

Reducing Clinical Waste in a Haemodialysis Clinic, Small Change Big Impact.

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CITATION

Reidy, Myriam (2014): Reducing Clinical Waste in a Haemodialysis Clinic, Small Change Big Impact.. figshare. Thesis. <https://doi.org/10.25419/rcsi.10812164.v1>

DOI

[10.25419/rcsi.10812164.v1](https://doi.org/10.25419/rcsi.10812164.v1)

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Reducing Clinical Waste in a Haemodialysis Clinic,
Small Change Big Impact

MSc in Healthcare Management, 2013/2014

Assignment:

MSc programme organisational development dissertation project. The project was conducted during the year two of the programme to enable the application of knowledge, skills and personal development gained throughout the whole programme. The project selected should be manageable and one that can be completed within the required timeframe. In situations where students are involved in a large organisational project a smaller aspect of the project can be considered to meet the programme requirements.

Student ID: 08502943

Date: 14/05/2014

Word Count: 13536

Acknowledgments

For Mam, thank you for supporting and encouraging me on the start of this journey. Though not here now, the strength and courage that you instilled, helped me reach the final. This one is yours. Particular thanks to my amazing sisters, Lorraine, Sinead and Yvonne who got me over the line. Also I extend a heartfelt thank you to my great friends, Susan and Deirdre and my cousin Martin for his endless wisdom. Not forgetting Liam, whose distraction and support couldn't have been more welcome. My love and thanks to you all.

Abstract

The 'Small Change, Big Impact' project was implemented in a busy 14 bed haemodialysis unit. The organisation as a whole was looking at ways to reduce waste production throughout the hospital. It was found, by looking at a departmental level that the amount of clinical waste generated by a single haemodialysis treatment was substantial. While this waste production cannot be eliminated, there are measures that can be taken to substantially reduce the majority of this fluid prior to removing the used dialysis circuit from the dialysis machine.

The dialysis machine has a function that enables the safe drainage of the blood contaminated fluid from the dialysis circuit prior to their disposal. This function does not incur any extra financial costs or require additional equipment to perform the task. By carrying out this simple action, it would result in the amount, in weight, of clinical waste leaving the unit reducing dramatically. The change was implemented over an 8 week period. Collaboration with all members of the team was important to maximise the potential for success in the change process. This was achieved by creating an interest and ownership in the change project from its inception. Current practice was observed prior to carrying out the project then 4 weeks after the initial intervention and then a further 4 weeks later. The involvement of the team was integral to the success of the change process. This was achieved through dissemination of instruction leaflets on how to drain the dialysis lines, ward meetings to gain feedback and answer questions and also provide audit results following the initial intervention. The NHS change model was used as an aid to implement the project. The results were highly positive. There was a massive increase from 18.7% to 93.75% in staff compliance with the new practice of draining the dialysis circuits before removing them from the dialysis machine. This led to a weight reduction of approximately 80kg of clinical waste leaving the dialysis unit on a weekly basis. This substantial reduction in waste shows that this was a positive change that can have a significant impact on the organisation as a whole.

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1.0 Introduction

Chronic renal failure is a debilitating lifelong condition that requires treatment in the form of renal replacement therapy. As reported by Chanouvas et al (2011) haemodialysis is by far the most widely selected form of renal replacement therapy by both patients and clinicians. Haemodialysis treatment is the removal of a build up of waste toxins from the blood. The patient is attached to the dialysis machine via 2 needles or a central line which has 2 access ports, one needle or port is used to remove blood and the other to return the treated blood to the patient. The blood is removed from the patient via an artery, it is then filtered through a dialysis machine and the cleaned blood is returned via a vein to the patient. As a result of this treatment the disposable lines (i.e. the dialysis circuit) that the treated blood passes through during the dialysis process contains approximately 500mls of blood contaminated waste fluid. Petrosillo et al (1995) acknowledge that the dialysis setting is a very high risk environment for the transmission of blood born infections to both patients and staff. The unit where the organisational development is taking place uses a more advanced form of dialysis known as haemodiafiltration (HDF) as acknowledged by James (2010); HDF produces significantly higher volumes of waste than standard haemodialysis treatments. With such high volumes of contaminated fluid being produced, looking at measures to reduce the amount of blood contaminated fluid held within the dialysis circuit post treatment and the disposal of these lines is very important. .

The change project to be carried out is the draining of the dialysis circuit prior to their disposal in the clinical waste bins. Management of healthcare waste is a

major concern in any healthcare setting. There are many different terms for waste, clinical waste, hospital waste, medical waste, healthcare waste. The WHO defines medical waste as ‘ the wastes generated by healthcare activities that can include a wide range of materials, such as needles and syringes, soiled dressings, body parts, diagnostic samples, blood, chemicals, pharmaceuticals , medical devices and radioactive materials.’ For the purpose of this study infectious waste, primarily the blood contaminated dialysis circuit will be referred to as clinical waste. A study by Tudor et al (2007) state that the quantities of waste generated in the UK healthcare sector has been shown to be amongst the highest in Europe. The unit the project is being carried out in is a busy 14 station satellite haemodialysis clinic. Over the course of one week the unit has the capacity to carry out 201 dialysis sessions. The average number of weekly sessions is approximately 190 -200 sessions. The variation in numbers is due to patients being away or inpatient in the acute hospital. After a dialysis treatment the circuits in the machines hold approximately 500mls of blood contaminated fluid. This equates to anything up to 100litres of blood contaminated fluid generated in the unit on a weekly basis. The dialysis machines used have the capability to safely drain the majority of this fluid prior to the circuits being removed from the machine for disposal.

1.1 Setting SMART Objectives

The origin of change project came about to achieve the overall goal of the hospital; to improve the handling of waste management throughout all departments. To achieve these, local level objectives needed to be set. MacLeod (2012) has underscored the need to create SMART goals. He developed on this concept highlighting that a goal is broad in scope and it is the more specific objectives that are narrower in scope, that collectively are the basis for the overall mission or goal of an organisation. The need for dialysis treatment is increasing and currently there is a waiting list of patients looking to transfer their care to the unit. Abraham et al (2012) identify that the number of patients with chronic renal failure is increasing globally, and with this in mind it is necessary to look at ways to improve waste management within the dialysis centres due to the continuous high volume of patients using the service. The organisation that the change project is taking place in has identified a need to improve waste handling throughout the hospital. In order to make a valuable and sustainable departmental contribution to this overall change, the student looked at an area within the renal unit that generates the most waste. By making meaningful local change this will add to the organisation's overall mission to improve waste handling. This focus on waste management prompted the need to look at ways to reduce waste within the dialysis unit and promote a safer waste environment.

In order for any goal to be achieved they need to be in line with the overall organisations' vision. This sentiment is echoed by Dr Chamberlain, he states that 'you are wasting your peoples time and energy and your organisations money by

asking them to do something that is not relevant.’(2011).With this in mind, a focused investigation into the areas in the unit where the most waste is generated was needed to identify where specific changes could be made. The area identified was the waste fluid remaining in the dialysis circuit following a dialysis treatment. MacLeod (2012) discusses the need to make objectives specific as a first step to bring a practical reality to the task. Also he notes that clear written objectives about exactly what needs to be accomplished should also be provided. Dialysis is an area that generates massive amounts of clinical waste. This waste can be reduced by making a small change to the current practice in the unit. This change involves taking less than 1 minute to drain the dialysis lines prior to removing them from the dialysis machine. The dialysis machine has a function that enables this process without needing any additional tools or equipment or financial cost and bears no increased infection or spillage risk to the operator.

Once an area for change is identified it is important to be able to measure the change transparently. As Chamberlain has stated, ‘if you can’t measure it, you can’t manage it.’ (2011) By being able to measure the results this gives not only staff the visual data to show the change has either improved practice or alternately has not been effective. It also gives a time line for when the goal or targets have been reached. Audits were carried out at pre arranged intervals, pre implementing the change to show the weight of clinical waste that current practice generates, mid change project and at the end of the 8 week change process to see if the change has been successful and attainable.

Macleod (2012) looks at setting achievable objectives for any change project. He makes the point that if objectives are not reasonably achievable, taking into account the time available to staff in their working day, resources available and also the abilities of the workers carrying out the task, frustration can set in and commitment to the change will not be sustainable. Open communication and planned monitoring allow any early problems to be identified and help ensure the change remains on target. This sentiment is echoed by Dr Chamberlain. In this phase he advocates a need to keep focused to prevent the rot setting in; by communicating and preventing small errors at an early stage, larger problems are far less likely to happen. This then helps to promote continuous quality improvement.

Achieving the objective of reducing the amount of clinical waste generated in the unit is both realistic and also very relevant for achieving the overall mission of the organisation as a whole. Goal relevance is very important to engage the staff to accept and champion change. Dr Chamberlain (2011) sees a 'SMART' goal as being relevant to the objectives of an organisation, he expands this saying 'Any goal can be delivered fully, can be efficient but only relevant goals will be effective.' By validating the expected outcomes, reducing the amount of clinical waste generated in the unit. This in turn will make a big impact in complying with the intended goals of the organisation to reduce all hospital waste.

While there is a time limit on the data collection for the change process it is a change that is intended to continue and become a part of daily practice. For this

reason the change process will be both timed and tracked. MacLeod (2012) indicates a need for a change to be time bound as projects without these time boundaries generate a lack in rigor in the pursuit of closure and cause a lack of discipline to achieve the objectives. Dr Chamberlain (2011) on the other hand suggests time bound objectives are less effective and should be replaced with track able measures. He expands this by showing all goals take time to be achieved but to build progress this needs to be monitored over time and one such way to track progress is through regular audits of waste management

To bring about effective and long lasting change the work force are going to need to feel engaged with the change in order to feel empowered by it. Cohen (2006) shows the hospital environment has to constantly change to deliver the best level of care to patients and also for the organisation. Nurses and managers need to be aware of the need to change and act as a change agent to lead their staff. She further acknowledges that, how you as a person respond to change is vital for the ability of a change agent to effectively promote and support change. As a change agent, the role of the student will be to keep the workforce focused on the objectives and provide regular feedback through audits and also to conduct a focus group meeting to gain feedback from the staff. In order to achieve effective change, a key tenant is to make the staff want the change to succeed, so planned staff meetings in conjunction with audit feedback will be the carried out by the student.

The focus of this report will be to firstly look at the current research into waste management in dialysis settings and hospital environments. Using the NHS

Change model the report will look at the 8 steps taken to effect a positive and meaningful change that benefits the unit at a local level but also the wider organisation. Also the report will encompass the barriers faced during the organisational development and also the drivers for change. Following on from this, details of the change project will be discussed and the findings leading to a discussion on the outcome of the change project and the impact it has in the organisation and future improvements that were identified.

2.0 Literature review

Schiavan et al (2014) identify that there is a high volume of water used during renal replacement therapy. Haemodialysis units generate a large amount of clinical waste on a daily basis. As such this waste carries a risk to all staff that will be handling the material, from source to incineration. Petrosillo et al (1995) identify the dialysis setting as a high risk environment for transmission of blood borne infection to healthcare personnel and patients. It is the responsibility of managers and all staff to minimise this risk by looking at ways to reduce clinical waste. Healthcare organisations are facing a 'more complex, changing environment and as such are facing high levels of competition' as discussed by Sumet et al (2012). Xie et al, (2012) show that reducing risk does not necessarily come at the expense of increasing waste. As such there is a need to look at all areas within an organisation to see what needs to change or could be changed to improve service delivery and also improve the running of the organisation as a whole. Haemodialysis units need to look at the areas of clinical waste management. A review of the literature yielded only 2 dialysis specific articles dealing with the issue of waste generation and

disposal in a dialysis unit. The first of these articles was a non-research article looking specifically at the financial implications of the mis-management of clinical waste material generated in the haemodialysis setting and the potential savings that can be made. Guek and Chua (2009) in their presentation discuss the poor handling and separation of clinical waste produced in a dialysis unit and found,

The cost for disposing these wastes in 2007 was one hundred and fifty-six thousand two hundred and eighty eight Singapore dollars. Improper waste disposal was identified by the infection control unit and we aim to reduce the cost for disposal of biohazard waste bins to at least 30% of the annual cost by December 2008.

While this article focused on reducing the cost of disposing of waste, the second article was concentrated more on the environmental impact of the waste generated by the dialysis setting and the potential for recycling and disposal in landfills. The lack of results yielded specifically concentrating on dialysis clinics waste management and strategies to reduce the amount of clinical waste they generate highlights the lack of research into this area. As a result of such a small article return the search criteria was expanded to the management of all hospital waste. The search terms included management of clinical waste, bio hazardous waste, hospital waste, blood contaminated waste. This generated a huge yield so exclusion criteria were set. Articles not considered were studies that did not focus specifically on waste reduction and also articles looking at clinical waste management in the domestic, community, general practice settings and dental clinics.

Looking at the research a number of themes emerged and each will be looked at in turn. The topic of the change project was discussed with the human resources

department of the organisation and no ethical approval was needed as no patient's or staff personal information would be identifiable or the focus of use for the study.

2.1 What constitutes clinical waste? Legislation and guidelines

The first theme that emerged was the differences and similarities globally in what constitutes clinical waste? In researching any potential change or organisational development an opportune place to start would ideally be to look at the government legislation and regulatory bodies' definition relating to the question in point and look to develop the investigation from the information garnered. In searching the term 'waste' and 'hospital' and 'management' a number of different definitions for 'waste' were generated. The hospital policy where the organisational development took place refers to any waste that has the potential to cause harm to, patients, staff or the environment and is contaminated with blood or body fluid is categorized as clinical waste. The Department of Health publication, 'Environment and sustainability Health Technical Memorandum 07-01: Safe management of healthcare waste.' (2013, pg 22) defines clinical waste in three categories

- a. Any healthcare waste which poses a risk of infection
- b. Certain healthcare wastes which pose a chemical hazard
- c. Medicines and medically-contaminated waste containing a pharmaceutically active agent.

They then go on to further categorize the marginal difference between clinical waste and hazardous waste. Both are essentially the same with the exception that hazardous waste contains cytotoxic medicines. The Royal College of Nursing

Guidelines on Safe Management of Healthcare Waste: 2007 also provides a mixed definition of clinical waste. They divide clinical waste into 2 categories, firstly defining infectious waste as being any waste 'that poses a known or potential risk of infection' and the second category of clinical waste is defined as 'medicinal waste includes expired, unused, split and contaminated pharmaceutical products vaccines and sera that need to be disposed of appropriately,' (Pg5-6). All of the articles reviewed referred to the different categories for waste and there can be anything up to 5-10 different categories of waste and sub categories in any institution and government policy. Muhlich et al, (2003), Huang and Lin, (2008), Yong et al,(2009), Cheng et al, (2010) and Omar et al, (2012) have all highlighted a wide range of categories and terminology for waste. Some of the articles use the same terms but overall there are a mix of terms for what is in essence the same product. The vast number of labels and bags and categories used to dispose of waste has been shown to be a big source of confusion. In reviewing the articles it can be concluded that the lack of clarity and the diverse number of similar categories and sub categories add to the confusion among staff when making the decision on how or where to dispose of any waste generated in healthcare at source. The literature does recognise this as potentially the most important reason for the confusion and levels of clinical waste produced. Omar et al, (2012) suggest, due to such a vast array of 'labels' for waste this does lead to the 'improper waste segregation at source' caused by the hospitals 'lack of instructions on the aspects of clinical waste segregation practices by nurses and the intermingling of clinical waste with general waste.' This leads onto the second theme that emerged in the literature relating to the high levels of clinical waste produced in hospitals.

2.2 High levels of clinical waste produced

All of the literature is in agreement that hospitals generate vast amounts of waste. (Tudor et al, 2008. Yong et al, 2009., Cheng et al, 2010., Muhlich et al, 2003., Omar et al, 2012., Huang and Lin, 2008.) As a result of this, hospital management and all staff are faced with the task of looking at how this waste is managed. Thorough investigations are needed to look at current practice and changes that can be implemented to produce effective management measures. Management of hospital waste is of the utmost importance to ensure safety to patients, staff and the environment. Waste generated within acute hospitals and other clinical settings can be broken down into a number of categories. These categories include general domestic waste, household waste, non-infectious waste, biohazard waste and infectious waste. Of all waste produced by hospitals only 10-25% of the waste can be categorized as hazardous waste, in that it can cause a risk to patient safety, staff safety and the environment. Yong et al, (2009) in their study of medical waste management also found similar figures; 15-25% of waste generated was actually considered infectious medical waste, while Tudor et al (2008) found in their study that 28% of waste was clinical and posed a risk of infection. It can be concluded that with approximately a quarter of all waste generated being a possible risk to staff, patients and the environment there is a growing concern to adopt measures that can reduce these high rates.

A number of the studies were in agreement that hospitals generate a huge amount of waste. It is the responsibility of employers to adopt strategies and initiatives to implement stringent measures to manage this waste more effectively and efficiently.

Woolridge et al, (2005) report that the NHS generated over 380,000 tonnes of waste in 2001, in order to manage such high volumes of waste effectively strategic and tactical tools within the NHS are required. Tudor et al (2008) also found that in the United Kingdom, the healthcare clinical waste generated was shown to be amongst the highest in Europe. This was also found by Muhlich et al (2003) in a study comparing the waste management practice of 5 different hospitals throughout Europe. The hospital studied at Sabadell and Freiburg reported only 3-4% of the overall waste produced was clinical waste, while the United Kingdom based hospital report 40% of its waste produced was clinical waste. Waste management cost thousands in the annual hospital budgets and Cheng et al, (2010) highlight that certain areas of the hospital, in particular surgical and dialysis services generate higher volumes of infectious waste than any other area of healthcare. This is very pertinent in the current economic climate as healthcare organisations have to look at ways to reduce their budgets while also maintaining high standards of delivery of care. High levels of waste are not only unique to the United Kingdom and Europe this has been recognised as a global issue, as discussed by Cheng et al, (2010). The high volume of clinical waste leaving the hospital setting increases the cost of disposing of this waste. It can be inferred that the lack of education and instruction on the correct handling of this waste at source is the root cause of the high volumes being disposed of incorrectly. Looking at the number of categories and subcategories that hospitals use to differentiate between clinical waste and all other forms of waste produced in the hospital led to another key theme in the literature, in looking at waste management and how waste is handled.

2.3 Poor segregation and handling of waste

One of the concerns with hospital waste is what amount of waste generated is actually clinical waste that poses a risk of infection or what portion is simply domestic waste? Lack of awareness by both staff and patients leads to a common practice where all waste is placed in the clinical waste bins for incineration to prevent any potential for risk occurring. There is a sense of “if in doubt or a one size fits all” and everything is put into the clinical waste bins. Omar et al (2012) in their report highlight that improper waste segregation is the most common issue faced by clinical waste management teams. Yong et al (2009) also echoed this as looking at all stages of the waste cycle, they found with 15-25% of waste labelled as clinical the problematic areas for management are the correct segregation and collection of waste. One key area that Ferreira and Teixeira (2010) found to contribute to improper waste segregation was a lack of knowledge by staff regarding the risks that certain waste carries and as such they place all waste in the one bin thus increasing waste and costs to the organisation. Also the lack of clinical waste bins or incorrectly labelled bins also contributes to misplacement and categorisation of waste. This is an issue when you have temporary staff and patients with access to clinical waste bins that lack training in waste management practices specific to the local area.

2.4 Training needed to improve waste management.

The confusion that waste segregation causes was a common finding throughout the literature. Looking at all the literature this is a repeated problem and one that needs to be continually addressed. The advancement in recycling and need to improve

segregation and legal requirements placed on hospital management to segregate waste has led to an array of different colour coding of bins, bin bags and sharps containers for the different categories of waste. When examining the research articles this was a problem that all investigations highlighted. Staff and patients are quite simply confused. They it would seem have always associated the yellow biohazard bins as the appropriate receptacle to use when disposing of waste generated by any interaction with a patient. This notion that any materials for disposal that comes into contact with patients are contaminated and pose a risk and as such need to be placed in the yellow bin is echoed in all the literature. This constantly changing regulation and new coding and categorization of clinical waste is happening at such a rapid pace staff re training cannot keep up and is ineffective. The sheer volume of waste and the potential for confusion that new regulations for handling and disposal of waste is highlighted 2 published waste management policies for 2 different NHS hospitals. The different categories and subcategories and differences between each of the trusts highlights the confusion that leads both trained staff and non-trained staff to place waste in the readily available yellow biohazard clinical waste bins. This reinforced the findings of the literature regarding the uncertainty of staff in disposing of all waste an opting for the perceived safety of 'one bin fits all'.

2.5 Environmental impact of clinical waste management.

James (2010) highlights the need for the active management in reducing waste. He looks at the importance of the current legislative requirement for the NHS to reduce its carbon emissions by 80% by 2050 as part of the sustainability development unit,

2009. Training is the key to promoting best practice in waste management. Providing clear and relevant information is paramount to offering staff the tools to improve practice. A framework for the best practice in management of healthcare waste is needed 'in order for healthcare organisations and other healthcare waste producers meet legislative requirements as well as identify opportunities to improve waste minimisation and reduce the associated environmental and carbon impacts of managing waste,' (DOH, 2013). Looking at the SMART objectives set, the specific need to reduce clinical waste volumes is attainable and a priority. In order to effect change leadership is important. How someone leads can impact on the success of any project. Passion and belief in a change and imparting this passion onto others is very important for success. To achieve this momentum and shared interest in any change, there is a need to give staff and patients ownership to commit and empower them to embrace change in order for it to be meaningful to them. With any change resistors are inevitable, but resistors can also become champions of a cause and can be interpreted as a positive sign. Cohen (2006) has found the very resistant can become the driving force for any change once negativity or fears of change are identified and redirected. If no passion is stirred it shows apathy which in turn leads to disinterest in practice and any initiative will just become a tick box exercise and will not elicit any long lasting change. Following on from the findings in the literature it can be concluded that lasting organisational change cannot be achieved through motivating and inspiration alone. It has been shown that there is a need to look at the systems and processes involved in implementing an organisational development in order for the change to be meaningful and long lasting. To attain this goal a structured approach is needed and change models are regularly used in healthcare to navigate change.

3.0 Methodology NHS Change model

The most difficult type of change to achieve according to Cervone, (2013) is directed change. Any change directed from the top levels of an organisation when filtered down to the frontline can have a lower rate of success. The main reason he attributes for this, is the lack of stakeholder involvement in the decision making process. He also found that workers often don't see how their role and duties impact and contribute to the larger picture of the organisation. In identifying this and also to add to the hospital goal it was important to address a very specific problem that was unique to the renal unit but would also positively contribute to the overall hospital plan to improve waste management. Following a comprehensive review of the literature it was felt that there was a real paucity of research into waste production and reduction measures specifically in the area of dialysis treatment. To avoid a lack of stakeholder involvement the student took the opportunity of looking directly at all the areas that generate the most clinical waste in the unit; this enabled a clear focus on the topic for the change process. On doing this investigation, the drainage of the dialysis circuit prior to their disposal was identified as a real and viable waste reduction measure that could be implemented effectively. To begin the change process of managing clinical waste in the unit, a change model would need to be used that would enable a timely and achievable change that was relevant to the renal unit specifically but also added to and enhanced the overall vision of the organisation. Banks (2009) identified that no one perfect and exact model exists for everyone. By comparing 5 of the change model pioneer's, Kotter, Lewin, Beckhard, Thurley and Bridges, she found they all have commonalities, most notably recognising that change is a constant and any model needs to be adaptable to the environment for the change and any situations that may arise.

With this in mind, the NHS model for change was the most relevant framework to use to bring about the organisational development. The NHS model of change is suitable for the implementation of any organisational development from either large scale projects to smaller scale localised projects. As the hospital where the change is being implemented is an NHS satellite unit it was felt appropriate to use this model as staff would be familiar with the NHS model as it is widely available through the intranet. Also the framework really enables the localisation of the change project and allows for people to take real ownership of the change. The NHS change model, like Kotter's seminal work, believes that there are 8 component parts that need to be used together in equal measures to make change successful (NHS Change Model 2013). The central tenant of the NHS Change Model is 'Our Shared Purpose' which is the platform from which the change evolves. This is in line with a local initiative enhancing the overall goal and improvement of the organisation. Macleod (2012) sees making objectives more specific to the area of work, adds to overall larger goal of any organisation in bringing about meaningful lasting change.

3.1 Our Shared Purpose

The inception of the NHS Change model was prompted by a need to change the way the NHS was running. Consultation with NHS staffs from all different levels and speciality areas of the organisation were carried out. The purpose of this was looking at a new approach to build energy for change to improve patient care. By developing a framework that everyone could agree with, this would enable effective and meaningful change by sharing a collective passion and belief in the NHS as an organisation. While the renal unit where the organisational development is proposed is a satellite NHS service it is part of a private hospital and as such works between 2

different frameworks. Jacobs et al, (2013) look at the relationship between the organisational culture and how this impacts on the performance of the staff within the organisation. 'Institutions are therefore formed and held together by the beliefs members hold about one another and the world. The culture of an organisation has a direct impact on any change that an organisation is trying to implement. McDonald and Foster, (2013) accept that understanding organisational culture is important in several areas of management, organisational behaviour, change management and strategy implementation. As a private hospital they have to consider, like the public sector the financial aspects of a consumer directed healthcare.

Not unlike the NHS, private hospitals are judged by their patients not only on the statistics regarding surgical procedures and services available, but they are also assessed on the service provided and if it is quality as well as value for money. As Powell and Laufer (2010) identify, healthcare is similar to all other business markets and patients are shopping around as they are actively looking for 'financial reward and value for the individual patient.' With this in mind the hospital embarked on an organisational change project to improve customer relations to not only focus on the monetary value of the care given but also on the level of quality and excellence the organisation wanted to be known for. The culture of any organisation has the ability to shape and influence change, Jacobs (2013) hypothesises that the culture of an organisation may impact on 4 different aspects of service delivery. The first aspect is the impact of culture on efficiency as the 'embedding shared values, beliefs and norms of an organisation...in turn help shape the ways in which organisational members interact and engage with each other.' Currently there is a big initiative of promoting customer excellence happening in the organisation as a whole.

Part of this initiative is putting the control over pride and innovation in the hands of the local managers in achieving the overall goal of customer excellence throughout the hospital. This is being accomplished by holding training sessions with people coming together from all different departments to gain a shared understanding of each others' work area and the role they play in the organisation. One of the change projects occurring in the hospital is waste management and a commitment to reduce waste.

As a direct result of the hospital excellence training sessions, the author after discussing with the portering department about their role in the hospital discovered that the current waste handling measures were challenged by the renal unit as the spillage rates once the waste left the unit was quite high. This leads to Jacob's second aspect of the impact of culture as it 'promotes the shared ethical principles of protecting vulnerable consumers and establishing arrangements that correct for purely efficiency seeking behaviour.' As the shared purpose of the hospital is to reduce the amount of waste produced and also to improve the handling of this waste, by understanding the role of the portering service in this process and how the renal unit is causing challenges led to a want to help colleagues outside the unit in carrying out their job safely without fear of risk. As found in the literature by making a change relevant at a local level this imparts a sense of ownership to the people and promotes the success of the change. This in turn can lead to a more meaningful achievement in the overall outcome and future focus of the unit.

A third area culture may influence is the 'overall economic and social objectives that an organisation pursues,' (Jacobs, 2013). While the quality and safety of work is at the forefront for workers they also have a duty to ensure that they are providing a service that is in line with the economic goals of the organisation. While there was

not a monetary value available to provide to the staff, providing information on the amount of weight reduced and the positive impact this has change has produced just from a handling perspective and safety was a stronger motivator than money. As this was something that personally affected the staff as well as the portering colleagues it provided an ownership of the positive impact of the change. Whilst the potential money saving of the change is part of the hospital budget sheet it doesn't have a personal connection to the staff, Jacobs (2013) identify that building relationships between departments can be very complex and difficult. By supporting a co-operation and relationship building culture among departments can encourage and promote more considerate interdisciplinary working relationships. As the 'Shared purpose' is at the heart of the change process the NHS change model advocates returning to this ideal throughout the process to ensure the team are still connected to the values and vision of the organisational development and the organisation overall.

3.2 Engagement to mobilise

In understanding the change it is then appropriate and in line with the NHS change model to identify who it is that you need to talk to in order to start the change process. The NHS change model does not see holding a list of names of people involved in or affected by the change as sufficient. It is important to understand who are the stakeholders involved in the change? Trastek et al, (2014) identify that healthcare organisations have a number of stakeholders. These include patients, healthcare providers, healthcare organisations and also healthcare related

businesses. Healthcare providers are the stakeholders driving the healthcare system through their continued interaction with patients and allied health services.

Integral to any new way of working is, firstly identifying the key people to get involved in the process from its inauguration. Central to this is speaking to the right person or people with the authority to advocate the change. Tudor et al, (2008) discuss the need to engage the support of senior managers in an organisation to sustain the change proposed and gaining momentum and commitment from all staff. To further ensure the success of any change process, gaining a real commitment from people and engaging their support and belief in the change from the inception will ultimately enable the change to take place. Roland et al, (2010), identify that within a hospital humans are the main resources and as such have feeling and preferences regarding their working conditions. They further expand this by acknowledging the feelings of the staff are supported through a collaborative process that enables, the establishing of current activities and providing a clear plan in any change to their practice. This was vital to beginning the change process by getting the support of the unit manager to begin the process she became a champion for its success. Once she was on board this made it easier to speak with the team and enable them to feel part of the process.

Change can be unsettling in any work environment, but particularly in a busy medical setting where emergencies are common and demands on time are a constant. Maestre et al, (2014) write, 'change means instability and is demanding and stressful. What was standard once is quickly tossed aside now for some new directive.' It was important to discuss what the change actually involves with all the staff and the impact this will have on their daily duties. The only additional duties that the change would entail would be the removing of the dialysis circuit in stages as

opposed to a one step removal process once dialysis treatment is complete. The new process involves removing one port and then clamping it while the remaining port drains the circuit lines. The user is required to wait for approximately 40 seconds before removing the used dialysis circuit. This enables the full or partial drainage of the lines. The volume drained depends on the amount of time the user allows for drainage before they remove the circuit. While this is a relatively short period of time, the nature of a dialysis setting is very time driven as patients arrive at a specific scheduled time. Any additional or perceived additional to time per session could have a negative impact on the staff carrying out the task as Roland et al, (2010) found in a study on theatre scheduling, any extended time lateness or emergencies can cause disruption and annoyance to users. Explaining the desire for the unit as a whole to embrace the hospital change initiative while also making it very relevant to the unit, was the first and most important step in engaging the team.

One of the key motivators and contributors for the staff within the unit engaging with the change is the culture of the hospital. Previously mentioned in the report, the organisation as a whole had embarked on a customer excellence programme which promoted a culture of change. This also instilled departmental pride among staff and the role they have in contributing to the hospitals overall vision of excellence.

Trastek et al, (2014) identify the strength of healthcare workers as change drivers by being, 'hands on service professionals, healthcare providers are capable of effecting change in healthcare.' This was successfully achieved by building momentum for the change and publically rewarding individuals and departments. Vacar and Miricescu, (2013) show that successful organisations are those that involve the team in the decision making process but also offer a wide range of rewards. To promote and visually recognise local initiatives quarterly awards ceremonies are held. At these

ceremonies, individual winners are given a small monetary voucher and departments are awarded certificates of excellence which are displayed within the department. To ensure all staff are aware of the positive changes and initiatives that are being done around the hospital, each month these are included in the newsletter that is attached to all employees wages slip. Awards are granted on an anonymous nomination basis, so staffs are aware that management are actively looking at measures departments and individuals have undertaken to contribute to excellence in service throughout the hospital. By promoting and publicly rewarding excellence initiatives this has proved valuable in gaining commitment from the team in the change process being implemented in the unit. Once the team were engaged in the change it was important to keep looking back at the shared values of the organisation, while pushing forward with the next step in leading the change process

3.3 Leadership for Change

Every project needs leadership and as Kuman (2013) discusses there is now a 'widespread recognition that effective leadership by healthcare professionals is essential in modern healthcare settings.' Cohen (2006) in her report on the role of the change agent speaks of how the change agent personally responds to change, as being a crucial marker in their abilities to effect change. By simply managing a process is not the same as leading one. With this in mind a collaborative leadership approach was adopted, as this inclusive approach has been shown to be a much more effective method in leading a successful change. In accordance with the NHS change model (2013) all people not just management have a leadership role in

delivering change. As the author pioneering the change was in a non management position within the unit and would be in essence asking for their peers to change the current practice a collaborative leadership approach was taken as opposed to a directional or hierarchical transactional leadership style common in healthcare. Kuman (2013) discusses the merits of transactional leadership in that it can maintain departmental budgetary targets but it is has a limited role in service improvement. Collaborative leading creates commitment from the team.

In order to create a deeper meaning for the change it was important to show the levels of waste that are produced in the unit. As mentioned in the literature clinical waste accounts for up to 25% of all healthcare waste but can be reduced if change measures are adopted, (Yong et al, 2009). To show staff the difference the change made, a circuit that was not drained was weighed and a circuit that was weighed post dialysis treatment. The results of this showed a 0.4kg weight difference. On an individual basis this did not seem to equate to a big change but once the figures for the volume of sessions carried out on a weekly basis were collated and staff were able to visualise this change it had a big impact and reinforced the commitment to the change. Once the positive change was imparted to the team it was met with mixed feelings. The majority of the team embraced the change but two members of staff remained resistant to commit to the change.

Healthcare professionals, as Kuman (2013) found, can be resistant to change even when it is apparent that another system or process could work better. To address this resistance it was important to discuss any issues that remained and work towards resolving this through collaboration and also by actions. The author demonstrated the proposed draining process and validated the impact of the change by weighing the drained circuit and further explained the concerns of the portering

department with regards to the spillage risks of not draining the circuits. As a leader of the project the author overcame this barrier through an inclusive leadership style as advocated by Kuman (2013) by meeting the needs of the healthcare professionals that were resisting the change. Trastek et al, (2013) show that leadership is very important within the healthcare worker peer network. Those assuming a leadership role need to relay important information central to the change to their peers and also show a real commitment to leading the change. They further expand that this is the opportune situation, as a leader working amongst peers is in a perfect position to share their work and directly field questions.

Vacar and Miricescu (2013), sees a good leader as someone who can, 'encourage employees to come up with new ideas,' while also involving them in 'planning and implementing change.' By adopting this style of leadership they purport that, 'such change will not only be accepted but also implemented by the team.' In taking this approach it brings together all parts of the change model, most importantly spreading innovation and discussion amongst the team.

3.4 Spread of Innovation

Getting people to think about the change and the merits of adopting it is amongst the biggest challenge of the change process. Ostrovosky and Barnett, (2014) conceptualized delivery innovation in healthcare as that which moves the healthcare system towards the aim of achieving an improved patient experience, improved healthcare quality and a decrease in costs. While the change being implemented does not directly impact on patient care it does have a direct impact on the well being of colleagues working in other departments. This in turn can have an indirect

impact on patients as reduced potential for risk prevents injury and impacts on staffing levels. Dooley and O Sullivan (1999) believe that an organisation will have an advantage relating to internal and external forces, when they develop an organisational culture that embraces innovative change to develop the organisation overall.

This is staying true to the NHS change model, it ascribes 7 factors that can either hinder or help the spread and adoption of innovation for change. These factors incorporate risk taking, resources, tools, information, relationships and rewards.

With regards to risk, there is no perceived risk in carrying out the planned change. The actions required to carry out the task do not increase or create any adverse risk of spillage as the circuit is a closed system so there is no potential for spillage. The only perceived risk is the lack of buy in from colleagues. As Cohen (2006) presents, the resistance of a change can be redirected and seen as a positive. In establishing what the issue that people are resistant to in the change process, this can then be overcome and seen as a positive drive for the change through collaboration and shared learning.

The dialysis machines are the only resources needed to carry out the change. In order for the team to successfully perform the new procedure, following a staff meeting a clear, comprehensive step by step instruction leaflet was emailed to all staff (see appendices). The sharing of information and clear plan and instruction is important as this enabled the team to gain a complete understanding of the process. Once you understand something you can then go forward and look at ways to improve or adapt practice, thus enabling the sense of personal ownership and commitment to a task.

Relationships are vital to the leadership and success of any change. Cohen (2006) advocates adopting a respectful policy in the treatment of all who are involved in the change and affected by it. As previously mentioned time constraints are always an issue in dialysis. One of the reasons for continued resistance from one member of staff was they felt it took too long to drain the machine. In order to alleviate these concerns the author worked with the team member and looked to them to experiment with the dialysis machine to see if they could find a way to speed up the process. Kuman (2013) has written that in order to engage a team member who is resistant, it is important to encourage them to buy into the process by allowing them to also lead change and bring innovative ideas in the process of change and also be open to other approaches. This was achieved and the resistance overcome as the team member had been trying different techniques on the machine. Ultimately the method proposed by the author did work the most effectively but this engagement was seen as a very positive change and encouraging as the team were looking at new ways to implement the changes. This is fostering a consultative process and also giving ownership and ability to lead innovation within the change process. Rewards are the hospital initiative and also the creation of the poster giving a visual aid and prompting questions from patients and visiting staff.

Innovative leadership, as discussed by Sen and Eren, is about 'introducing something new like an idea, method, technique...or discovery to solve current problems and satisfy people's needs at the present and in the future,' (2012). This simple change can be credited with making a big impact and is a positive move forward in the hospital shared goal of reducing and improving waste management. Innovation as further defined by Sen and Eren, (2012), embraces the methodology of

continued quality improvement by leading through recognising the skills, knowledge, values and talents and how they can impact on the future of services.

3.5 Improvement Methodology

For any organisational development or change to be successful it needs a tried and tested plan to work from. The literature is in agreement in the need for a structured approach in successful organisational developments. Roland et al, (2010) reiterate this, highlighting that a clear structured plan allows for the best use of resources in supporting positive outcomes. In line with the NHS change model, 'a carefully chosen improvement methodology provides a solid platform for rigorous delivery of change,' (2013). The methodology adopted for the purpose of the change was the continuous quality improvement methodology. This methodology was chosen as the plan, do, study, act cycle is easy to use and it focuses on the process leading to an overall outcome. As reported by Goldman, (1998) as a methodology it is simple, intuitive and closely resembles the way healthcare professionals inherently approach clinical problem solving. Millar (2013) also extols the merits of using the Plan, Do, Study, Act model methodology. As a quality improvement tool he found it to be a particularly innovative technique in overcoming previous shortcomings in quality standards in the healthcare setting.

During the planning stage the author identified that the current practice for management of clinical waste was not meeting the hospital shared goal of reducing waste production and incorrect segregation. In consultation with the unit manager and the portering department, who handle the transporting of clinical waste, the high

level of leakage from the clinical waste bin bags was a major concern. Following observation, the author proposed the idea to drain the dialysis circuits prior to removing them from the dialysis machines post treatment, which was accepted as the organisational development. This consultation was the first of three steps in the planning phase. As highlighted by Goldman, (1998) this phase has 3 is comprised of 3 distinct steps, firstly recognising a problem that requires improvement. The second step in planning was looking at the people involved in the change, the procedures involved and the equipment that would be needed. The final stage of the planning process was to plan what the desired outcome was. Via observation and audit, this enabled the author to identify via data collection the current practice by establishing the amount of waste and the current measures the team were taking in the unit in managing this waste. Following this phase clear instructions were provided via email of a comprehensive instruction sheet on the steps needed to reduce the waste by draining the dialysis circuit.

During the second, 'Do' phase of the cycle as highlighted by Varkey et al, (2007) the planned change is implemented and is the beginning of testing if the planned change can be implemented. It is the stage in the process where observations are made and unexpected problems are identified and problems are documented. This was carried out by the author. As the focus of the observation was the teams commitment to draining the dialysis circuits it was only necessary for one person to carry out these observations. Once all findings were documented this led onto the study phase of the change process. Studying the data enabled the author to identify if the planned measures were implemented. Berwick as cited in Goldman, (1998), explain the suitability of this methodology on improving outcomes in local projects. Its unique advantage is that it requires only enough information to take the next step in

improving an outcome and is less disruptive than traditional randomised prospective research. This enables a more immediate action in determining what changes need to be made in the 'Act' phase of the cycle.

The use of a continuous quality improvement methodology as found by Skledar and Mc Kaveney, (2009) maximises the quality and efficiency of delivery of care and this improvement in processes can be directed towards any clinical or administrative process in healthcare. It provides a rigorous delivery in change by remaining focused on the desired outcome. This methodology provided a structured organisational plan that was underpinned by the whole involvement of the team. This remains true to the central vision of the NHS change model and also the shared hospital goal of providing quality healthcare that meets or exceeds expectations.

3.6 Rigorous Delivery

Driving the change and ensuring that all members of the team were engaged helped to guide and advance the process. Senior and Swailes (2004) show that team performance can be judged on whether they perform tasks set for them. Managing the process was a key role of the author in keeping the team focused on the desired outcome and showing the benefits that the strategy had for all colleagues. This was achieved with staff meetings and also the author made them self available to demonstrate the change and also supervise when members of the team were unsure of how to perform the new drainage methods. When reverting back to the NHS change model this supports the need to embark on change with a disciplined

approach, keeping the team focused on the desired outcome and reinforces the activities that have been done in achieving the change.

Strategic planning allows management groups to agree on the future strategies and vision for the organisation. It identifies the future direction for the organisation and communicating this to everyone in the team ensures that everyone is developing the change in the same direction. (Dooley and O Sullivan 1999).

3.7 Transparent Measures

As per the NHS change model, (2013), the reason for measuring a change is three fold. Firstly, measurements are carried out to identify whether planned improvements are taking place. Secondly, their purpose is to judge the performance of the people who are carrying out the planned improvements. The final reason for measuring is to inform the healthcare organisation and the possible need for further research evidence. The need for transparent measures is important as staff need to be able to track a change and see that the adjustments they have made have been either positive or also negative for the organisation. As Cohen (2006) justifiably reports, leaders and change agents need to provide clear visible results and also to be humble in conceding if a planned measure is not going to script. The measurement and evaluation tools used by the author were the audit cycle and will be covered in greater detail in the next chapter of this report.

3.8 System Drivers

In accordance with the NHS change model, in order for change to be effective, the 'conditions need to be in our favour if the change we want to see is going to work and be sustained,' (2013, pg 15). The model further expands this sentiment, discussing that system drivers can take the form of incentives for change or standards to be achieved and these incentives do not always have to be of a monetary remuneration. As the hospital where the change was implemented is energetically embracing a culture of innovation and change the team was already motivated to highlight the role that they play within the unit and what this contributes to the hospitals customer excellence programme.

As a satellite unit for the NHS, the renal unit can at times be isolated from the rest of the hospital. By pushing through and embracing the change and proving the dramatic results a relatively small department can achieve in the overall hospital vision of improving waste management was a very powerful driver in making the change successful.

Innovation and drive as discussed by Sen and Eren (2012) depends partly on the conditions of the internal and external environment of the organisation. Cohen (2006) also fosters this idea and develops it further, in that for a change to be driven by the team you need to capitalise on this natural good feeling and encourage people to want the change to succeed. This has been a key to driving the success of the change process and the next stage of the report will look at the methods employed to evaluate the change.

4.0 Evaluation: The audit cycle

Changes in healthcare need to be measurable and transparent in order for them to be deemed a successful or indeed a failed venture. As per Brunt and Abbey, (2013) they consider the importance of the clinical audit tool in its role as a support for achieving best quality in patient care and practice overall. In looking at any change or organisational development it is important to set a clear aim and the objectives that you need to fulfil in order to achieve the overall goal. Verma (2012) discusses the importance of the clinical audit tool for evaluating a planned action as it 'helps to improve the quality of care delivered to patients and is invaluable in maintaining and monitoring standards of care.' Using the audit cycle to evaluate a change is a method favoured in healthcare as it provides an easy and quick to use template that is suited for the busy hospital environment. It also provides a timely and concise set of results for an existing issue. Bryce et al, (2007) support the use of audit as a suitable tool for garnering information in a healthcare environment as it provides an 'organised examination of the ward or service practices and procedures, ' and also 'provides an opportunity to simultaneously review safety in the workplace and identify and remedy deficiencies.'

4.1 Identifying the problem

The first step in any change process is to identify the area that is in need of improvement or even possibly in need of a complete change to the current practice. In setting goals, Dr Chamberlain (2011) warns of the need to set goals that are specific to the area of work but are also in line with the organisations vision. By setting goals not in line with the organisations fundamental reasons for existing he

purports that the change agent is wasting their colleague's time and energies. Therefore the author, in consultation with unit manager and the portering manager and also remaining in line with the overall hospital mission discussed the goal of improving waste management practices and the potential different ways to achieve this. The area identified by the author was the need of a change within the renal unit practice in dealing with the amount of clinical waste produced by the haemodialysis session specifically. By identifying the clear aim, to reduce clinical waste in the haemodialysis unit this allowed a very structured approach to work towards the shared goal of the hospital. Reverting back to the SMART objectives that were set at the outset of the change process, drainage of the dialysis circuits was a very specific target. In setting a specific objective it was important to look at the daily duties in a dialysis environment. As identified by Dettenkofer et al, (1997) it is important to perform a comprehensive review of the working environment before progressing with a change project. As the nature of a dialysis unit is very time driven the rate of which each team member drains the circuit was not as easy to determine as it would involve weighing every persons disposed circuit it was felt this would be very disruptive and could also have the negative impact on feeling that there were punitive measures if staff did not drain the full 0.4kg of fluid from the dialysis circuit. Therefore to prevent any adverse disruption or resistance to the change the aim of the audit was to specifically look at the compliance of the team in attempting and carrying out the drainage of the dialysis circuits post treatment. By setting this clear objective it meant that the specific aim of reducing clinical waste was now a very measurable process.

4.2 Setting Criteria and Standards

The data to be collected was the rate of compliance among staff in the drainage of the dialysis circuits following a treatment. In order to assess all the team members practice within the unit the author reviewed the staff rota schedule to ensure they would be in the unit and able to observe all staff members on the 3 planned audit weeks. Only a single observation of each team member removing the dialysis circuit during each of the 3 audits was deemed sufficient to capture the individuals practice for the data collect. Dialysis is a very routine working environment with little deviation as found by James, (2010), so if a team member attempted to drain the dialysis circuit or not after a session it was unlikely that they would deviate from this practice. The veracity of the person or persons carrying out the observation is very important, and as Mortel and Murgu (2006) discuss in any study there is the potential for observer bias. As no study had been carried out before in this area there was no benchmark and the purpose of the initial data collection was to ascertain current practice observer bias was not an issue for concern. As practice in the renal unit is unlikely to deviate from the normal practices this was deemed an appropriate method to capture the data required for the purpose of the audit. In identifying the problem pre acceptable criteria needed to be determined. Following the authors consultation with the unit manager it was agreed upon that there was a real need to reduce the risk of spillage of the blood contaminated fluid from the disposed dialysis circuits. In order to set standards it was important to identify the current waste management practices. To do this the author carried out an unannounced observation audit. Mortel and Murgu (2006) in their report, advocate the use for covert observation as a solution to data collection in an audit cycle. They found that

this can give a true account of the practice and not a pre planned unrealistic representation in the performance of daily duties.

Audit week 1 Determining Current Practice			
Staff Number	Attempt to drain circuit	No attempt to drain circuit	Comments
1	No	Yes	
2	No	Yes	
3	No	Yes	
4	No	Yes	
5	No	Yes	
6	No	Yes	
7	No	Yes	
8	Yes	Attempt made	
9	No	Yes	
10	Yes	Attempt made	
11	No	Yes	
12	No	Yes	
13	No	Yes	
14	No	Yes	
15	No	Yes	
16	Yes	Attempt made	

Figure 1; Initial observation in determining current practice.

As laid out in figure. 1 the results of the initial observation identified that the numbers of the team draining the circuits post dialysis session was very low. As a result of this observation the findings were discussed with the team and the aim of the change process further discussed in detail. The reasons for the low compliance were a lack of awareness by the team in the functional capability of the dialysis machine to perform the drainage of the dialysis circuit. Following on from this meeting all staff were emailed a comprehensive information sheet on the steps they need to undertake to drain the dialysis circuit and that going forward this would be a required element when disposing of the dialysis circuits post treatment.

4.3 Observation and data collection

Following on from the initial audit the second audit was performed after a 4 week interval. During this time the team were emailed by the author the results of the first audit and also the information sheet detailing the steps that were involved in draining the dialysis circuit.

As the second audit was not covert the author was aware of the potential for the Hawthorne and observer effect. The Hawthorne and observer effect describes the effect on a subject of being knowingly observed while carrying out their 'normal' duties. As discussed by Bryant and Bell (2007) this effect was first noted when in the 1920's during a number of observational studies it was noted, 'increases in worker productivity were due not to any changes in the condition of the working environment, but instead to the favourable circumstances that the experimental arrangements had produced,' while the observer effect is also prevalent as those being observed are also studying the observer and the way they represent themselves and their activities, so as identified ' the researchers activities will have an influence on the research setting' (pg 52). Gould et al, (2011) also recognise the potential influence of the Hawthorne effect on an observation but see it as an inevitable drawback with the audit process. The author was aware of the potential for this to happen and to minimise the possibility of this observations were kept discreet with the author not standing in direct line of vision of the team members while they were carrying out their duties.

4.4 Comparing performance with criteria and standards

As Verma, (2012) rightly states conducting a single observation or data collection exercise does not constitute an audit. The audit tool is a cycle and for it to have merit as a benchmark for setting standards a first audit is conducted to establish the current practices and a follow up audit is carried out to see if any of the changes implemented have led to improvements in standards. The second audit was carried out by the author 4 weeks after the initial observation audit and the results are detailed in figure 2.

Re Audit week 4Evaluating Change			
Staff Number	Attempt to drain circuit	No attempt to drain circuit	Comments
1	No	Yes	
2	Yes	Attempt made	
3	No	Yes	
4	No	Yes	
5	Yes	Attempt made	
6	No	Yes	
7	No	Yes	
8	Yes	Attempt made	
9	Yes	Attempt made	
10	Yes	Attempt made	
11	Yes	Attempt made	
12	No	Yes	
13	Yes	Attempt made	
14	No	Yes	
15	Yes	Attempt made	
16	Yes	Attempt made	

Figure 2 Evaluating Change

The results of the change were encouraging as they had shown a marked improvement in compliance with the drainage of the dialysis circuit post treatment. In line with the SMART objectives, following the results it proved that the objectives set were achievable. While there was still a number of people not compliant with the change the observation were very useful in identifying these people. Gould et al,

(2011) speak of the merits of direct observation auditing as this enables the auditor to see the members of the team that are compliant with the change and those who are not. They expand on this by sharing the capture of this information allows the auditor to intervene and encourage the improved performance measures with those non compliant team members.

To build on the success of the second audit the results were again emailed by the author to the team. Also emailed were figure 3 and 4, the weight differences in the drained and non drained circuit.

Weight of Dialysis Circuits post treatment with dialysis fluid;

Non Drained and Drained

- Weight per un-drained large dialysis circuit = 1.2kg
- Weight per drained large dialysis circuit = 0.8kg
- Weight per un-drained regular dialysis circuit = 1.0kg
- Weight of drained regular dialysis circuit = 0.6kg

Figure 3; Weight of the used dialysis circuit

These figures on their own were not very powerful so to reinforce the impact that the change had on the amount of clinical waste that the unit were actively working to reduce a second table was emailed with a more detailed breakdown of the weights of clinical waste produced on a daily, weekly and annual basis. Also emailed was a series of graphs (Table 1 and Table 2) plotting the differences in clinical waste production on a daily, weekly and annual basis and the differences in weights pre and post the application of the change. This Havnes et al, (2012) discuss the merits of visual learning as it actively engages participants by enabling them to actually see

a physical change. In line with this theory a graph (figure 4) was also emailed showing the difference in weights if the intervention was not carried out.

Weekly Dialysis Patient Sessions and Weight Clinical Waste Produced		
Day	Number of sessions	Clinical Waste Weight reduction in kg
Monday	39	15.6 kg
Tuesday	28	11.2 kg
Wednesday	39	15.6kg
Thursday	28	11.2kg
Friday	39	15.6kg
Saturday	28	11.2kg
Total	201	80.4kg
Total annual figures	10452	4180.8kg

Figure 4 Weekly Clinical Waste produced.

Table 1 Weekly Clinical Waste Produced

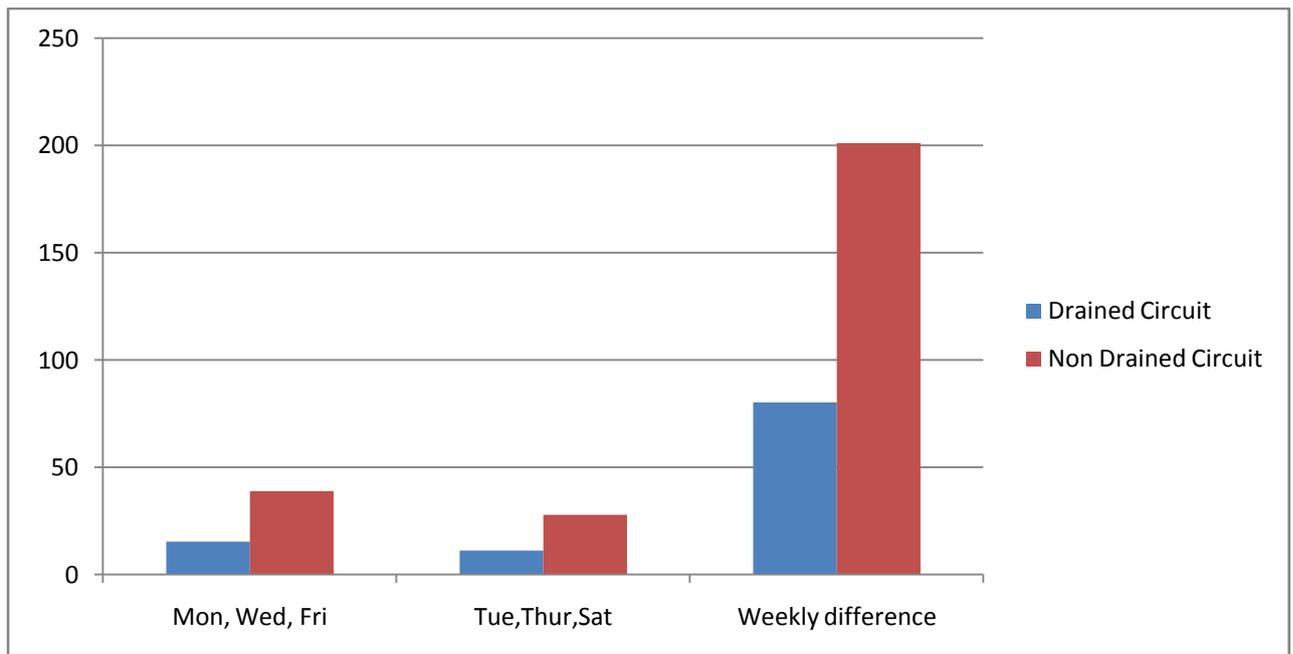
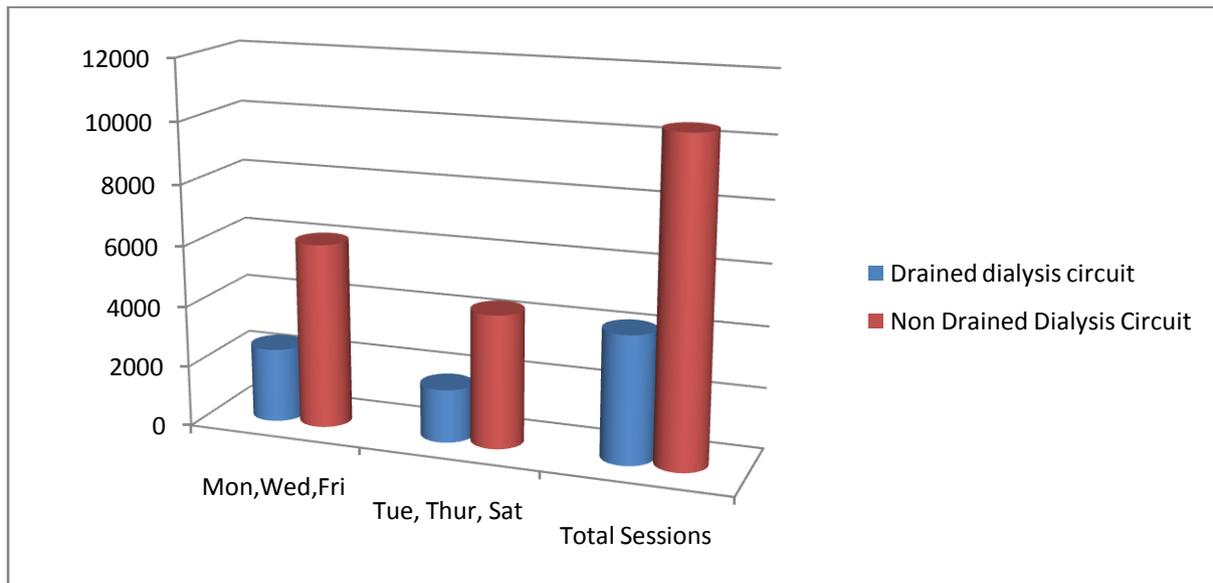


Table 2 Annual Weights in Kg of Dialysis Clinical Waste Produced



As a direct result of these interventions following the data comparison with the initial audit and the second re audit the results were extremely positive and garnered an almost 100% compliance as shown in figure 5.

Re Audit week 8 Amending Change			
Staff Number	Attempt to drain circuit	No attempt to drain circuit	Comments
1	Yes	Attempt made	
2	Yes	Attempt made	
3	No	Yes	
4	Yes	Attempt made	
5	Yes	Attempt made	
6	Yes	Attempt made	
7	Yes	Attempt made	
8	Yes	Attempt made	
9	Yes	Attempt made	
10	Yes	Attempt made	
11	Yes	Attempt made	
12	Yes	Attempt made	
13	Yes	Attempt made	
14	Yes	Attempt made	
15	Yes	Attempt made	
16	Yes	Attempt made	

Figure 5 Amended Changes

4.5 Implementing Change

The dramatic difference in the waste production once visible was a real driver in achieving almost 100% compliance amongst the team with the change. To ensure that the change remains effective it is important to carry out regular audits within the unit. Bryce et al, (2007) also advocate this as carrying out regular auditing has positive implications as it makes the process less intimidating for staff and allows the immediate capture of any potential new issues while also providing a truer picture of what really happens in a unit as opposed to a once off planned audit event.

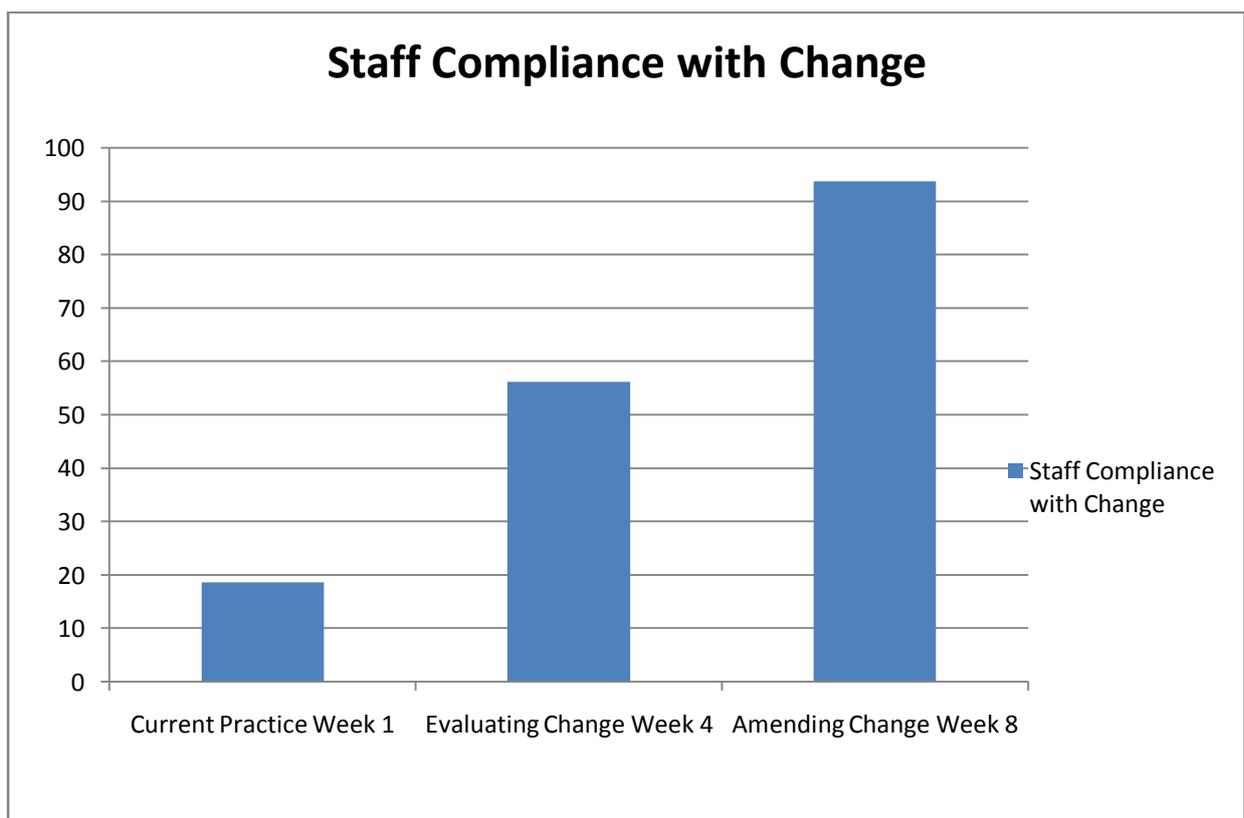


Figure 6 Staff Compliance with Change

Figure 6 lays out the change in the team's practice from the beginning of the process to the end of the 8 week cycle. In order to maintain and promote success Bryce et al, (2007) also further bestow the virtue of the audit tool in effecting change, as a tool that is designed not to catch people out but to identify where a change is needed and assist in making this change. In line with Havnes et al's, (2012) teachings of visual learning a final graph showing the difference in the team's compliance with the change was emailed. Also a poster detailing the change process was placed in the unit. The use of a hippopotamus analogy to demonstrate the potential dramatic waste reduction was very powerful in portraying the expected outcomes of the change. By providing so many different visual representations of the change and the contribution of the team in achieving the aim of the project produced a profoundly positive impact on the team overall and created a sense of ownership and innovation in the activities within the unit.

5.0 Discussion and Conclusion

The results of the 'Small change, big impact' change process were highly encouraging. Pivotal to the success of the change was the willingness of the team to embrace a new way of working and also the culture of the organisation as a whole. As shown in figure 6 the steady improvement in compliance over the 8 week process was a direct result of the information and supporting documents about the change.

On reflecting back through the change project the most difficult part of the process for the author was firstly identifying an area for improvement but also one that they were passionate about and could in turn impart this passion onto their peers. This

was also found to be the most difficult aspect encountered by students in a study by Skledar and Mc Kaveney, (2009). It was found that identifying a topic to change was one of the more difficult challenges the students faced. By looking at the overall goals of the hospital in reducing wastes and improve the general handling this assisted the author in choosing the topic. As the focus of the change was not in an area that the team would necessarily have viewed as integral to their role the existing culture within the hospital really allowed the team to engage with the idea of the targeted change.

Of particular benefit in creating a strong foundation for the change process was the setting of SMART objectives to launch the change. By keeping in line with the hospital goal it achieved an almost automatic buy in from management to push it forward but the real advantage of the SMART objectives was making it very specific to the renal unit. As MacLeod (2012) discusses the larger goal of an organisation can only be achieved if the narrower in scope objectives are made both specific to an area of work and more importantly relevant to the local area to increase the chances of successful change. This was a definite contributor to the success of the change but also the fact that the change was realistic to achieve as it did not require any additional equipment or financial considerations, just the engagement of the team. The resources required were already available in the unit, namely the dialysis machines and the communal email and staff meetings used as the platform for disseminating the information on the change and the progress that the team were making.

Choosing the right change model that would fit with the team and the hospital while also being appropriate to support and ad structure to the change was very important. Reflecting back on the outcome of the change process, the use of the NHS Change

Model was really appropriate. The CQI methodology and in particular the PDSA tool is similar in nature to the audit cycle and also to the care planning process that nurses and healthcare professionals use when assessing and planning the care for patients. Using this methodology provided a very clear and structured set of guidelines for the team and as identified by Swinglehurst (2005) good quality guidelines can benefit patients, health professionals and the healthcare system as a whole. Continuously reverting back to the central theme of the NHS change model, the shared purpose of the organisation enabled the change process to keep its focus but also strengthened the commitment of the team to the change on both a departmental level but also as a point of pride in strengthening the units overall commitment to the hospitals customer excellence programme. A further endorsement of the use of the continuous quality improvement methodology was the innovation of staff in trying to improve on the improvement. As Skledar and McKaveney, (2009) discuss at the core of continuous quality improvement is the provision of a structured organisational process that is very inclusive by involving people in the planning and execution of a continuous flow of improvements with the result of attempting to exceed expectations.

The audit tool used had not been verified and this is an acknowledged limitation, but the information gathered as a result of the audit cycle was very useful in seeing the progress of the change. As previously discussed the ability of the audit to provide immediate data really helped to identify areas that the author needed to concentrate extra effort on and the team members that needed more encouragement to embrace the change. The audit tool was found to be very useful tool and the most appropriate for use for the purpose of the change.

As found by Sen and Eren, (2012) 'the development of a successful innovation in one area cultivates further innovations in its own and other areas through its chain effects.' Following the success of the change and as a direct result of the positive feedback and encouragement at staff meetings throughout the 8 week change process for the new system a member of the team was inspired to embark on a change process of their own. This further solidifies the success of the change as, 'The chain effect of an innovation in one area generates other innovations through its push and pull effects.' (Sen and Eren, 2012).

As a result of the visual impact of the poster and the audit results, the author proposed making the drainage of the dialysis circuit a standard operating procedure (SOP) within the unit. The unit policy for waste management is currently being updated and the draining of the circuit will be included as an SOP. This inclusion in the unit policy will act as a marker to achieve 100% compliance and get the one resistant staff member converted to the change.

Conclusion

Clinical waste as discussed in the literature is a major concern for all healthcare organisations. With this at the fore of most budgets and heads of department

meetings, ways in which hospital waste is managed in order to comply with current government regulations is a major concern for the healthcare waste management teams. In tackling the issue of waste the overall the change has been a tremendous success and has had a very positive impact on the moral of the unit. As referenced in; the Department of Health publication, Environment and sustainability Health Technical Memorandum 07-01: Safe management of healthcare waste, (2013) by implementing a small change specifically targeted to your area, you can make a big impact to the overall organisation. As found by the literature, the initial process of reducing clinical waste production may come at an extra financial cost to the organisation, but the long term implications of this far out way any reservations or reluctance to invest. As further discussed in the literature, a major factor for the vast amount of clinical waste being disposed of by hospitals was the incorrect segregation and disposal by staff at source. By investing in education and perhaps more importantly supporting change agents the impact on an organisation will be one of money well spent as opposed to money thrown in the bin. To build on positive change and make it sustainable Tudor et al,(2008) state there are two significant factors that serve to maintain and drive change, firstly, 'a motivated and committed individual or small group of individuals, and second the support of senior managers.' By supporting visionary leaders to take ownership of a change by educating and developing frameworks to work from sustained change, the continued improvement in service delivery can become a reality. In summation, by looking specifically at a local level, innovative leaders can utilise existing resources and inspire their team to adopt 'small changes that have a big impact.'

6.0 References

- Abraham, S., Venu, A., Ramachandran, A., Chandran, P.M., and Raman, S. Assessment of Quality of Life in Patients on Hemodialysis and the Impact of Counselling. *Saudi Journal Kidney Dis Transplant*, (2012), Vol 23(5), pp 953-957.
- Brisson-Banks, C. Managing change and transitions: a comparison of the different models and their commonalities. (2010) *Library Management*, Vol 31 (4/5), pp 241-252.
- Brunt, H. and Abbey, H. An audit of the accuracy of medication documentation in a United Kingdom osteopathic training clinic before and after educational intervention. (2013). *International Journal of Osteopathic Medicine*, Dec, pp 1-7.
- Bryce, E.A., Scharf, S., Walker, M., and Walsh, A. The Infection Control Audit: The standardized audit as a tool for change. (2007). *American Journal of Infection Control*, Vol 35(4), pp 271-283.
- Bryman, A. and Bell, E. (2007) *Business Research Methods* (2nd Edition). Oxford: Oxford University Press.
- Cervone, F. Managing Digital Libraries: The View from 30,000 Feet. Organisational change models and digital library projects. (2013). *International Digital Library Perspectives*, Vol 29(2), pp 61-64.
- Cheng, Y.W., Li, K.-C., and Sung, F.C. Medical waste generation in selected clinical facilities in Taiwan. (2010). *Waste Management*, Vol 30, pp 1690-1695.

Dr Chamberlain, J. Who put the 'ART' in. (2011) *Management Services*, Autumn, pp 22-27.

Chanouzas, D., NG, K.P., Fallouh, B., and Baharani, J. What influences patient choice of treatment modality at the pre-dialysis stage? (2011). *Nephrology Dialysis Transplant*, Vol 27, pp 1542-1547.

Cohen, S. Change agents bolster new practices in the workplace. (2006) *Nursing Management*, June 2006, pp 16-17.

Department of Health(2013) Environment and Sustainability, Health Technical Memorandum 07-01: Safe Management of Healthcare Waste. London: London Department of Health.

Department of Health (2013) An Introduction to the NHS Change Model. London: NHS Improving Quality

Dettenkofer, M., Kummerer, K., Schuster, A., Muhlich, M., Scherrer, M., and Daschner, F.D. Environmental auditing in hospitals: approach and implementation in an university hospital. (1997). *Journal of Hospital Infection*, Vol 36, pp 17-22.

Dooley, L. and O'Sullivan, D. Decision support system for the management of systems change. (1999). *Technovation*, Vol 19, pp 483-493.

Ferreira, V. and Teixeira, M.R. Healthcare waste management practices and risk perceptions: Findings from hospitals in the Algarve region, Portugal. (2010). *Waste Management*, Vol 30, pp 2657-2663.

Guek, C.C, and CG, C. Are We Wasting or Saving Dollars – in the Dialysis Centres? (2009). *American Journal of Infection Control*, Vol 37(5), pp 34-35.

Goldman, R.S. Continuous Quality Improvement in ESRD: The Role of Networks, the United States Renal Data System, and Facility- Specific Reports. (1998).

American Journal of Kidney Diseases, Vol 32(5), pp 182-189.

Gould, D.J., Drey, N.S., and Creedon, S. Routine hand hygiene audit by direct observation: has the nemesis arrived? (2011) *Journal of Hospital Infection*, Vol 77, pp 290-293.

Havnes, A., Smith, K., Dysthe, O., and Ludvigsen, K. Formative assessment and feedback: Making learning visible. (2012). *Studies in Educational Evaluation*, Vol 38, pp 21-27.

Huang, M-C., and Lin, J.J. Characteristics and management of the infectious industrial waste in Taiwan. (2008). *Waste Management*, Vol, 28, pp 2220-2228.

Jacobs, R., Mannion, R., Davies, H.T.O., Harrison, S., Konteh, F., and Walshe, K. The relationship between organizational culture and performance in acute hospitals. (2013). *Social Science & Medicine*, Vol 76, pp 115-125.

James, R. Incineration: Why This May Be The Most Environmentally Sound Method of Renal Healthcare Waste Disposal. (2010). *Journal of Renal Care*, pp 161-169.

Kumar, R.D.C. Leadership in Healthcare. (2013). *Anaesthesia and Intensive Care Medicine*, Vol 14(1), pp 39- 41.

MacLeod, L. Making SMART Goals Smarter. (2012) *Physicians Executive Journal*, March/April, pp 6872.

Maestre, J.M., Manuel-Palazuelos, J.C., Del Moral, I., and Simon, R. Clinical simulation as a tool to facilitate culture change in healthcare: Practical application of advanced learning theory. (2014). *Columbian Journal of Anesthesiology*, pp 1-5.

Millar, R. Framing quality improvement tools and techniques in healthcare: The case of Improvement Leaders' Guides. (2013). *Journal of Health Organization and Management*, Vol 27(2), pp 209-224.

McDonald, S., and Foster, R.A. The Use of Johnson's Culture Web to Improve Understanding of Organisational Culture: A Critical Review. (2013). *International Journal of Management*, Vol 30(4), pp 340-354.

Muhlich, M., Scherrer, M., and Daschner, F.D. Comparison of infectious waste management in European hospitals. (2003). *Journal of Hospital Infection*, Vol 55, pp 260-268.

Omar, D., Nurshahida Nazli, S., and Karuppanan, S. A/L. Clinical Waste Management in District Hospitals of Tumpat, Batu Pahat and Taiping. (2012). *Procedia- Social and Behavioural Sciences*, Vol 68, pp 134-145.

Ostrovosky, A., and Barnett, M. Accelerating change: Fostering innovation in healthcare delivery at academic medical centers. (2013). *Healthcare*, Vol 2, pp 9-13.

Petrosillo, N., Puro, V., Jagger, J., and Ippolito, G. The risks of occupational exposure and infection by the human immunodeficiency virus, hepatitis B virus, and hepatitis C virus in the dialysis setting. (1995). *American Journal of Infection Control*, Vol 23 (5), pp 278- 284.

Powell, P.T., and Laufer, R. The promises and constraints of consumer – directed healthcare. (2010). *Business Horizons*, Vol 53, pp 171-182.

Roland, B., Di Martinelly, C., Riane, F., and Pochet, Y. Scheduling an operating theatre under human resources constraints. (2010). *Computers and Industrial Engineering*, Vol 58, pp 212-220.

Royal College of Nursing. (2007) Safe Management of Healthcare Waste: RCN guidance. London: Royal College of Nursing.

Schiavano, G.F., Parlani, L., Sisti, M., Sebastianelli, G., and Brandi, G. Occurance of fungi in dialysis water and the dialysate from eight haemodialysis units in central Italy. (2014). *Journal of Hospital Infection*, Vol 86, pp 194-200.

Sen, A. and Eren, E. Innovative Leadership for the Twenty-First Century. (2012). *Procedia- Social and Behavioural Sciences*, Vol 41, pp 1-14.

Senior, B., and Swailes, S. The dimensions of management team performance: a repertory grid study. (2004). *International Journal of Productivity and Performance Management*, Vol 53(4), pp 317-333.

Skledar, S.J., and McKaveney, T.P. A method for the teaching continuous quality improvement to student pharmacists through a practical application project. (2009). *Currents in Pharmacy Teaching and Learning*, Vol 1, pp 79-86.

Summet, S., Suwannapong, N., Howteerakul, N., and Thammarat, C. Knowledge management model for quality improvement in the hemodialysis unit of a non-profit private hospital, Bangkok, Thailand. (2012). *Leadership in Health Services*, Vol 25(4), pp 306-317.

Swinglehurst, D. Evidence- based guidelines: The theory and the practice. (2005). *Evidenced Based Healthcare & Public Health*, Vol 9, pp 308-314.

Tudor, T.L., Marsh, C.L., Butler, S., Van Horn, J.A., Jenkin, L.E.T. Realising resource efficiency in the management of healthcare waste from the Cornwall National Health Service (NHS) in the UK. (2008). *Waste Management*, Vol 28, pp 1209-1218.

Tudor, T.L., Bannister, S., Butler, S., White, P., Jones, K., Woolridge, A.C., Bates, M.P., and Phillips, P.S. Can corporate social responsibility and environmental citizenship be employed in the effective management of waste? Case studies from the National Health Service (NHS) in England and Wales. (2008). *Resources Conservation & Recycling*, Vol 52, pp 764-774.

Trastek, V.F., Hamilton, N.W., and Niles, E.E. Leadership Models in Health Care-A Case for Servant Leadership. (2014). *Mayo Clinic Proceedings*, Vol 89 (3), pp 374-381.

Vacar, A., and Miricescu, D. Leadership- a Key Factor to a Successful Organization- Part II. (2013). *Procedia- Economics and Finance*, Vol 6, pp 430-435.

Van de Mortel, T., and Murgu, M. An examination of covert observation and solution audit as tools to measure the success of hand hygiene interventions. (2006). *American Journal of Infection Control*, Vol 34(3), pp 95-99.

Varkey, P., Reller, M.K., and Resar, R.K. Basics of Quality Improvement in Health Care. (2007). *Mayo Clinic Proceedings*, Vol 82(6), pp 735-739.

Verma, R. Data quality and clinical audit. (2012). *Anaesthesia and Intensive Care Medicine*, Vol 13(8), pp 397-399.

Woolridge, A., Morrissey, A., and Phillips, P.S. The development of strategic and tactical tools, using systems analysis for waste management in large complex

organisations: a case study in UK healthcare waste. (2005). *Resources Conservation & Recycling*, Vol 44, pp 115-137.

Xie, S.R., Bish, D.R., Bish, E.K., Slonim, A.D., and Stramer, S.L. Safety and waste considerations in donated blood screening. (2011). *European Journal of Operational Research*, Vol 217, pp 619-621.

7.0 Appendices

Steps for draining Dialysis circuit.

- Disconnect patient lines
- Reconnect safe line to on line fluid port
- Secure arterial line to blue connector on venous line
- Reconnect couplet to port
- Place bung on the dialyser venous port
- Clamp venous line at dialyser
- Allow lines to drain for 30-40 seconds
- Disconnect couplet of arterial port and replace in holder
- Bung arterial end of dialyser
- Remove drained circuit

