

N: We need the doctor to sign off scripts other than that, we work according to scope of work, each nurse knows her scope of work according to rank nurse, sister, staff nurse etc.

S: So, do you think there might be anything that might streamline events in the ARV clinic?

N: We could use some additional staff, to ease the load and

S: Are you familiar with the Adherence system, could you explain it to me.

N: Patients in good health with low viral loads come and collect their medication see the counsellor and leave they see the doctor one after six months only.

S: Next was the waste of over processing or inappropriate processing, are patients sent through multiple diagnostic procedures?

S: So, what patient data do you record for patient files? Apart from the script

N: High blood pressure, weight, pregnancy, diabetes and any symptoms they might be reporting on this visit example night sweats.

S: Does file duplication ever occur. Or files getting lost?

N: Yes, if the patient arrived at 4pm and its end of day they leave the file at the pharmacy and sometimes if not returned in the morning then it might get lost in that manner.

S: So, do you test blood once or twice a year?

N: Once a year if in good health, but if the viral load is not steady we do it twice or three times per year.

S: Do you ever have to discard of any medical supplies?

N: Only blood tubes that expire but not often.

S: Next was the waste of defects, time spent correcting errors, one of those was having the incorrect name or Id number on the file

S: Have there been cases of patients being falsely diagnosed

N: No not really with HIV we test thoroughly

S: Have there been instances where the incorrect medication has been issued, in Mg for instance

S: Do the patients ever get lost when trying to get to departments to make bookings or appointments

N: We call the other department but they sometimes don't come for the appointment.

S: Do they ever get booked for the same day to see the Audiologist or dermatologist?
N: No not the same day.
S: Do patients get referred to this clinic from other clinics in the surroundings
N: Sometime but not
S: Are referrals due to the fact that they lack the capacity to treat that patient anymore?
N: We don't have specialists but we refer them within the hospital if they need to see the eye specialist
S: How many doctors tend to be in ARV clinics
N: Generally, just one.
S: Are there always two doctors on duty here?
N: Yes, if doctor is away we get helpers to come in
S: Next was the waste of untapped human potential. Defined as lack of involvement and accountability of improvement processes this requires a culture of trust and mutual respect, by example interest and involvement.
S: Do staff attend workshops, and if so what intervals and what's the frequency
N: Yes, we do attend workshops, they get scheduled we are informed but, sometimes we don't all get to attend due to the numbers.
S: Are you ever tapped for ideas
N: (Not answered)
S: Many have echoed the sentiment that sometimes they want to attend the workshops but they don't have the staff to relieve them, so scheduling was sometimes problematic.
N: Yes
S: Do you think it's necessary to do vitals for everyone that comes in, even if it's just for repeat prescriptions
N: Yes, we can find out about the patients' health
S: Are staff sent for training for job specific training regarding HIV?
N: Yes
S: Is staff trained in new implementations, projects and systems
N: Yes, we have TB and HIV workshops at times others are just refreshers for new staff, but we do get trained before the new implementation is put in place.
S: Would you say you're personally satisfied with your job at the end of the day
N: Yes
S: Is staff more high in the department?
N: Yes
S: Does management ever do a GAMBA, is there any form of feedback regarding complaints
N: You report to your direct superior and they will take it forward, we have a meeting every Friday morning, all the nurses in the ARV clinic, the matron does sometimes come and see
S: Do you get notified of meetings and workshops
N: Yes, they send a notice to us
S: How many patients miss the dates set for return, if you were to estimate as a %
N: five to ten % miss their dates.

INTERVIEW: CLINIC C (DOCTOR)

(S: Sabrina D: Doctor)

S: The first waste that I had was the waste of over production or under production. Defined as producing more than the customer needs or less.

S: Do you have enough space in this consultation room do you have the equipment that you need?

D: yes, everything that I need is within the perimeter.

S: what is your shift pattern like in days, in terms of days on and days off?

D: We work 7:30 to 4 every day of the week Monday to Friday

S: How many patients do you see in a day on average?

D: It's different some days we see more than others, some days we see like 50 patients on Wednesday but on Fridays we only see about 15 for the day

S: Do you know why on Wednesday there are more patients on that specific day?

D: we have patients from the prison coming in on that day so numbers are pushed

S: Is there a reason for the prison patients coming here?

D: They have to go to a hospital and not a clinic, but another reason is due to the fact that they don't want to go to their local clinics so they come here, they might feel that they like it more than their local clinics perhaps.

S: Do you deal exclusively with complicated patients here?

D: No some patients that we see to are not complicated cases they come out of choice

D: How many doctors are there in this ARV clinic

S: I work alone here but at times they have spear labour and as such I get an intern for two weeks but mostly I am alone here

S: Does it ever happen that there are no doctors in the clinic to attend to patients?

D: They get sent to the OPD to find me or if they are a complicated case they get sent home to return the following day

S: In this office do you often find that you don't have the medical supplies that you need like the gloves that you had mentioned?

D: I am not in charge of the store room and as such I am not sure how things run but if I need anything I notify the nurses and the bring it shortly for me

D: On my side, I don't have any problems

S: The next one was the waste of waiting, time wasted waiting for the next activity or process to occur

D: It never happens here, patients sometimes prefer to come here because I work through lunch and our lines move fast so no long queues.

S: Have there ever been instances that are spilled over to the next day?

D: When I'm not here they are sent to OPD, but most of our patients are booked so we plan their dates if no intern is available and I am away and it needs special attention then they come the next day.

S: Next was waste of unnecessary motion, movement by staff that might not be production or necessary.

S: Do you have centralised printers that you need to use, but I see that you have printer here in the office so do you use it for all the administrative printing that you have to do?

D: this printer is strictly for blood work. No other work apart from the printing of blood results for patients

S: Is the Lab located on the hospital premises?

D: Yes, it on the other side of the building

D: Does your printer work, and have you ever had any issues having it repaired or replaced if necessary?

D: No I haven't been at this hospital for long but I will say that haven't had any issues as yet, I have only been here for 7 months

S: Do you ever have to come out of your consultation room to call patients, or does the nurse bring the file this side

D: The nurse brings the file, but I don't attend to each patient for some patients I just see the files and write scripts out and others I see the patient as well, so it depends on the patient's condition weather or not I see them or not on the day.

D: Some days I might have finished with the files so I go out and call the patients and hand them the files myself. But it's the nurse's function to do it.

S: The next one was that at times HIV patients have other illnesses attached to the HIV example TB, Diabetes or hypertension. Do you treat all these additional illnesses as well or are they referred to the relative departments for treatment?

D: We deal with other illnesses that might not be related to HIV but at times depending on my load and mood I mostly help

S: Do you have all the procedural equipment that you might require to do your job efficiently in this consultation room or do you have to ask for it to be brought to you?

D: Sometimes the patient comes in with high blood pressure and we are able to help other times we might need an ECG machine but that would require them going to OPD or casualty department

S: The next one was waste of transporting, defined as unnecessarily moving materials, specimens or even patients.

S: In terms of approvals are you the senior most authority figure in the department or do you also require approval signatures at times?

D: For basic procedures, I don't need approval but if I wanted to refer to another department Then id require approval

S: Is it a long process or is it just one person you require a signature from?

D: For blood test as well as x-rays I have my clinical funding so I know what to do as the doctor I make those decisions no questions asked

S: Doctor do you ever have to get up and go collect or look for items that are meant to be here that aren't present at time needed

D: No, the nurse brings everything I require

S: Do intern doctors come for approval before performing procedures such as a lumber puncher s?

D: Sometimes but mostly not, we might discuss a patient's case but not often I give them greenlight to do as needed

S: Next was waste of unnecessary inventory, have you ever found that there has been medication or items like blood tubes that have expired?

D: To be honest I have never checked or had a report from the lab about expired blood tubes so to my knowledge nothing of that nature has happened, but the nurses would know

S: Next is the waste of defects time spent doing something incorrectly or inspecting or fixing errors

S: Do you ever have to correct errors made by interns or the nurses, perhaps due to the fact that they might be inexperienced?

D: No, the staff in this department is very good at what they do, the nurses have taught me a lot in this department and the staff are well experienced and we know everything about HIV.

S: Have there been instances where you have found that the patient details name, surname or id numbers are printed incorrect or incorrectly hand written

D: yes, this is true I have seen this occur maybe once or twice in the past and in fact it's not just that I have found the blood results of one patient in the file of another and we corrected it.

S: What was the corrective action taken once the incident has been identified?

D: We correct it immediately, and I have reprimanded the individuals concerned

S: Do patients ever get referred to the incorrect departments?

D: No, we have specific documents so that cuts out and such errors

S: next is the waste of untapped potential, due to lack of involvement and accountability of improvement processes, this requires a culture of trust mutual respect by example interest and involvement

S: do the staff have to attend workshops, if so how often and what frequency

D: yes, we do workshops but it depends on the dates, I am the only doctor here so if I have a workshop yes, I go. The nurses have to schedule the timetable to allow everyone to go but yes

S: Are staff encouraged to further their studies, are staff sent for job specific training

D: I am not sure about the nurses but with regards to the doctors, after 6months of service you can apply for a diploma in HIV management.

S: Are staff trained on new process and implementations

D: yes, we are all trained of new developments

S: Does management do GEMBA Walks

Next is the waste of time, do all patients that come in have to do vitals

D: yes, they all do vitals even if it's repeat prescription, just to catch anything that might be out of the ordinary

S: are you of the opinion that ARV clinics should be inclusive of all departments under one roof? Or should the clinic be its own entity.

D: no each department should be free standing, as they offer in depth knowledge in HIV and refer them to other disciplines only when necessary as to save recourses.

INTERVIEW: CLINIC C (INTERN)

(S: Sabrina K: Intern)

S: the first waste that I had was the waste of over production or under production. Defined as producing more than the customer needs or less.

S: do you have enough space in this consultation room

K: space wise is fine but equipment wise we are lacking,

S: how so?

K: we have otoscopes but no ear pieces making that piece of equipment redundant, the bed is broken, viewing boxes most of them are there but there are no globes in them. But yes, we have enough space in the rooms.

S: what is your shift pattern like in days, in terms of days on and days off?

K: we work 7:30 to 4 every day of the week, one week day call and one weekend call, and minimum 80hours overtime

S: Is that just at ARV clinic or is for other departments as well

K: It's at OPD as well, it constitutes our intern hours

S: So how many patients do you see daily specifically at ARV clinic not including OPD?

K: We see roughly 16 patients a day between two doctors, in OPD we see up to 25 patients per day and you have to do a full workup on them spending 25-40mins per patient, whereas here many of the times we don't even see the patients as the sisters just bring in the files for scripts to be written out and signed off

S: do you notice that there's perhaps a difference in the influx of patients' different times, days?

K: yes, there a lot more in the morning and afternoons are slow, and towards month end there a larger number but if it rains then they stay away but with the first sunny day after the rain has passed there happens to be more people coming in on that day

S: So, they miss appointment dates due to the rain?

K: Yes, that correct

S: how many nurses are there that help out in this department

K: I am unsure there are probably 6 or 7 in the department, but there more than enough nurses here

S: do they do the same shifts as the doctors?

K: I am unsure but I think they work from 7:30-4 as well, the sisters in the wards work a 7 to 7 shift.

S: Are medical supplies ever pulled and not returned, or do you find that you need supplies but they not here.

K: yes, that happens a lot here, many times you are looking for something specific and it's not here, and another example of this is the government will get pink needles on tender but they blunt so nobody uses them, so you have boxes that are sitting not being utilized

S: So, what happens if you can't find what you need?

K: well if I find the items that I am looking for while in another department like OPD I just keep it with me in my bag till such time as I have need of it.

S: Does this ever effect a consultation?

K: Yes, it's happened before where I had to borrow a needle from OPD or ear piece, to continue with processing my patient, wish doesn't really help the problem because nobody has been alerted to the fact that we out of stock down here.

S: the next waste I had said was the waste of waiting, defined as idle time spent waiting for the next activity event or process to begin.

S: do you ever find yourself spending time waiting for things that you shouldn't be waiting for

K: No not really there's always a constant influx of patients here so in between I read, but that speaking as a doctor,;30 in the morning and to wait till 2 or even 4pm in the afternoon and sometimes they get turned away because the doctors have to leave early to go on call or they have other appointments.

K: Patient wise they all told to get here at 7. I think it's silly to have everyone arrive here at 7 and wait all day, I think they should have a staggered arrival time for patients and have them come at 7,9,11 and 2 O'clock that they don't have to wait the entire day

S: Do you think that due to the fact that they walk in patient? So, they just trickle in.

K: No those are booked patients; every single book patient gets told to be here by 7 and that makes no sense.

S: Have there been instances of spill-over to the next day

K: In OPD it might happen three times a week but in ARV it's not happened

S: Is that due to the fact that it's quieter this side

K: Yes, it's due to the fact that It's not very busy, if someone walks in at 4pm we still help them and attend to them.

S: Next on was the waste of unnecessary motions, defined as motion by staff that is not productive and unnecessary, we already discussed the having to go get needles in mid consultation can you think of any others.

K: Having to find an interpreter can at times be a problem, there are enough sisters around but then I have to leave my consultation room to find them and sometimes they are also busy, so it's a bit of waste there.

S: Do you ever have to go use the printer or make copies

K: Nope there's only one computer in this hospital and its used for blood results in the lab no printing, no computers and no photocopies.

S: Are there clear visual labelling systems and if so do they work?

K: No really, we have the brown folders that somebody has hand written their names on and sometimes the find that the name /Id or surname is incorrectly written or spelt.

K: It would improve things a lot if they had a barcode or sticky label tag, with all the patients' details like at some other hospitals.

S: So, could you run me through the process

K: The patient comes in, hands the clerk the card, the clerk retrieves the card pulls the file, the sisters will triage them see if it's an emergency, if so they get pushed forward, they do the vitals urine tests blood tests and then they get sent through to us we make notes and examine them, do the script and once done send them back to the sister and she then tells them to go to pharmacy or go to x-ray etc.

S: Do they do vitals even if they coming for a repeat script?

K: Yes, vitals and weight, the weight is important to see if they are failing the treatment

S: So, once you done seeing the patient do you write the return dates in file or does the nurse do it

K: The nurses do it thereafter the patient takes the file to pharmacy and leaves the file with pharmacy.

S: Could you shed some light on the functions of a phlebotomist

K: Okay they just take blood, sometimes we too busy to do the administration and still be drawing blood so we send them to the phlebotomist whose next door to lighten the load and reduce waiting times.

S: How long does it take to draw blood and how long does it take to have it tested

K: On average the blood takes about 4hours the basic bloods are out in about before that bit in an emergency it can be done in 20munites, you take it down to the lab yourself.

S: Are there instances where you have to personally have to take blood work down to the lab?

K: Not here because there hardly any emergencies relating to ARV Clinic but in other departments yes.

S: Are medical supplies well labelled

K: Yes

S: do you perform any procedures during consultation that might require medical supplies?

K: Yes, we sometimes perform a lumbar puncher s

S: do you ever have to come out to call a patient

K: No here we wait for the files to be brought in by the sister or nurse

S: Do you ever get four files on a row or do they bring you the files individually

K: No, they would bring them in sets of 2 or 3 at once

S: do you know why they bring them in those quantities?

K: Most probably due to the fact that they know that all 3 the patients are all coming in for repeat prescriptions so it's just a matter of new scripts.

S: Are patients not allowed to hand out scripts

K: No, they may write the script out but it requires a doctor's signature for legislative purposes

S: Do staff, nurses or doctors have to accompany patients to different wards

K: We don't usually admit anyone from this here, but in OPD south yes, we walk them to the next department being casualty find the intern on day cover and do a formal handoff

S: Are assessments of the other closely related illnesses and ailments such as TB and diabetes monitored under the same roof or are they referred to other departments?

K: The nurses will ask them if they are feeling well, if they are losing weight or if they are coughing, so we screen for TB and if they not coughing or losing weight than we don't do anything about it.

K: But if there are any red flags we will pick it up in the consultation, it would be noted in the file and we screen for TB so then we send bloods and sputum to the lab.

S: What medication do they take for HIV and TB given a patient has both illnesses? Do you write the scripts for the TB medication as well?

K: They have made things a lot more convenient these days, we have one pill for TB and one pill for HIV. With the ARV's they have combined three pills into one and for the TB medication they taken 4 drugs and combined them into one combination tablet for the first four months and later they get two pills in one, so effectively if a patient has both HIV and TB it's just two tablets they are taking for the day

S: What happens to a patient who has been found positive for TB?

K: I am not sure what happens once they get back from lab with the results, I've never had a patient come back and present me with their results. I think they might go to the TB clinic or to OPD for a work up.

K: We would initiate treatment but there's also some administrative registers that need to be filled in for the statistical reasons

S: Next waste was the waste of transportation, unnecessarily moving materials, specimens or even patients

S: do you have multiple handoffs with specimens? Example blood work?

K: No I haven't drawn blood while here in ARV clinic but there's a box and the phlebotomist draws the blood and places it inside the box and somebody comes to collect it. We might have to go to the lab every now and then in emergencies but that about it.

S: Why is it that you not allowed to draw blood work? you had said that in OPD you draw blood work yourself?

K: It's just that here we have a phlebotomist here so it makes life simpler for me

S: Do you ever need any approvals for procedures

K: Yes, if I wanted to do a CT scan I'd need approval from the consultant, many a times they are not here so we have to call them and discuss the patient. If they approve then we just write on the form that consultant has approved the procedure. But then we get flak from the guys in X-RAY department because they want a signature for administrative purposes.

S: so, is that just one signature for approval?

K: yes, just that one.

S: so, do you think there might be anything that might streamline events in the ARV clinic?

K: if they could train a nurse to rewrite scripts for patient, given there are no issues and treatment is going well, that would be very helpful but legislation won't allow it

S: Are you familiar with the Adherence system, could you explain it to me.

K: If a patient has been stable for a year they get down refer them to their local clinics, we see them once a year check bloods make sure that they have no complications and furthermore they collect the medication at the clinics

S: Next was the waste of over processing or inappropriate processing, are patients sent through multiple diagnostic procedures?

K: No, it's very simple it's a pin prick and if indicated positive then four more bloods are drawn and sent off to the lab we have the results the next day and we can start treatment after all the tests to ensure they compatible with treatment have been done

S: So, what patient data do you record for patient files? Apart from the script

K: we just go through the checklist page and see if vitals and everything else is in order. If the patient needs to come back for blood on their next visit we then just make a note so next doctor sees that blood needs to be taken.

S: Does file duplication ever occur.

K: No, it very happens that a patient loses the file, if they do in most cases the patient knows the type of medication that they are taking and a few months later the file will turn up again.

S: So, do you test blood once or twice a year?

K: we test twice a year but as soon as the viral load is undetectable we test once a year

S: do any errors occur in the files example patients' blood work not being taken on time?

K: Yes, it happens from time to time with the numbers of files and scripts you might forget to order blood work and in most cases the patient will remind the nurse that they need to do blood work and we will slot them in for blood work to be done.

S: Do you ever have a stockpile of files?

K: No not here

S: Do you ever have an equipment that you don't use due to the fact that is inoperable due to missing components or broken down.

K: You could have to find a unit in OPD that has what you are looking for and lend their ear piece,

S: How far is OPD from your current station in ARV clinic?

K: it's a two minutes' walk but

S: Do you ever have to discard of any medical supplies?

K: Yes, there are a few items that get thrown away by the nurses when the restock the supplies but I don't what in particular.

S: Next was the waste of defects, time spent correcting errors, one of those was having the incorrect name or Id number on the file

K: Most times it's our own fault we either forget to sign the script or filling in the date and then patients came back from pharmacy.

S: Have there been cases of patients being falsely diagnosed

K: No not that I know of, but it can be difficult to do the test on children under the age of 18months they could present a false positive due to the anti-bodies being present till the age of 18 months their actually negative.

S: Do they monitor the children further? Is the child put under medication immediately in that case?

K: Yes, there have been cases where the sister will administer treatment after having diagnosed the patient with HIV.

S: So, what do you think could be the reason for these mistakes?

K: Training

S: Have there been instances where the incorrect medication has been issued, in Mg for instance

K: Yes, I am sure there have been due to the fact that its hand written and not printed from a PC, some handwritings are illegible so it would be easy to miss interoperate the 100Mg for a 10Mg if you're not familiar with the dosages and strengths of these various medications.

S: Do you ever have to send the patients to other departments apart from the TB and Phlebotomist?

K: Yes, we send them to Audiology and dermatology.

S: Do the patients ever get lost when trying to get to departments to make bookings or appointments

K: Well generally what happens is that they book an appointment and never show up, or they get lost on the way to book the appointment

S: Do they ever get booked for the same day to see the Audiologist or dermatologist?

K: No, it's always like for two months down the line

S: Do patients get referred to this clinic from other clinics in the surroundings

K: yes, I think what happens is the peripheral clinics just phone and inform the sister that they will be sending the patient through,

S: Are referrals due to the fact that they lack the capacity to treat that patient anymore?

K: Yes, or I could be due to the fact that the patient might be in the ward and they get referred here from the ward to commence treatment.

S: How many doctors tend to be in ARV clinics

K: At this one we have two, but I have only ever been to one and this is the setup

S: Are there always two doctors on duty here?

K: No not always, if I am on call then I would have left the morning at 10 so he would have been alone for the balance of the day, or if his on call tonight then he leaves at about 14:00 and I am on my own.

S: Are there ever times that the scheduling works in such a manner that you both are not in the clinic?

K: No there will always be a doctor here.

S: What happens if you both not here for sum or other reason?

K: The sister will tell them to return in the morning or if it's urgent they will go look for a doctor in one of the other departments nearby.

S: Next was the waste of untapped human potential. Defined as lack of involvement and accountability of improvement processes this requires a culture of trust and mutual respect, by example interest and involvement.

S: Do staff attend workshops, and if so what intervals and what's the frequency

K: There are workshops throughout the year, but they also have many that are aimed at the month of august.

S: Are you ever tapped for ideas

K: Yes definitely

S: Many have echoed the sentiment that sometimes they want to attend the workshops but they don't have the staff to relieve them, so scheduling was sometimes problematic.

K: Yes, you can't leave the department if you're short staffed.

S: Do you think it's necessary to do vitals for everyone that comes in, even if it's just for repeat prescriptions

K: I don't think it's necessary to do vitals on every patient, but in not doing the vitals we miss out any of the other conditions that could have been monitored such as high blood pressure. We don't just treat HIV we are treating the patient.

S: Are staff sent for training for job specific training, for your personal upliftment within your profession not just the workshops

K: No, I've never heard of such happening here

S: Is staff trained in new implementations, projects and systems

K: I would imagine it must I am unsure

S: Would you say you're personally satisfied with your job at the end of the day

K: Yes definitely

S: Is staff more high in the department?

K: Yes, surprisingly high seeing as everyone in here has a terminal illness, but even the patients are golly so yes

S: Does management ever do a GEMBA, is there any form of feedback regarding complaints

K: No not really feedback goes upwards and never back.

S: Do you get notified of meetings and workshops

K: No, the only time we as interns get any notifications are when we had the right to care workshops.

OBSERVATIONS: CLINIC C

Simple steps to define what happens when the patient comes into the clinic

- Place the card on the table
- Clerk gets up to collect card
- Clerk looks for patient file
- Once he gets the patient file he hands them over to the nurse in adjacent room.
- The nurse will call out the patient name
- The nurse will check the vitals of the patient
- The patient is then issued a script and has to go to the pharmacy to collect the medicine (This is a different building entirely)
- Alternatively, the patient may have to be referred to another department OPD.
- In a simple case the patient will leave the file at the pharmacy. The nurse will have written down the date of return for the patient. This is also written on the patient Card that the patient goes home with. (Patients missing appointments is not due to lack of not being informed!!)
- The data capturers (3 individuals will then collect the files from pharmacy and capture the data in their system e.g. return date, CD4 count)
- The data capturer will then bring back the files to clerk who will file the patient file.

No forms are filled out by the patient. All administrative type documents are filled out by the nurses/clerk. (Literacy level of the general population/ visiting the clinic)

Patient files are arranged in order of year and patient file number.

Existing defect in the system- At pharmacy sometimes files are put in the wrong department basket. Eventually some of these are returned to pharmacy or sent back to the ARV clinic (others get lost forever*) Also if the doctor keeps a patient file in the event he wants to review that patients file for a particular reason. Sometimes the doctor will inform the clerk he is keeping the file, however the clerk may sometimes forget

In both cases a temporary file is opened, resulting in duplication

OPD (Out-Patient Department)

HIV Patients, are transferred to the ARV clinic even when the condition is not related to a Viral Infection. E.g. if a patient is sent to OPD from ARV clinic due to cellulitis the patient will be sent back to the ARV clinic.

The function of the ARV clinic is to provide the following services to their patients:

- To conduct viral load test and CD4 count
- Provide counselling for patient who are HIV positive
- To administer ARV medications and therapy to help reduce the Viral load as much as possible - preferably to undetectable levels - for as long as possible (Virologic goal). To assure that less damage will be inflicted on the immune system.
- Treat viral Infections associated with the HIV virus

There is failure demand in both the clinic and OPD. Patients get sent back and forth.

Due to budget constraint, there have been shortfalls e.g. no budget to buy ink. Printers sit idle (Factoring in the cost that was spent on buying the printer??? What was the purpose of buying the printer)

Phlebotomist that takes blood for OPD has consultation in Clinic C. The clinic also has their own phlebotomist (the head nurse in the clinic/ Operation Manager, expressed that there is no real need for this as they are all trained to draw blood). There is only one nurse/ practitioner (OPD) that performs this task is not always around, the work of the OPD then gets done by the ARV clinic staff (Spill Over). Also, location!!!! The blood collected must then go to the lab, which is also in a different location. (The room is basically only used for blood collection, can this task perhaps not be performed by the nurse/doctor issuing the test be done) (Failure demand when the Phlebotomist, I not around, e.g. on leave, or has to go to maternity to collect blood)

There are too many meetings! Some of these meeting clash e.g. IPC and general staff meeting can be on the same day, alternatively the workload may be too much on that day and since they operate with skeleton staff the manager may choose to completely avoid the meeting. As a result, the manager of clinic may miss a meeting. The result associated with missing a meeting is where to get information from. The manager can try and then get in touch with other persons who attended the meeting. However, the staffs are constantly busy lagging behind, often this doesn't happen. Information loss occurs...

The Clinic has visible signs; however, these do not help much (Signs have also been translated to other languages). Patients will still ask for directions from staff (In some cases even this is not enough, they will need to be taken to the department that they are looking for). Perhaps Culture?

There is an appointment system in place, however this system does not work because 70% of the patients do not stick to their return dates (Most come late, sometime early). This has discouraged the clerk, who previously used to take out files to stop doing so. Most of the patients who come into the clinics are walk in patients.

When stock needs to be ordered, the Operational manager (head nurse at the clinic) has to take a stock count??? Then fill out form for stock order, this has to be signed by Matron, who is in another building. To? (At the end, Department approval is what is required)

There is only one Doctor at the clinic, things start to get tricky when the doctor is on leave, patients have to return to see the doctor in dire cases (failure demand???). Interns come in from time to time this helps with workload. (Why isn't there an intern allocated to the clinic permanently??? What does intern training entail?)

Time frame of Return – Most patients who come to the ARV clinic in most cases they have to return in 5/6 months (some of these patients have repeat slips, so after measuring their vitals they leave). Bloodwork is normally done on a yearly basis.

Time frame for an exceptional case – patients who have Viral Pin – these patients have to come in every 2 weeks (Find out more on Viral Pin).

Clinic C does not hold a large number of drugs, all drugs administered through pharmacy. Only small stock kept on hand for emergency purposes. These drugs are return back to pharmacy when they start to approach date of expiration (3 months close to the time), so that they can be used by a department that needs them more urgently.

Very rarely are wrong prescriptions issued, however this does happen.

Emails at an administrative level – Currently at the start of year (Jan 2017), the staff have a problem with their emails server problem (@mpuhealth.gov.za). Staff haven't been able to receive emails (personal

accounts Gmail, yahoo etc. still work). Another point to consider is that there is no internet connection in the ARV clinic, internet only on administrative block, where CEO's office is located). Sort of defeats the purpose of email?

Feedback System – To report a complaint or put forward a new idea, this work in the form of email and verbal communication, with the next immediate supervisor. Matters for the clinic (e.g. problems with cleaner) end up going to the Matron. From this stage on there is feedback or course of action provided back to the Clinic. This is a dead end! (No action taken possibly because of budget cuts, too many chains of administrative approval)

Data recording/Capture – The data is capture on 3 different documents (patient info)

1. When the patient comes in it is captured in a book by the clerk (Patient No, Name, File/ Reg no, Gender, Regiment, date of return
2. The nurse will then enter the date of return and details from vital collection in the patient file (CD4 count, Viral load, next appointment, Blood pressure, Medication)
3. The data capturer enters details of (CD4 count, Viral load, appointment date, medication on the online file). The data capturer expressed t main concerns (1. That the system does not allow him to enter details of the hypertension, TB and diabetes, patients return because they lack info perhaps on medication and he is unable to help) 2. He expressed that there is no real need for the clerk to enter patient data – On further clarification with clerk I came to realise this book is used for audit processes.

Need to expand on what exactly needs to be recorded, why there is duplication of soft and hard copy and when the IT system is limited.

File Clerk Office - This is a breakdown of 2 offices (1. Front end office 2. File Room)

There is a lot of empty space in the file room (e.g. it was easy to see that they could have shelves or cabinets put in in the front-end office). The complaint at this office was that there is not enough space in the file rooms. Patient files from 2016 have been sitting on the desk in the front office as well as 2017 file. (2016, 2017 patient files are files- called as such since year represents the year the date patient first came to the ARV clinic).

The file room contains not only patient files, also a box that has filled out (duplicate) prescription/letters that had been issued, old staff registers, unknown files, stationery. The dockets the files are placed – some of them are full, some are half empty. The dockets hold the files are rigid structure that can possibly hold up to 15 files each. Some hold 5 others hold 15. Unused capacity?

Moving forward sorting out files – Due to the lack of space and the 2016 and 2017 files being kept out. The clerk and a few administrative staff have decided that they need to go through the file room manually to identify the files of the lost to follow patients (defaulted patients, patient who came to the clinic only once) When asked why manual not using the computer database I came to find out that the computer system does not have this data. Perhaps because of the number of years.

APPENDIX C



health
MPUMALANGA PROVINCE
REPUBLIC OF SOUTH AFRICA

66 Anderson Street, Nelspruit, 1200, Mpumalanga Province
Private Bag X11278, Nelspruit, 1200, Mpumalanga Province
Tel l: +27 (13) 755 5100, Fax: +27 (13) 752 7498

Litiko Letemphilo

Departement van Gesondheid

UmNyango WezeMaphilo

PERMISSION TO CONDUCT RESEARCH

To the Human Research Ethics Committee (Medical) at the University of the Witwatersrand, Johannesburg.

The purpose of this letter is to inform you that I give Sabrina Chatur (Student number 501012) permission to conduct the Masters research titled *Improving service delivery oin South African clinics: the case for using work study*. This also serves as assurance that the research will be conducted in accordance with the committee's requirements for research.

Sincerely,

Mr. David Mdluli


District Manager: Ehlanzeni District
Department of Health
66 Anderson Street, Nelspruit



R14/49 Ms Sabrina Chatur

HUMAN RESEARCH ETHICS COMMITTEE (MEDICAL)

CLEARANCE CERTIFICATE NO. M160487

NAME: Ms Sabrina Chatur
(Principal Investigator)
DEPARTMENT: School Mechanical, Industrial and Aeronautical Engineering
Helen Joseph Academic Hospital

PROJECT TITLE: Improving Service Delivery in South African Clinics:
The Case for Using Work Study

DATE CONSIDERED: 06/05/2016

DECISION: Approved unconditionally

CONDITIONS:

SUPERVISOR: Dieter Hartmann

APPROVED BY: 
Professor P. Cleaton-Jones, Chairperson, HREC (Medical)

DATE OF APPROVAL: 12/05/2016

This clearance certificate is valid for 5 years from date of approval. Extension may be applied for.

DECLARATION OF INVESTIGATORS

To be completed in duplicate and **ONE COPY** returned to the Research Office Secretary in Room 10004, 10th floor, Senate House/2nd floor, Phillip Tobias Building, Parktown, University of the Witwatersrand. I/We fully understand the the conditions under which I am/we are authorised to carry out the above-mentioned research and I/we undertake to ensure compliance with these conditions. Should any departure be contemplated, from the research protocol as approved, I/we undertake to resubmit to the Committee. **I agree to submit a yearly progress report.** The date for annual re-certification will be one year after the date of convened meeting where the study was initially reviewed. in this case, the study was initially review in April and will therefore be due in the month of April each year.

Principal Investigator Signature _____

Date _____

PLEASE QUOTE THE PROTOCOL NUMBER IN ALL ENQUIRIES

Letter of Consent

I, [REDACTED], agree to participate in the MSc research entitled *Best Practice Approach to Identifying Waste in Healthcare*, to be undertaken by, Sabrina Chatur, under the supervision of Mr. Dieter Hartmann, and certify that I have received a copy of this letter of consent.

I acknowledge that the research has been explained to me and I understand what it entails, as follows:

1. I agree to allow access to the Hospital/Clinic and service facilities for the purpose of this research.
2. There will be two interviews, which are expected to take no more than 1.5 hours each.
3. The interviews will be audio taped, and transcribed for analysis by the researcher.
4. The processes of the Hospital/Clinic will be mapped.
5. I will provide a brief tour of the Healthcare facilities at my discretion, and that the researcher will record her own observations.
6. I have the right to withdraw my assistance from this project at any time without penalty, even after signing the letter of consent.
7. I have the right to refuse to answer one or more of the questions without penalty and may continue to be a part of the study.
8. I may request a report summary, which will come as a result of this study.
9. I am entirely free to discuss issues and will not be in any way coerced into providing information that is confidential or of a sensitive nature.
10. Pseudonyms will be used to conceal my identity, and that of my company, my employees, my suppliers and my customers. The information disclosed in the interviews will be confidential.
11. Audio-tapes and transcripts will be kept securely stored during the research and after the research has been completed.
12. This project was approved by the Faculty of Engineering and the Built Environment of the University of the Witwatersrand and the School of Mechanical, Industrial and Aeronautical Research Ethics Committee (non-medical) of the University.
13. If I have any questions or concerns about my rights or treatment as a participant, I may contact the Chair of the School of Mechanical, Industrial and Aeronautical and Chairperson for Human Research Ethics Committee (medical) at (+2711 717 2301) or by email (peter.cleaton-jones1@wits.ac.za).

Signed: _____

Date: _____

Questions concerning the study can be directed to:

Sabrina Chatur

Tel: +27764710402 and Email: sabrina.chatur@students.wits.ac.za

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UNIVERSITY OF THE WITWATERSRAND, JOHANNESBURG
SCHOOL OF MECHANICAL, INDUSTRIAL AND AERONAUTICAL ENGINEERING

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Signed: 

Date: 23.02.2014

Questions concerning the study can be directed to:

Sabrina Chatur

Tel: +27764710402 and Email: sabrina.chatur@students.wits.ac.za

Letter of Consent

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Signed:  _____

Date: 24.02.2017

Questions concerning the study can be directed to:

Sabrina Chatur

Tel: +27764710402 and Email: sabrina.chatur@students.wits.ac.za



Letter of Consent

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Signed: 

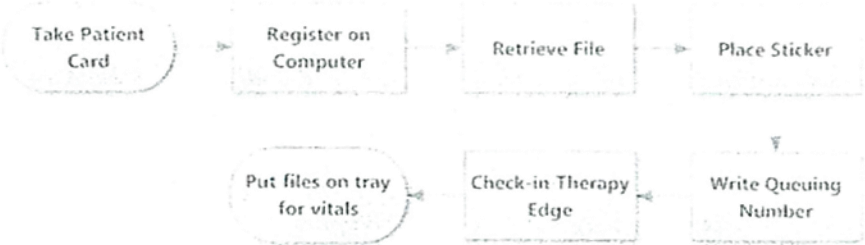
Date: 24/02/2017

Questions concerning the study can be directed to:

Sabrina Chatur

Tel: +27764710402 and Email: sabrina.chatur@students.wits.ac.za

APPENDIX D

<u>Standard Name</u>	PATIENT REGISTRATION AND CHECK IN	<u>Responsible Person</u>	ADMIN CLERK
<u>Customer Value</u>	PATIENT REQUIRES TIMELY FILE RETRIEVAL, WITH ACCURATE UPDATED INFORMATION AND DIRECTED TO CORRECT CARE STREAM THE FIRST TIME		
<u>Input</u>	<u>Process</u> /	<u>Steps</u>	
1. Appointment card 2. Identity Document 3. File Number		1. Ask patient for appointment card/registration info & very visit type 2. Register patient on computer 3. Retrieve patient file from drawer 4. Placer color sticker on front cover of file 5. Write queuing number on sticker 6. Check in patient on TE 7. Put files on tray for vitals	
<u>Output</u>			
<u>Information or Activity</u>	<u>Time</u>	<u>Quality</u>	
- Registered patient - File with appropriate clinical records - Checked in on Therapy Edge - ONE PATIENT AT A TIME	MAX = 2 minutes	1. Correct file given to patient 2. File with legible records 3. Accurate/up-to-date patient information 4. Correct care stream	

Job Breakdown Sheet

Description of the task:				List Common Key Points:	
Process or Medical Equipment					
Processes, people and tools required:					
Important Steps		Key Points		Reasons	
WHAT?	A logical segment of the operation advances the flow.	HOW?	Things in important steps that will: 1. make or break flow 2. harm patient or staff 3. make the work easier	WHY?	List the reasons for the key points
Key Point reminders:		☐ Critical check or inspection	☐ Quantity check (of medical supplies)	☐ Could harm the patient or staff	☐ Makes the job easier
Owner of this document:		Page:		Rev #:	
		of		Date:	

Figure 22: Job Breakdown Sheet