THE EVOLUTION OF A CHECKLIST INTO AN INFECTION PREVENTION AND CONTROL PROCESS.

Elizabeth Andrea Denton

A thesis submitted to the University of Huddersfield in partial fulfilment of the requirements for the degree of Doctorate of Philosophy.

October 2014

Abstract

Clostridium difficile (C.difficile) infection (CDI) has the potential to be a severe or fatal infection, occurring predominantly in the elderly and other vulnerable patients (NHS England, 2014, a). Since 2010, the Infection Prevention and Control Team in association with staff across an acute Trust have undertaken a collaborative daily checklist review which later became known as the daily review checklist process (DRCP) for all CDI patients. This review included feedback at ward and organisational levels. The DRCP incorporated completion of a checklist through contemporaneous clinical patient assessment and ward level examination of infection prevention and control practices.

A grounded theory approach was used to explore the influence of the DRCP on the care and management of patients with CDI. The study consisted of two distinct phases. Phase 1 included a retrospective documentary analysis that examined all checklists (n=928) completed between July 2010 and December 2011. Phase 2 explored the perceptions of different groups of staff (Infection prevention and control practitioners [IPCPs], matrons, ward based staff and senior managers) concerning the influence the DRCP had on the care and management of patients with CDI.

The findings from Phase 1 highlighted that the DRCP was used as a form of real time monitoring, providing organisational surveillance to assure safe and effective infection prevention and control practice for inpatients and appropriate and timely responses when care or standards of infection prevention and control may have been suboptimal.

Phase 2 findings indicated that staff perceived that the DRCP had been influential in the care and management of patients with CDI. Three main themes were developed: education and learning, developing and sustaining relationships and leadership and change management that offer an explanatory framework for understanding the interactive processes that may have contributed to the care and management of patients with CDI. In terms of education and learning, ward staff valued the situated nature of learning provided by the review process. The DRCP also appeared to conceptualise CDI as an illness suggesting embodiment. Traits such as approachability and helpfulness of the key players involved in the DRCP (IPCPs and matrons) appeared to be fundamental to the DRCP and were particularly significant for developing and sustaining relationships and team work between staff. Finally the DRCP illustrated clinical leadership in practice with the IPCP and matron providing leadership and assistance in the care and management of patients with CDI.

The DRCP evolved from a checklist serving as an instrument of surveillance and monitoring to an interactive educative facilitative process assisting staff in the care and management of patients with CDI and in compliance with general infection prevention and control practice. What emerged during the evolution of the DRCP was the influence of a human factors approach and the impact that communication, teamwork, situated learning and leadership had on the process.

The key implication that emerged from this study included the contribution of human factors theory to behavioural change and improved patient outcomes. Incorporated within this was the influence situated learning can make to effecting change in knowledge and compliance and the impact relationship development can have on infection prevention and control practices and potentially processes that require different professionals to work together to improve patient outcomes.

Table of Contents

5

Word count: 81482

List of Tables

List of Figures

List of Appendices

1.	Versions 1 and 2 of checklist.

2.	Trust governance and ethical approval forms.

3.	Interview Agendas.

4.	Initial email and email to senior manager.

5.	Examples of open codes.

6.	Examples of focused codes.

7.	Example of Bristol Stool chart used in the study trust.

8.	Example of snapshot taken from care plan for CDI used in study trust.

List of Publications Generated From This Thesis

1. **"Managing *Clostridium difficile* infection in hospitalised patients"** – Journal Article Nursing Standard. (see reference list Denton et al 2014)
   April 2014

2. **"Managing patients with *Clostridium difficile* infection (CDI) in an acute NHS Trust: Understanding the impact of implementing a daily review checklist process (DRCP)"** - Poster publication (IPS conference Sept/Oct 2013)
   Oct 2013

3. **"The impact of a daily review checklist process on the care and management of patients with *Clostridium difficile* infection (CDI)"** - Oral presentation at Chi Mia, Conference Bournemouth
   June 2013

4. **"Checklists and patients safety in the care and management of patients *Clostridium difficile* infection (CDI)"** - Poster presentation at Patient Safety Conference Bradford
   Oct 2012

Acknowledgements

The undertaking of this thesis would not have been possible without the contributions and /or support of the following:

Firstly thank you to all the participants without whom the study would not have been possible. Within those participants, a special thank you to my IPCP colleagues who as well as their contributions were supportive throughout the whole of my PhD journey.

Thank you to both my supervisors for their support, advice and patience. They truly made the journey whilst challenging at times, overall an enjoyable learning experience.

Thank you also to the study Trust for supporting me to undertake the research.

To my family and friends who probably got tired of me saying 'I'm doing my PhD', thank you for your support and encouragement.

Finally, this thesis is for my husband Paul. Without his help and support as well as his continued patience and love, this journey would not have been possible.

List of Abbreviations

C.difficile   – *Clostridium difficile*

CDAD   – *Clostridium difficile* associated diarrhoea

CDI   – *Clostridium difficile* infection

DH   – Department of Health

DIPC   – Director of Infection Prevention and Control

DRCP   – Daily review checklist process

HCAIs   – Healthcare associated infections

HCC   – Health Care Commission

HII   – High impact intervention

HIS   – Healthcare Infection Society

HPA   – Health Protection Association

HPS   – Health Protection Scotland

HSE   – Health and Safety Executive

ICNA   – Infection Control Nurses Association

IPC   – Infection prevention and control

IPCP   – Infection Prevention and Control Practitioner. This term/abbreviation is used throughout to denote generic terms, for example Infection Control Nurse, Infection Prevention and Control Nurse and Infection Preventionist.

IPCT   – Infection Prevention and Control Team

IPS   – Infection Prevention Society

IRAS   – Integrated Research Application System

MDT   – Multi-disciplinary team

MRSA   – Meticillin resistant *Staphylococcus aureus*

n/c   – not completed

NHS   – National Health Service

NICE   – National Institute for Health and Care Excellence

n/k   – Not known

NPSA   – National Patient Safety Agency

NPT   – Normalisation process theory

PHE   – Public Health England

PHLS   – Public Health Laboratory Service

PPE   – Personal protective equipment

PPI   – Proton pump inhibitors

RCN   – Royal College of Nursing

SREP   – School Research Ethics Panel

u/k   – Unknown

WHO   – World health Organisation

Chapter 1
Introduction and Overview of the Thesis

1.1 Introduction and context of the study

Clostridium difficile (C.difficile) is a Gram positive spore forming anaerobe, and is one of the main causes of infective diarrhoea in hospitals (Gouliouris et al, 2011; Department of Health [DH], 2010, a). The spores are the transmissible element of the bacteria and are resistant to exposure to air, drying and heat (DH/Public Health Laboratory Service [PHLS], 1994). Particular strains or ribotypes[1] of *C.difficile* have been responsible in the past for global epidemic spread (Wilcox, et al, 2012). An example includes the '027 ribotype'[2] as it is commonly referred to in the UK, which was responsible for the first major outbreak of *C.difficile* infection (CDI) in Stoke Mandeville Hospital Buckinghamshire Hospitals NHS Trust accounting for over 300 cases and 38 deaths in the period between 2003 and 2005 (Freeman et al, 2010).

Since 2008/2009 there has been a year on year reduction in the numbers patient with CDI with a 59% reduction in 2012/2013 (n = 14,687 cases of CDI occurring in patients aged 2 years and over) compared to 2008/2009 (n= 36,095) (Public Health England [PHE], 2013, b). Whilst there is an acknowledgment that rates of CDI have continued to decline, it continues to be a major cause of healthcare associated diarrhoea (Walker et al, 2012).

Alongside a national picture of reduction in CDI rates, an NHS Trust had been successful in reducing CDI rates. This success has been ascribed to the implementation of a range of interventions and initiatives, including Saving Lives High Impact Interventions (HII) and guidelines on antibiotic prescribing (DH, 2010, a; 2007). Following a period of increased incidence in 2010 in the study Trust, the Infection Prevention and Control Team (IPCT) in collaboration with staff across the Trust devised and introduced a checklist to assess patients and context specific indicators that may impact on recovery from, and spread of CDI. During the study it became apparent that the review was more than just undertaking a checklist. As the study progressed, I referred to the checklist review as the daily review checklist process (DRCP).

The checklist review incorporated contemporaneous clinical patient assessment undertaken by an Infection Prevention and Control Practitioner (IPCP) with the Matron responsible for the ward alongside a ward level review of infection prevention and control practices that

---

[1] Ribotype is. 'Method for identification of bacteria using DNA probes to identify their ribosomal RNA' (Bender, 2005) Downloaded 05/08/14.
[2] The 027 ribotype is also known as the B1/NAP1/027 strain; named after a variety of bacterial typing techniques. 'NAP1' denotes 'North American pulsed-field type 1'.

were being, or should have been employed. This review was undertaken in conjunction with ward based staff. The checklist and subsequently the DRCP became the focus of this study.

1.2 The rationale for undertaking the study

Prior to commencing the study, the checklist had been in use within the study Trust for approximately 18 months. As one of the IPCPs involved in undertaking the DRCP and regularly completing checklists, I was interested in exploring has the checklist and what became recognisable as the DRCP, influenced the care and management of patients with CDI. The actual checklist was the starting point for the study (Phase 1) as I wanted to interrogate the information recorded on the checklists and determine how this information offered insight into the care of patients with CDI and the infection prevention and control practices employed by staff to contain spread.

The checklist was part of the regular review of patients with CDI throughout their hospital stay. I noted that the checklist had become the primary focus of the IPCPs and matrons when they visited the wards to undertake what became known as the DRCP. This in turn led to an increased presence and visibility of IPCPs and matrons on the ward areas in terms of engagement with care and management of patients with CDI and associated infection control practices. As a participant in the DRCP, often responsible for completion of checklists, I became interested in how the key players (IPCPs, matrons and ward staff) understood the DRCP and if they perceived it to be influential on the care and management of patients with CDI. I was also interested to explore why and how this may have been the case. With these aspects in mind Phase 2 of the study set out to explore the perceptions of the different staff involved in the review process.

The checklist had been devised and introduced locally. Whilst individual elements had been based on evidence based infection prevention and control practices, the checklist itself was unique to the study Trust. This, combined with the exploratory nature of the study, that aimed to 'discover rather than test any variables' (Corbin and Strauss, 2008, page 12), a grounded theory approach which provided the framework for research design. Grounded theory provides the 'flexibility and freedom to explore a topic in depth' (Corbin and Strauss, 2008, page 25). As I had been involved in undertaking the DRCP there was inevitably the possibility of researcher bias frequently inherent in practitioner research. Drawing on personal experiences however, can enhance the research process (Corbin and Strauss, 2008) provided the researcher acknowledges their involvement and utilises strategies to help address these challenges.

1.3 Aims of the study

In using a grounded theory approach it is important that the research aims were sufficiently exploratory. This is in order to provide the researcher with the ability to investigate the data which was relevant to the persons and the organisation for which the research was important (Corbin and Strauss, 2008). The following research aims were developed:

Research aims

1. To explore the findings generated from a retrospective analysis of the daily review checklist.
2. To explore with infection prevention and control practitioners (IPCPs) matrons, ward staff and senior managers their perceptions of the checklist which became known as the daily review checklist process (DRCP) and what it means to them.
3. To explore with infection prevention and control practitioners (IPCPs) matrons, ward staff and senior managers their perceptions of the influence the DRCP has had on the care and management of patients with *C.difficile* infection (CDI).

1.4 Overview of the methodology

A constructivist grounded theory approach was used in order to explore how the DRCP was used to assist in the care and management of patients with CDI. A qualitative research methodology can help to discover rather than test any existing theories (Corbin and Strauss, 2008). Whilst checklists within the context of infection prevention and control were not a new phenomenon, the collaborative interactive approach involving matrons and ward teams in order to complete the checklist was unique. Grounded theory provided a methodological approach to examine both the checklist and its use (Phase 1). Grounded theory also helped to gain insight into the participants experience and views on the checklist review process including any perceived benefits or constraints and any influence on the care and management of patients with CDI (Phase 2).

The study was designed with two distinct phases. Phase 1 included undertaking a retrospective documentary analysis of checklists that had been completed over the period July 2010 to December 2011. Phase 1 was designed to provide an understanding of the

checklist, its use and findings over the specific period in time and also to direct Phase 2 in terms of the selection of participants and the nature of the subsequent enquiry.

Phase 2 engaged participants involved in the DRCP to examine their experience of the review process as well as any perceived benefits or constraints both to them, to patient care and management, and ICP practice with respect to CDI

1.5 Outline of Chapter Contents

This section provides an overview of the content and brief summary of each of the chapters contained in the thesis.

1.5.1 Chapter 2

Chapter 2 provides an overview of the literature linked to *C.difficile* and CDI. The chapter also provides a description of the design, development and introduction of a specific checklist in the study Trust. Literature in relation to the design, utility and value of checklists is also explored. This includes background information on the development of checklists and their evolution in the airline industry to recent adoption in health care and infection prevention and control. Checklists are often linked with human factors theory therefore an introduction to human factors theory is also included in this chapter.

Finally the chapter concludes with an overview of the development and use of the checklist in the study Trust. This includes details about the various reviews of the checklist content and format and the formal and informal feedback mechanisms operating in relation to patients, ward areas and at organisational level as part of the checklist review.

1.5.2 Chapter 3

Chapter 3 provides an overview of the methodology used to conduct the study. The nature and design of the methodology helps to establish the intent and the expectations of the research (Mackenzie and Knipe, 2006). A constructivist grounded theory approach was used which enabled participants' views of the daily checklist review to be explored. This approach demanded the researchers own background and influence on the research topic (Creswell, 2014) was made explicit. Issues relating to reflexivity, reliability and validity are

therefore explored in chapter 3. The chapter also discusses the rationale underpinning the choice of Corbin and Strauss' (2008) method of analysis.

A description of data collection and analysis methods are provided for both Phase 1 and 2. Different types of data were derived from each phase. Phase 1 produced predominantly quantitative data with Phase 2 qualitative data. Both phases involved coding methods in order to undertake analysis and these are explored in the analysis section of chapter 3.

An overview of research governance associated with the project and procedures associated with NHS ethical and University ethical approvals is outlined in the chapter. Whilst there were no patients involved in the research study, human participants were involved, therefore it was important to ensure that ethical principles were upheld (Robson, 2011).

1.5.3 Chapters 4 and 5

These two chapters present the findings and a discussion of Phase 1 of the study.

Chapter 4 presents the retrospective analysis of checklists (n=928). The findings illustrate the different elements included in the checklist and explore overall rates of compliance and non-compliance with in effect required standards of care, management of patients with CDI and the clinical environment.

Chapter 5 discusses the relevance of these specific findings with respect to the literature linked to CDI. Chapter 5 also provides insight into the design weaknesses evident in the checklist illuminated by the problems encountered when attempting to extract data derived from the checklists for analysis (largely through descriptive statistics). Finally the chapter provides outlines the relationship between Phase 1 of the study and how findings directed and informed Phase 2.

1.5.4 Chapter 6

Chapter 6 provides an overview of the main findings of Phase 2 of the study. This includes how the themes and concepts arose from the various stages of coding employed. A diagrammatic representation (see figure 6.1) is used to represent the overall explanatory framework that emerged and the relationships between the concepts and themes. Three main themes emerged: education and learning, developing and sustaining relationships and leadership and change management that are presented to explain the DRCP. The chapter

provides an overview only whereas more detailed interpretations and discussion is provided in the subsequent chapters (chapters 7, 8, 9 and 10).

1.5.5 Chapters 7, 8 and 9

These three chapters set out each of the main themes that emerged that explain participants' perceptions of the influence that the DRCP had had on the care and management of patients with CDI. Each of the main themes is divided in to sub-themes and concepts, and the reader again is signposted as to how the sub-themes and concepts evolved from the data. In each of the chapters excerpts from the interviews are used to illustrate and highlight specific points from the participants' accounts, drawing on relevant literature to offer an interpretation.

1.5.6 Chapter 10

Chapter 10 discusses and summarises the main findings outlined in previous chapters. This predominantly refers to the findings from Phase 2 but also summarises Phase 1 findings to demonstrate connectedness. This chapter draws on relevant literature to elaborate the findings, focusing on the three substantive themes of education and learning, developing and sustaining relationships and leadership and change management. The discussion then demonstrates the evolving nature of the DRCP and the link to a human factors approach.

1.5.7 Chapter 11

This chapter provides an overview and a synthesis of the findings linked to the research aims. The chapter also explores the implications of the findings in relation to education and practice, providing recommendations and direction for further research. The recommendations include those specifically related to the DRCP and CDI and the study Trust but also include recommendations that emerged from this study but have broader application to infection prevention and control practices and the use of checklists and human factors approaches in this area. The chapter concludes with a discussion of the limitations of the research study. These link to the research design, sample size, data collection and analysis methods.

Chapter 2
Background and Literature Review

2.1 Introduction

C.difficile infection (CDI) occurs mainly but not exclusively in the elderly and other vulnerable patients groups and in particular in patients that have been subjected to antibiotic treatment (NHS England, 2014). Infection rates at the beginning of this century were extremely high. This resulted in a variety of measures and the introduction of mandatory targets in order to reduce the numbers. This subsequently led to a reduction in the number of reported cases of CDI by 74% since 2007/08 (PHE, 2014). However CDI is still 'associated with considerable morbidity and risk of mortality' (PHE, 2013, a, page 4) and the death rate attributable to CDI is 8%, one in twelve patients (Planche et al, 2013)

This chapter outlines the background information and literature with regards to *C.difficile,* CDI and the introduction of a checklist to assist in the care and management of patients with CDI in the study Trust. The use of checklists and human factors approaches in health care and specifically in the field of infection prevention and control is also explored. The chapter goes on to outline the rationale, design and introduction of the checklist within the study Trust.

2.2 Review of the literature

A literature review was undertaken at the beginning of the PhD process and continued throughout the study. A review of the literature was undertaken rather than a systematic review due to the fact that a grounded theory and an exploratory approach were used. There is some argument that grounded theory should be 'free from preconceived ideas or predetermined conceptual frameworks' (Elliot and Jordan, 2010, page 30) and therefore should be undertaken once the actual research has been done in order that it can be interwoven into the theory as it emerges (Glaser, 1998). However, research ethics committees often require literature reviews in order to make decisions on the research project (Cutcliffe, 2005).

For this study it was beneficial to have some relevant background knowledge of the literature relevant to CDI and checklists as this helped to understand the topic under review (Walls, et al, 2010). A review of the literature can provide an overview of the subject area. It can be problematic when undertaking research not to have some understanding or background in order to ensure that the proposed topic under study has not already been extensively researched and that the topic is researchable (Hart, 1998).

Initially the literature focused on general aspects of *C.difficile* and CDI linked specifically to this study alongside the use of checklists and human factors approaches to healthcare and infection prevention and control. A continuous review of relevant literature was undertaken throughout the study. This can assist with introducing other literature that may contribute to the developing concepts and themes generated from the data produced (Corbin and Strauss, 2008). This was particularly useful in this study in Phase 2 when interviewing participants. One of the themes that emerged was 'Education and Learning'. This instigated further literature being reviewed linked to this theme and specifically to infection prevention and control and CDI.

2.2.1 Key words and phrases

Initially key words and phrases included *Clostridium difficile, C.difficile,* CDI, *Clostridium difficile* associated diarrhoea (CDAD), diarrhoea, infective diarrhoea, infectious diarrhoea and pseudomembranous colitis. Advanced searches involved combining these words and phrases with infection control, infection prevention, infection prevention and control. Other combinations included associated factors that could be linked with *C.difficile* and that were linked to this study. This included key words such as 'transmission', 'spread', 'spores', 'environment', 'treatment', 'cleaning', 'outbreaks' and 'outbreak management'. The review also incorporated checklists, their origins, links with healthcare and infection prevention and control in particular.

Developing and emerging themes for example education and learning and infection prevention and control and CDI alongside human factors theory[3] which is often linked to checklist use were also explored. Again these were in relation to this study and the findings as the study developed therefore exhaustive reviews were not undertaken.

2.2.2 Inclusion and exclusion criteria

Evidence based literature was included in the review. This included National evidence based guidelines linked to infection prevention and control. These are often 'broad principles of

---

[3] Ergonomics (or Human Factors) is the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimise human well-being and overall system performance.' (The Institute of Ergonomic and Human Factors [UK], 2014) Downloaded Aug 2014

best practice' as is highlighted in the new epic 3[4] evidence based guidelines (Loveday et al, 2014, page S1). Literature included latest publications which at the start of the study included up to 2011. However as the literature continued to be reviewed throughout the study it included references up until 2014. Seminal texts and pertinent literature in relation to infection prevention and control and particularly CDI were also included. For example Lyerly et al (1988) who discusses the development of CDI and some of the treatments and risk factors and the DH '*Clostridium difficile* infection: How to deal with the problem' (DH, 2008, a) which is still relevant as current guidelines but has a recent updated chapter on treatment advice (PHE, 2013, a).

2.2.3 Electronic data bases and search engines used

Robson, (2011) and Greenhalgh and Peacock (2005) maintain that accessing a large array of data bases may not be always accurate to ensure all relevant literature has been retrieved. Conversely it is also important to ensure that more than one data base is used to retrieve the literature for any research study. For this study a variety of data bases were used. These included CINAHL, Medline, Cochrane, Science Direct, and Scopos. The search engine Google scholar® was used as well as the University library search engine Summon®.

Search engines are a useful add-on to data bases as they can assist with retrieving articles and literature that may be difficult to find by single words or phrases. Search engines also allow full titles to be included and whilst the article may not be readily available it may provide access to abstracts that can assist with judging relevance. Secondary sources from original references were also useful to retrieve literature (Greenhalgh and Peacock, 2005). Secondary sources of literature were particularly relevant in this study as often specialised areas of healthcare such as *C.difficile* may generate further specialist knowledge and expertise.

2.2.4 Key sources of information

National and government publications for example DH publication '*Clostridium difficile* how to deal with the problem' (DH, 2008, a) which outlines the guidance for the care and management of patients with CDI were included in the review of the literature. Other key government and national body publications as well as the DH included publications by Public

---

[4] epic 3 (Loveday et al 2014) outlines the 'National Evidence Based Guidelines for preventing Healthcare – associated infections in NHS hospitals in England'.

Health England (PHE) formerly the Health Protection Agency (HPA) and The National Institute for Health and Care Excellence (NICE). National bodies for example the Royal College of Nursing (RCN), British Medical Association (BMA) were also useful sources of information. Infection prevention and control specific websites and journals were useful resources for researching the literature. These included the Infection Prevention Society (IPS) and the Healthcare Infection Society (HIS)[5].

As the checklist was designed locally to link to the care and management of patients with CDI it was also important to access local sources of information and policy and guidelines to facilitate the background and rationale for the development of the checklist and the components in the checklist.

2.3 Historical perspectives and *Clostridium difficile*

C.difficile, the organism was initially isolated from the stools of healthy infants' in 1935. Hall and O'Toole (1935) cited in Lyerly et al (1988) demonstrated that the bacterium produced toxins. The toxins produced by the organism were not investigated in any great depth until the 1970's when *C.difficile* was associated with pseudomembranous colitis[6]. In the late 1970's early 1980's the organism also began to be linked with antibiotic associated disease in humans due to the increasing use of Clindamycin for anaerobic infections. Diarrhoea had been recognised as a common side effect of antibiotic therapy, but this was accompanied by increasing reports of severe inflammation of the colon. Post-mortem diagnosis of pseudomembranous colitis in patients who had died following treatment with Clindamycin led to increasing links with CDI and antibiotic use (Lyerly et al, 1988).

In the early 1990's *C.difficile* was confirmed as a healthcare associated infection (HCAI) following the outbreak of CDI in three Manchester hospitals. This resulted in 175 patients being affected and at least 17 deaths attributed to CDI (Cartmill et al, 1994). A report by the then Public Health Laboratory Service (PHLS) and the DH into the prevention and management of CDI was published (DH/PHLS, 1994). The report acknowledged the lack of research on the pathogenesis of CDI and the mode of spread of infection, and highlighted the importance of prudent antibiotic prescribing, the development of antibiotic policies, thorough hand washing, environmental cleaning and prompt isolation. These have subsequently been reinforced by the DH in both the 2008 guidelines (DH, 2008, a) as well as

---

[5] The Healthcare infection Society (HIS) recently changed from the Hospital Infection Society.
[6] Pseudomembranous colitis is an inflammatory process where the pseudo membranes form a sheath over the mucosal layer of the bowel (Lyerly, et al, 1988).

Saving Lives and the High Impact Intervention (HII) for the prevention of *Clostridium difficile* infection (DH, 2010, a; 2007).

The DH (2008, a) guidelines provided guidance on how to deal with the problem of CDI and acknowledged that in the main the messages and guidance offered in the original 1994 report were still applicable. Increasing knowledge and evidence regarding pathogenesis and mode of spread coupled with an increase in rates from the 1990's through to 2006 prompted a more thorough review specifically for issues associated with CDI. The current guidelines (DH, 2008, a) provide more detail on how to prevent and control both individual cases as well as outbreaks. There has been a recent updated section on the treatment of CDI has been included to replace the specific treatment chapter in the 2008 guidance (PHE, 2013, a). This only replaces the specific treatment chapter and the remainder of the 2008 guidance is still applicable (PHE, 2013, a; DH, 2008, a).

Two further major outbreaks at Stoke Mandeville hospital NHS Trust (Healthcare Commission [HCC], 2006) and Maidstone and Tunbridge Wells NHS Trust (HCC, 2007) occurred. The latter resulted in excess of 500 cases and over 60 deaths. This led to investigations by the then HCC. The former outbreak at Stoke Mandeville hospital was also investigated by the Health and Safety Executive (HSE) as there were alleged failings in the Trust's management of the outbreak as opposed to clinical failings (HSE, 2006). In 2008 the BBC reported that following the publication of the HCC report into the Maidstone and Tunbridge Wells NHS Trust outbreak (HCC, 2007), the HSE and the Kent police had determined that there was insufficient evidence to bring a criminal prosecution (BBC, 2008, downloaded 03/01/12).

This led to a plethora of media attention highlighting failures of the Trust but also general attention to other aspects of CDI and HCAIs. The overall effect was portrayal of lack of public confidence in the management and control of infections generally and a mistrust in hospitals with a public perception that hospitals were unsafe places in relation to infections.

2.4 *C.difficile* and risk factors

Risk factors for developing CDI include host factors such as increasing age, co-morbidity and/or impaired immune status and alteration to the normal intestinal flora which can be caused by antibiotic use (McFarland, et al, 2007). Proton pump inhibitors (PPI's) and other gastric acid suppressants namely H2 receptor antagonists (H2RA) have been linked with an increase in CDI rates.

Theoretically, the mechanism by which this occurs is by decreasing the colonisation barrier against *C.difficile* which is undertaken by increasing the gastric PH. Freeman et al (2010) argue that whilst the vegetative form of *C.difficile* could be affected by gastric PH., the spores which are the main mode of acquisition of *C.difficile* are resistant to gastric acid. Whereas McFarland et al (2007) maintain that whilst the spores may not be killed directly, germinating binding[7] may be inhibited. PPIs that have been associated with CDI, raise the gastric pH and allow the germinants to bind more effectively which could provide some of the rationale for PPI's increasing the risk of CDI due to the fact that allowing the germinants to bind more effectively leads to increased numbers of replicating (Blocher et al, 1985).

Dial et al (2004) however in a cohort and case controlled study found that the use of PPI's was independently associated with increased risk of CDI. The study involved a cohort and case controlled studies in order to allow for patients that were 'sicker' and had other 'risk factors' (Dial et al, 2004, page 33). Freeman et al (2010) maintain that in the studies where links have been associated with PPI use and increased CDI rates, these have tended to be also where outbreaks of CDI have occurred. This potentially could provide other variables and risk factors that may have led to increased rates, for example cross transmission. They go on to suggest that often PPI's are used on patients with specific co-morbidities and it may well be the co-morbidities that increase the risk. A true definitive answer as to whether gastric acid suppressants increase risk of CDI, may only be obtained from randomised controlled trials (RCT's) where colonisation of *C.difficile* is compared to actual development of CDI and the use of gastric acid suppressants (Freeman et al, 2010).

The PHE (2013, a) after considering the available evidence maintain that there is a possible risk of acid suppression drugs impacting on CDI therefore have requested that consideration is given to reviewing and stopping where possible the use of PPIs in patients with CDI or at increased risk of CDI. They go on to state that this is particularly relevant in patients who are on long term PPIs that may have not been recently reviewed and, or may no longer require the use of those drugs (PHE, 2013, a)

2.5 Transmission and *C.difficile*

Whilst there is evidence to support direct transmission of *C.difficile* by either patient to patient route or via the contaminated hands of healthcare workers (National *Clostridium difficile* Standards Group, 2003; Fawley and Wilcox, 2001), there is also increasing evidence

---

[7] Germinating binding is a process whereby the *C.difficile* spores in the presence of a nutrient rich environment revert to replicating cells (Howerton et al, 2011).

to indicate that the environment contributes indirectly to the acquisition of HCAIs including *C.difficile* (Weber and Rutala, 2011)*.* When levels of environmental contamination increase, the level of hand carriage by health care workers also increases (Samore et al, 1996).In addition *C.difficile* spores have been found to survive for months in the environment (Vonberg, et al, 2008), potentially resulting in the environment providing a continued source for cross transmission.

In a study by Fawley and Wilcox (2001), newly opened wards were found to have little or no recoverable *C.difficile.* However within 6 months the levels of contamination rose. In one ward the increase in environmental contamination directly correlated with increases in CDI rates (Fawley and Wilcox, 2001). McFarland et al (1989) found that spores can be found in the environment where a patient with CDI has been resident for up to one year later.

Ward based transmission of *C.difficile* over a two and a half year period across 3 hospitals in an acute trust was investigated (Walker et al, 2012). They found that the hospital environment was not, as had been claimed in the past, a long lasting reservoir for *C.difficile.* CDI cases that were attributable to within hospital transmission were following the initial onset of the disease, thus indicating that shedding of spores is most significant during episodes of diarrhoea. The study did support the recommendation of timely isolation of patients. They concluded that in an endemic setting with good infection prevention and control practices, cases of new CDI could not be attributed to the ward environment (Walker, et al, 2012). It is important to point out that there are a number of limitations with this study, including the potential of inter-ward cross transmission and asymptomatic carriage which were not considered and these may have influenced the results (Harbarth, et al, 2012).

Gerding et al (2008) maintain that infection prevention and control practice to reduce the rates of *C.difficile* infection should focus on two major approaches. The first is preventing the ingestion of the organism, or the spores, by patients through cross transmission, and the second is to reduce the likelihood of developing CDI if ingestion takes place by the use of prudent antimicrobial stewardship. Strategies to help prevent ingestion focus on the environment and reducing the bacterial and/or spore load as well as meticulous hand hygiene, isolation precautions and use of personal protective equipment (PPE) (Gerding et al, 2008). All of which have been repeatedly highlighted in the literature and guidelines produced by the DH (2010, a; 2008, a; 2007).

Reducing spore load by the use of cleaning agents has produced a number of studies that examine the efficacy of detergent and chlorine based solutions. Wilcox and Fawley (2000) in

a laboratory based study compared the sporicidal levels of different strains of *C.difficile* with different cleaning solutions. One of the endemic strains in the UK at the time produced greater sporulation than other strains when exposed to non-chlorine based cleaning solutions. The authors concluded that the type of cleaning solutions used in hospitals could directly influence the continued presence of spores within the hospital environment. Mayfield et al (2000) found that the incidence of CDI reduced in a bone marrow transplant unit following the use of a hypochlorite solution for disinfection purposes; however the same study saw no changes to the CDI rate in the ICU and general medical units.

In a prospective study of long term care patients, Riggs et al (2007) examined the role of asymptomatic carriage and the risk of disease transmission. They found that in the context of a CDI outbreak, 52% (n= 68) of long term patients had no symptoms of CDI yet were asymptomatic carriers of toxin producing *C.difficile* strains, a third of which were a hyper-virulent strain. They also found that the frequency of contamination of both skin and environment amongst asymptomatic patients was almost as high as that of those patients with symptomatic CDI. The conclusion was that asymptomatic carriage has the potential to contribute to the transmission of the disease. The study had limitations, including the potential for overestimation of asymptomatic carriage due to faecal incontinence and the fact that the study was undertaken in an outbreak setting. Nonetheless the importance of prompt stool sample collection, isolation or cohort nursing of patients with diarrhoea and the need to practice good infection prevention and control precautions and environmental decontamination were evident (Freeman et al 2010).

In two reviews of epidemiology, risk factors and treatment of CDI (Freeman et al, 2010; McFarland et al, 2007), the changing face of *C.difficile* was highlighted. Increased knowledge of epidemiology, transmission, risk factors, treatment and new and emergent hyper-virulent strains has shaped the way in which CDI is now managed. The DH guidelines on '*Clostridium difficile:* How to deal with the problem' (DH, 2008, a) as well as the updated HII (2010, a) reflect increased awareness and knowledge. This growing understanding helped to inform, formulate and contribute to the design of the daily review checklist which is the focus of this study.

2.6 *Clostridium difficile* and the extent of the problem

National and local CDI rates are provided with current and previous national CDI rates. The national data illustrated with the graphs (figures 2.1 and 2.2) demonstrate the changing face of CDI. Local rates are compared and contrasted in section 2.6.2 (figure 2.3).

2.6.1 National CDI rates

National figures for CDI up until 2004 increased (see figure 2.1)
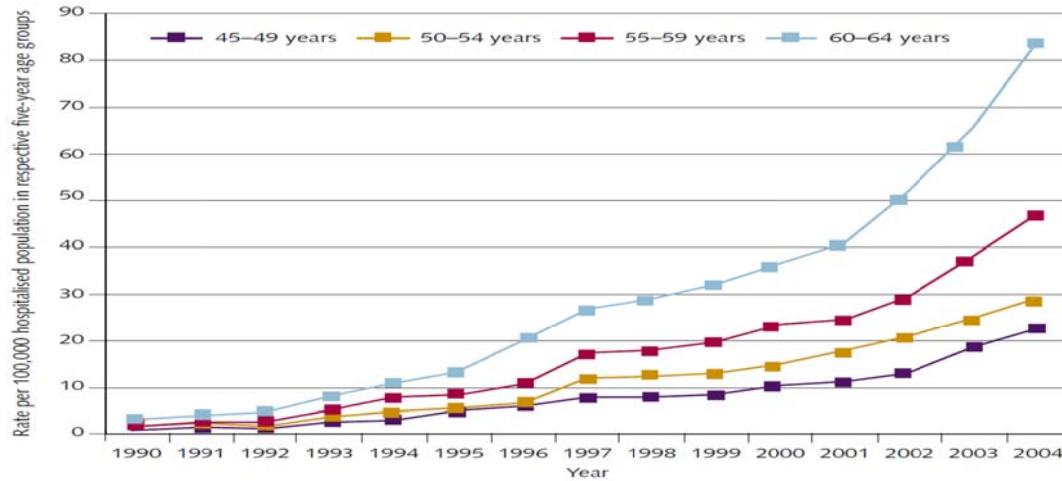
Figure 2.1: *Clostridium difficile* **infection rates up until 2004 from people aged 45-64 (excluding North West, South East and London regions) (HPA, 2006).**
Source: DH (2008, a) '*Clostridium difficile* infection: How to deal with the problem'.

In 2004 mandatory surveillance[8] was introduced for all patients over the age of 65. Since 2007 enhanced surveillance began which included all patients with CDI over the age of 2 years (HPA, 2011, b). The rise in cases was attributed in the DH (2008, a) guidelines to a combination of factors, including increased reporting and more complex epidemiology with emerging hyper virulent strains, such as ribotype 027 (DH, 2008, a). The figure below (figure 2.2), demonstrates an overall reduction since the third quarter of 2008/2009.
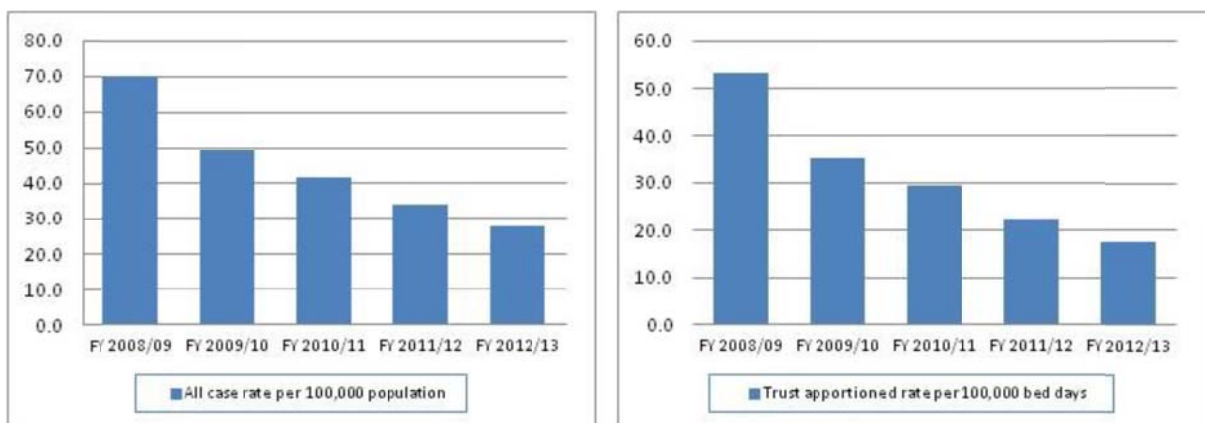
Figure 2.2: Trends in rates of CDI all cases and Trust apportioned cases (2008/09 to 2012/13) (PHE, 2013, b).
Source: PHE (2013, b) 'Summary Points on *Clostridium difficile* infection'.

---

[8] Prior to 2004 data were produced by a voluntary laboratory based surveillance system (HPA, 2009).

2.6.2 CDI and the local picture

The rates of CDI in the study Trust mirrored the national picture with the rates below the Trust's apportioned rates[9] (figure 2.3)
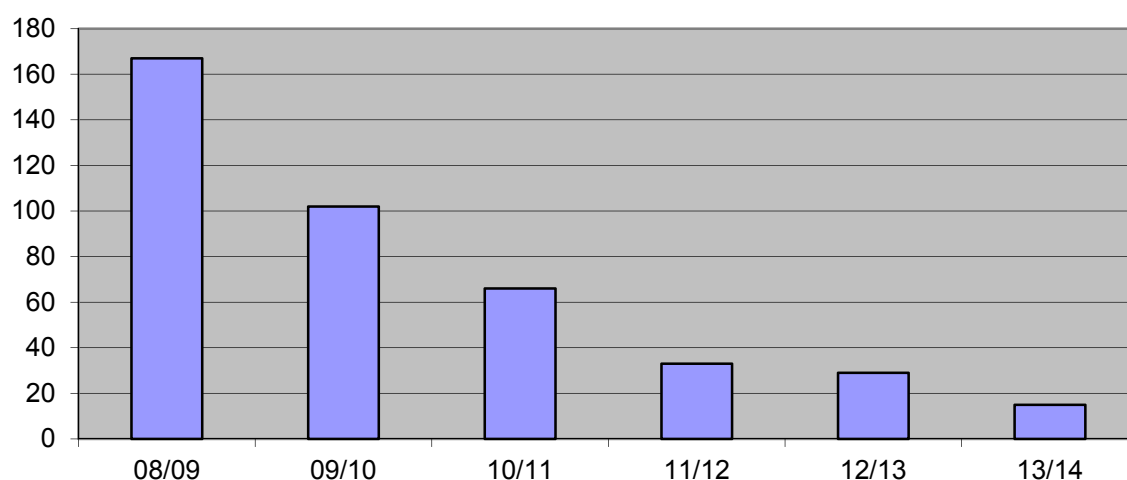
Figure 2.3: CDI rates from 2008/2009 to 2013/2014 taken from the study Trust.

2.7 Healthcare associated infections (HCAIs)

Healthcare associated infections (HCAIs) are defined as '....any infection by any infectious agent acquired as a consequence of a person's treatment by the NHS or which is acquired by a health care worker in the course of their NHS duties' (DH, 2006, page 1). The World Health Organisation (WHO) also defines health care associated infection as 'an infection occurring in a patient during the process of care in a hospital or other health care facility which was not present or incubating at the time of admission. HCAI can affect patients in any type of setting where they receive care and can also appear after discharge..'. (WHO, 2014).

HCAIs became of increasing concern at the end of the twentieth and beginning of the twenty first centuries. Not least because of a recognition that technological advances in treatments were being undermined by the transmission of HCAIs and in particular resistant strains of some endemic bacteria present in health care environments. There was also increasing awareness that many infections were preventable.

---

[9] Trust apportioned rates refer to patients who develop CDI 72 hours post admission (DH, 2008, a).

The government at the time and the public became aware of the risks of HCAIs and the financial, as well as physical, social and emotional, costs to patients, relatives and the NHS as a whole (Pratt et al, 2007). The government and the media attention focused mainly on *C.difficile* and Meticillin resistant *Staphylococcus aureus* (MRSA).

2.8 Methods introduced to reduce HCAIs

A variety of initiatives were introduced to reduce the burden of HCAIs. In 2002 the DH produced a report 'Winning Ways' (DH, 2002) outlining some of the strategies and measures to reduce the effect of HCAIs. This brought recognition then that infection prevention and control was not just the responsibility of the IPCTs but fundamental to everyone in the organisation. The report highlighted the importance of leadership, increased awareness through training and education and monitoring progress amongst other initiatives to reduce the burden of HCAIs. In 2006 the Health Act 2006[10] subsequently superseded by the Health and Social Care Act 2008[11] highlighted individual responsibility of all staff for the prevention and control of infection. The code of practice within the Health Act 2006 (DH, 2006) outlines the main duties of health care professionals in relation to specific core competencies aimed at reducing health care associate infections. All job descriptions are required to include of infection prevention and control (DH, 2010, b).

2.8.1 National Strategies introduced to reduce CDI rates

The marked increase in CDI rates up until 2007 led to further publications with suggested measures to reduce the problem (HPA, 2011). 'Saving Lives' (DH, 2007; 2010, a) included a series of High Impact Intervention (HII) care bundles; one was aimed at reducing the risk from *C.difficile.* The care bundle outlined the principles associated with the prevention and management which included prudent antibiotic prescribing, hand hygiene with emphasis on the use of soap and water, environmental decontamination, particularly the importance of a chlorine based or sporicidal products, the use of personal protective equipment and prompt isolation or cohort nursing of patients with CDI. The HII's have been recently updated in 2010 and now provide a more comprehensive audit check list (DH, 2010, a). Elements of the checklist introduced in the study Trust incorporated these aspects such as cleaning, hand hygiene and prompt isolation of patients.

---

[10] The Health Act 2006 provided a legal requirement to have systems in place to reduce the risk of HCAIs (DH, 2006).
[11] The Health and Social Care Act 2008 is outlined in the DH 'Code of Practice for health and adult social care on the prevention and control of infections and related guidance (2010, b). This has recently been updated by the Health and Social Care Act 2012.

Further guidelines (DH, 2008, a) highlighted key infection prevention and clinical management measures to help Trusts reduce their CDI rates. The 2008 guidelines replaced the previous DH/PHLS publication in 1994, following the outbreaks at Stoke Mandeville hospitals NHS Trust (HCC, 2006) and Maidstone and Tunbridge Wells NHS hospitals Trust (HCC, 2007). The report highlighted the need for prompt and efficient recognition of cases and potential outbreaks as well adherence to the main aspects covered by the HII. The report also includes advice on the management of disease severity and recognition of what constitutes disease severity, for example increased white blood cell count, and signs and symptoms of pseudomembranous colitis. The report also included the benefits of multidisciplinary (MDT) involvement and in particular IPCT involvement during periods of increased incidence (DH, 2008, a).

2.8.2 Current National Strategies

In early 2011 Trusts were given new objectives. The '2010-11 NHS Operating Framework' (DH, 2009) included a 'minimum standard' for all CDI's enforceable from April 2011. The aim was that by 2014 all Trusts reduced their CDI rates to the level of the 'current best'. This meant that for some Trusts it would mean a reduction in over half of their overall yearly Trust apportioned CDI rates (DH, 2010, b). With the introduction of clinical commissioning groups (CCGs) responsible for the delivery of services, the NHS outcomes framework was introduced in 2011/2012 (DH, 2011). The framework included five domains designed to assist commissioners in the planning and deliver of local quality outcomes. The fifth focused on 'treating and caring for people in a safe environment and protecting them from avoidable harm' (DH, 2013, page 15). One of which is a reduction in HCAIs for *C.difficile* which has also been included in the NHS Operating Framework for 2014/15 (DH 2013).

Other initiatives from the White Paper 'Equity and excellence: Liberating the NHS' (DH, 2010, c) highlighted the importance of quality standards and uses the National Institute for Health and Care Excellence (NICE) to develop key standards in the prevention and control of HCAIs (NICE, 2011). These standards again highlighted leadership in infection prevention and control as well as audit and surveillance. They also recognised that a knowledgeable and skilled workforce should be able to minimise the risks of infection. Together these aspects were important in reducing the rate and impact of HCAIs. Prioritising good communication about care management and prevention of HCAIs by implementing good standards of cleanliness in the environment and general hand hygiene were also key

standards within the framework. These standards also provided further guidelines to help reduce HCAIs including *C.difficile* to be used alongside the other initiatives.

2.8.3 Recent developments in CDI rates and reductions

Whilst the rates of CDI have reduced dramatically, recently the reductions have appeared to have slowed down. Experts maintain that this is due to a number of reasons including the changing epidemiology and biology of *C.difficile.* There is some argument that many Trusts are reaching their irreducible minimum targets and as such CDI cases may not all be related to failures in patient care. There is also evidence to suggest that not all strains of CDI are linked thus suggesting that patient to patient spread may not always be the case of reported CDI's. With these factors in mind, NHS organisations have been asked to examine each individual case and determine if there has been a lapse in care provision and take any steps to put things right if there were mistakes. This is seen as the way forward 'for delivering continuous improvement of patient safety in relation to CDI (NHS England, 2014).

2.9 Local Initiatives to reduce CDI rates (the study Trust)

The original Saving Lives care bundle, HII for *C.difficile* (DH, 2007) incorporated core elements to assist in the prevention of spread of *C.difficile.* This formed part of the study Trust's CDI surveillance approach where staff completed Saving Lives audits on a monthly basis. For all newly diagnosed patients with CDI, a standard care advisory sheet outlining the principles of infection prevention and control was distributed to ward staff and placed in the nursing notes for reference by the staff. This was provided in conjunction with information regarding the study Trust's policy on the care and management of patients with *C.difficile* infection and specific guidelines for clinical treatment options for medical staff (*C.difficile* associated diarrhoea [CDAD][12] guidelines).

Any further review by the IPCP at that time would be on an ad hoc basis for example if the clinical staff had any worries. Patients who remained as in patients with an 'alert organism'[13] may also have been reviewed by the IPCP but this would be dependent on a variety of factors for example if there were other priorities at the time which may have included an outbreak of an infection.

---

[12] CDAD is often used as well as CDI for *Clostridium difficile* infection.
[13] Alert organisms are organisms designated by the local trust in this case that require infection prevention and control input or advice for example MRSA and *C.difficile* due to their potential transmission risk. Other alert organisms in the local trust would include Mycobacterium tuberculosis (TB) due also to the risk of transmission.

2.9.1 Background to the development of the daily review checklist

In the first quarter of 2009 (April to June 2009), one of the hospitals in the 2 hospital study identified an increased number of patients with CDI. The predominant strain for this particular outbreak was the particularly virulent strain, ribotype 027, which was known to be highly transmissible and could therefore lead to an increase in morbidity and potential mortality if it infected other patients (Weiss et al, 2009).

Whilst the Trust had seen a reduction in the general trend in the rate of CDI's since 2008 similar to the national picture (PHE, 2013, b), the sudden increase in the spring of 2009, led to concerns and a review of the care and management of patients with CDI. Vonberg et al (2008) emphasise that any increased rates at local level requires comparisons to the normal base rates, an investigation into the particular strain or ribotype and a review of local infection prevention and control practices with appropriate actions or changes being instigated.

At the time of the outbreak, in conjunction with the guidelines produced by the DH (2008, a; 2007) and epic 2[14] (Pratt et al 2007) the IPCP's in addition to the usual infection prevention and control advice for patients with CDI, began a daily review of all newly diagnosed and existing in-patients with CDI. This practice involved reviewing the patient by assessing temperature, stool frequency and type and whether or not the patient had signs and symptoms of abdominal pain or distension. The IPCPs also assisted staff to recognise and understand symptoms and potential complications of CDI, providing further advice and follow up where necessary. The review also incorporated examining the infection prevention and control practices in place in the area at the time.

After a reduction in CDI cases, during the winter of 2009/2010 a subsequent outbreak occurred on a particular ward. This led to some concern that whilst the daily review by the IPCP alongside other initiatives had helped to reduce rates and mortality figures, it was suggested that there was a lack of ownership of the review process by staff on clinical areas. The IPCPs were reviewing patients, communicating information and concerns directly to the ward or unit staff there was no systematic approach or engagement to highlight omissions or areas of concern or indeed areas of good practice. The HCC (2007) in their report after the

---

[14] epic 2 (Pratt, et al 2007) has now been updated in 2014 by epic 3 (Loveday et al, 2014). However at the time of the increased incidence in the local acute hospitals trust, epic 2 (Pratt, et al, 2007) was the current guidance in use.

outbreak of CDI at Maidstone and Tunbridge Wells NHS Trust highlight the lack of any systematic monitoring of patients with CDI including assessment of the patient's condition (HCC, 2007).

Saving Lives audits (DH, 2007; 2010, a) were being undertaken on a monthly basis including the HII care bundle[15] for reducing the risk of *C.difficile*. However the HII audit documentation was not in itself audited to check whether wards or areas were fully compliant in every aspect of the care bundle. Also the care bundle did not facilitate assessment or monitoring both of the severity of the disease or other potential complications of CDI. The DH (2008, a) identify the importance of assessment of stool frequency, fluid and electrolyte balance, nutritional status and pressure ulcer risk assessment when caring for patients with CDI. In order to address some of these issues, the then Director of Nursing requested that the CDI review should involve the matron for the specific area as well as an IPCP. This was to address 'ownership', facilitate sharing aspects of good practice and address any areas of concern especially around cleanliness. 'A Matron's Charter: An Action Plan for Cleaner Hospitals' (DH, 2004) emphasises the importance of cleanliness and infection prevention and control and the pivotal role of the matron in achieving this. In the forward of the report Claire Edwards Matron in Orthopaedics states that matrons should 'lead by example' (actual page number not provided in document) and instigate changes when there are areas of concern (DH, 2004).

2.9.2 Design and Development of the Daily Review CDI Checklist

A checklist incorporating the key principles from epic 2 (Pratt et al, 2007), the HII (DH, 2010, a; 2007), the DH guidelines (DH, 2008, a) and local factors was devised by the lead IPCP from the study Trust. The checklist formed part of a series of measures including the joint completion of the checklist by an IPCP and matron, the patient being exposed to an individual assessment including stool frequency and type, signs and symptoms of any abdominal pain, discomfort or distention alongside temperature assessment. The checklist also included the audit and surveillance of infection prevention and control practices which examined the environment and the use of standard precautions (Table 2.1 provides an example of the original checklist which is also available in appendix 1).

---

[15] Care Bundles consist of a series of evidence based practices aimed at improving processes (Institute for Health care Improvement, 2014 downloaded from: http://www.ihi.org/topics/bundles/Pages/default.aspx Downloaded Aug 2014.

At the time of the study these measures were connected by purpose but not necessarily perceived as one process or recognised as such at the time. As the study progressed the focus changed to the whole process or the DRCP rather than just the actual checklist.

Clostridium *difficile* Daily check list.

This checklist should be completed by the Matron & IPCN on a daily basis.

WARD   DATE   COMPLETED BY

	YES	NO	Comments or Actions taken
SLUICE			
All bedpan bases are clean and in good condition			
All commodes are clean – check underside, frame and foot rest.			
Apron and gloves are available			
Slipper pans are maceratable and not reusable			
Cleansing foam is single patient use (check cupboards/shelves for part used containers)			
STANDARD PRECAUTIONS			
Staff are washing hands with soap and water after contact with patient with diarrhoea.			
Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals			
Staff are wearing single use aprons and gloves when in contact with a patient and/or patient environment			
Staff decontaminate their hands prior to putting on PPE and with soap and water after removing PPE.			
All staff decontaminate their hands before and after any patient contact or different patient bed spaces.			
Clean linen stored in the linen store area only (not bathrooms/sluice/bays)			
Infected linen is disposed of correctly and is not left in the side rooms or bays.			
MANUAL HANDLING EQUIPMENT			
All manual handling equipment is single-patient use.			
CLEANING			
Tristel is being used at the correct dilution and is dated and timed (8 hour shelf life once made up)			
Side rooms are clean, free from dust/ spillages (check behind lockers, under beds and curtain rails)			
ISOLATION			
Patients with clostridium difficile are being nursed in the side room with the door closed and appropriate signage in place			
Used linen has been removed from the room			
PATIENT CARE			
Care plan and patient information leaflet provided			
Discuss with Nurse in Charge re. patients condition to include:			
Abdomen			
Temperature			
Nutritional status			
Pressure ulcer risk assessment			
Fluid balance			
Daily bed bath/hygiene care			
Daily bed linen change			
Stool chart – document type of stool			
Medication			

DRCP V 1

Table 2.1: Original checklist (DRCP) version 1.

The original checklist was based upon the 2007 version of the HII (DH, 2007). Whilst there was limited empirical evidence to support the design of the checklist, the individual elements

were all based on best evidence and supported the care processes and specific CDI management. In essence the checklist initially was devised as a guide and audit tool to ensure certain aspects of care management and infection prevention strategies were performed.

2.10 Checklists and human factors theory

Checklists are not new phenomena, they have been used in the airline and other non-medical industries for many years to reduce errors and improve safety (Worrall, 2008). Checklists act as important reminders to ensure that procedures are undertaken and standardise individual and collective actions. Checklists are often associated with human factors. Human factors theory combines the technical aspects of for example a system or a checklist with other factors that can impact on the success of whether or not a checklist or system is successful. These include social, cultural, psychological and sometimes emotional factors, often termed as barriers to success (Bosket al, 2009).

2.10.1 Checklists and aviation

In 1935 the US Army Air Corps held a competition for airplane manufacturers vying for the next contract for bomber planes and staged a test flight for one particular model 299 plane. The plane lifted off and climbed to 300 feet then stalled and crashed killing two of the five crew members, one of which was the pilot. On investigation there was found to be no mechanical errors and the crash was found to have been due to 'pilot error' (Gawande, 2009, p33). Despite media criticism the army went ahead and bought the aircraft feeling that they were good flyable planes. Instead of providing training for the pilots, a group of test pilots devised a checklist to be completed before take-off, during flight, before landing and taxiing. The checklists comprised of brief, simple lists that ensured procedures were undertaken systematically and ultimately safely. Using the checklist the pilots went on to fly over 1.8 million miles with no accidents (Gawande, 2009).

In aviation, the aim of the checklist is to ensure that critical actions have been carried out and the checklist acts as a trigger to a 'challenge, verify and respond' (Gawande, 2009, p 9) approach to any problems that may materialise (Karl, 2010).This approach may involve the pilot initiating the checks and the co-pilot confirming that the checks have been undertaken with any necessary actions undertaken by both pilot and co-pilot (Degani and Weiner, 1990). Other approaches that are utilised in the airline industry include a shopping list or recipe

method whereby the pilot reads out the list and the co-pilot confirms that the check has been undertaken. The responsible officer and confirmation approach tends to be the more commonly used in the airline industry or a combination of both. Degani and Wiener (1990) advocate the use of checklists to help promote safety and prevent accidents, but they also acknowledge their limitations. These focus on role of the pilot as the central to the checklist task and the impact that human strengths and limitations can have on the effectiveness of checklist.

The importance of ensuring that the checklist is evidence based and accommodates human factors is also important in the design. The checklist is also interdependent on the environment that it is operational in. For example checklists can be subject to time and resource pressures leading to inadequate use or failure to use (Degani and Wiener, 1990).

2.10.2 Healthcare and checklists

Pronovost et al (2009) maintain that the healthcare industry can learn lessons from aviation and suggest assert that checklists help to standardise procedures, prevent errors and improve communication. Pronovost an American Professor in anaesthesiology is renowned for his development of the use of checklists in critical care settings. Pronovost first developed a checklist to help reduce the incidence of central catheter line infections, which is now used globally including the United Kingdom (Laurance, 2009). The simple checklist he devised provides a five staged approach to insertion of central line catheters which includes hand hygiene, the use of Chlorhexidine to clean the skin, utilising a sterile procedure and removing other unnecessary devices (Pronovost et al, 2006).

In a study undertaken by Pronovost et al (2006), the introduction of a checklist reduced catheter related blood stream infections up to 66%. There was recognition that the study had limitations including absence of randomisation of implementation of the Intensive care units that implemented the checklist. The authors asserted that there was a strong association between the use of the checklist and reduction in infection rates. This was due to the variability in implementing the checklist and avoiding seasonal trends. There was also a continued reduction in infection rates when the checklists were continued (Pronovost et al, 2006).

Healthcare related checklists have also found favour with surgical procedures and are now used in pre and peri-operative surgical procedures. In 2009 The World Health Organisation

(WHO) launched guidelines on Safe Surgery (WHO, 2009). The checklist incorporated in the guidelines improves surgical safety by reinforcing accepted safety measures and engendering communication between members of the MDT. The checklist provides key prompts to help reduce the risk of major complications and thereby avoiding preventable deaths. Gawande (2009) when discussing the benefits of the surgical checklist maintains that 'even the most expert among us can gain from searching out the patterns of mistakes and failures and putting a few checks in place' (page 158).

Haynes et al (2009) undertook a study examining the use of a checklist adapted from the WHO Safe Surgery guidelines (WHO, 2009). The study used a multisite approach incorporating eight different hospitals in a range of international cities. This prospective pre and post checklist implementation study demonstrated that mortality rates reduced from 1.5% to 0.8% and surgical complications rates reduced from 11% to 8% after the implementation of the checklist. Whilst there was acknowledgment of limitations to the study, again including lack of randomised assigned groups and the collection of data of inpatient complications only, the authors suggested that the checklists have has the potential to significantly reduce mortality and surgical complication rates (Haynes, et al, 2008).

Gawande (2009) maintains that checklists are not new in healthcare and argues that they are an everyday part of most healthcare professionals' daily routine. He uses the example of recording the original four vital signs; temperature, pulse, respirations and blood pressure measurement. Gawande (2009) suggests that the chart to record vital signs was instigated by nurses as a checklist to ensure that an important element in the patients' assessment was not forgotten amongst the busy routines of caring for patients.

2.10.3 Infection Prevention and Control and Checklists

In infection prevention and control, there are a number of examples of the use of checklists in the literature. The Saving Lives HII care bundles (DH, 2010, a; 2007) are a form of checklist in that they audit practice associated with the care and management of patients with CDI. The care bundle provides a systematic approach for helping to reduce the incidence of disease by providing a series of prompts on antimicrobial prescribing, hand hygiene, environmental decontamination, isolation or cohort nursing of symptomatic patients and the use of personal protective equipment.

Limited literature, guidelines and, or research involving the use of a 'daily review checklist' for patients with CDI with an IPCP and matron for patients with CDI were found. Planned

programmes of interventions, care bundles and checklists have been used in the past. These have been focused on reducing the incidence and managing specific outbreaks of CDI. Studies where a checklist has been used have demonstrated that infection prevention and control strategies can contribute to the overall reduction in CDI rates and help to reduce the incidence of outbreaks (Aldeyab et al, 2011; Hardy et al, 2010; Abbett et al, 2009; Salgado et al, 2009; Weiss et al, 2009; Gerding et al, 2008). However other than the study by Hardy et al (2010), the other studies involve use of checklists by hospital or unit ward staff as a prompt for the staff themselves rather than another team. In relation to the daily review checklist for patients with CDI in this study site, the focus was designed as a prompt for the IPCP and matron to assist in the review of patients with CDI and act as an audit tool to capture a 'point in time' analysis of the care and management of a patient with CDI.

In the study undertaken by Hardy et al (2010), early identification of clusters of CDI and the introduction of specific infection prevention and control interventions helped to reduce the incidence of CDI. However the IPCP's role was to perform a weekly audit in areas when there was a period of increased incidence[16]. This involved checking compliance and that the various prescribed interventions had taken place as well as providing audit scores with feedback to the matron and ward manager. The scores had to be above 90% for 3 consecutive weeks in order for the weekly check to be discontinued. Whilst there are some similarities to the daily review checklist approach adopted in the clinical areas in the study Trust, the main difference with the study by Hardy et al (2010) is the review was undertaken weekly and by the IPCP alone with feedback to the matron rather than involvement of the matron. The design was not to test whether ownership was significant, more to assess compliance. The other key difference was the absence of a review to assist in the recognition of disease severity (Hardy et al, 2010).

The principle aim of the daily review checklist used in the study Trust was as an audit of current practice. The checklist process also provided information to staff on the potential complications of CDI and the importance of early recognition as well as an opportunity to examine and highlight the general principles of infection prevention and control to help prevent cross contamination. In studies where a checklist or care bundle approach has been implemented with staff completing the actual checklist, increased awareness and knowledge of key staff has been a major element of the implementation process and a key aspect of its success (Abbett et al, 2009; Muto et al, 2007).

---

[16] Period of increased incidence or PII as often called is defined by the DH (2008, a) as '. two or more new cases (occurring >48 hours post admission, not relapses in a 28 day period on a ward' (page 12).

2.10.4 Disadvantages of checklists

Whilst the exponents of checklists argue that they provide a comprehensive guide to help protect against failures and provide a minimum set of standards (Gawande, 2009; Haynes et al, 2009; WHO, 2009), others maintain that healthcare is often more complex and checklists can work contrary to professional decision making (Bosk et al, 2009). Bosk et al (2009) argue that checklists are simply reminders of what to do and unless accompanied by attitudinal change, can have limited impact. McNellis (2010) also highlights the importance of cultural change and maintains that there has to be a safety culture and recognition of the need to use checklists to help maintain safe practice. This is relevant to this particular study as a checklist was instigated and reviewed by the IPCP and matron. The information collected was then shared with staff on the ward and the patient assessment information recorded in the medical notes. The checklists were not instigated or completed by the ward/unit staff themselves.

Degani and Wiener (1990) point out in the case of aviation checklists, environmental pressures can impact on the use and quality of checklists. This again is applicable in this study. In a busy healthcare environment, time factors and the environment of care may impact on the nature and quality of the checks being undertaken by the IPCP and Matron. Feedback to ward staff may also be dependent on the timeliness and manner in which the feedback is delivered and also staff's response to that feedback. This may again be influenced by time restraints and the environment of care.

A further potential disadvantage of checklists is that they may be poorly constructed. This could result in the users overlooking important aspects, in this case in the care and management of the patient with CDI. The checklist in this study was developed using evidence based key literature to determine the different items in the checklist. The absence of a 'gold standard' comparable checklist to assess whether items had been excluded made judgments on the checklist in relation to validity and reliability difficult. An overreliance on the constituent elements of a checklist may have resulted in the IPCP, matron and ward staff omitting vital aspects of care which may have resulted in failures in the management of patients with CDI.

Checklists when used as part of a human factors approach incorporating behaviour principles as well as a checklist can help to overcome some of the disadvantages. In the example of the safer surgery surgical checklist (WHO, 2009), the checklist promotes safety

46

and also engenders a culture of team work and decision making allowing the whole team to highlight concerns or problems (Gawande, 2009). Human factors approaches are considered in more detail in section 2.10.5.

2.10.5 Human factors theory and checklists

Checklists, whilst commonly associated with human factors theory are not exclusively linked. Exponents of human factors theory highlight that a human factors approach is more than just the completion of a checklist. It is 'the application of behavioural principles to the design of systems that lead to improved functioning of those systems and increase abilities to achieve goals' (Proctor and Van Zandt, 2008, page 54.). Ross et al (2013) maintain that a human factors approach combines science and engineering with the fundamental aim of promoting human performance and maintaining quality and safety. Human factors approach also addresses the concept of human engagement and strives to analyse human behaviour in the workplace (Fawcett and Rhynas, 2014). Fawcett and Rhynas (2014) go on to maintain that adopting a human factors approach can help to design safe and effective systems that enhance decision making and performance and minimise error.

When considering the local implementation of the checklist review in the study Trust, whilst the design of the actual checklist may not have been based on a human factors approach initially, the overall aim when the checklist was introduced was to assist staff in promoting the safety of the patient with CDI. This was twofold, both in assisting staff in the recognition of disease severity and the complications of CDI and in assisting staff in the prevention of spread of the disease.   In the literature related to checklists and human factors approaches, this often involves those directly involved in the process in terms of healthcare. In the study Trust, however it was the IPCP and matron that undertook the checklist review and not directly the staff on the ward. It would be interesting to see if those principles of helping to enhance decision making and performance were inherent in the daily review checklist used in the study Trust both for the IPCP and matron and the ward staff.

Human factors theory focuses on decision support systems to improve reasoning and decision making performance (Proctor and Van Zandt, 2008). The checklist in this study provided a series of prompts and important aspects related to the recognition of disease severity and complications of CDI. This was also combined with important information linked to standard precautions and the environment in order to prevent transmission of the infectious agent. Again it would be interesting to explore if the checklist review provided a platform to assist in the processes of improved reasoning and decision making.

The checklist was not originally devised with human factors theory in mind. Initially the study focused on the checklist and the emerging process. As the study progressed however, it became apparent that human factors theory was inextricably linked with the checklist review. A grounded theory approach assisted in exploring these aspects further. Grounded theory, methodology and methods are explored in detail in chapter 3. Human factors theory is further developed and linked throughout the summary and discussions (see chapter 10).

2.11 Aims of the study Trust daily review checklist

The principle aim of the daily CDI review checklist that formed the attention of this thesis was to maintain quality and safety and enhance human performance in relation to the care and management of patients with CDI. I was also interested in whether or not the 'challenge, verify and respond' approach was similar to those used in other checklist and human factors approaches. The emphasis when the local study Trust checklist was introduced was to audit that certain actions had been undertaken, challenge and verify any issues that emerged from undertaking the review and to plan and respond to any eventualities. Eventualities may have included responding to the patient complaining of abdominal pain or increased stool frequency. The IPCP or matron may have also initiated the ward staff to respond by asking them to consult with one of the medical staff. Alternatively the IPCP or matron may have instigated the action and speak to one of the medical staff. This would depend on the most appropriate course of action and the urgency of the response required.

Staff may lack an awareness of some the potential complications of CDI as well as the potential infection prevention and control implications. A survey using a convenience sample of nurses (n= 46) and doctors (n=58) was undertaken by Madeo et al (2008). The questionnaire included items that tested knowledge of the spread of the bacterium (*C.difficile)*, definitions of diarrhoea and decontamination issues. Although small and not generalizable the study found that informants were able to provide a definition of CDI. Nurses had more awareness of decontamination issues whereas the medical staff were more knowledgeable about the microbiology of *C.difficile.* This tends to imply that nursing staff may not have the awareness of the aetiology and complications of CDI.

Before the checklist review was introduced, it was recognised that there was a lack of knowledge, particularly complications of CDI and recognition of disease severity. This corresponds with the findings of the study undertaken by Madeo et al (2008). Randle et al (2008) explored the infection prevention and control knowledge of link infection prevention

and control practitioners (LIPCPs)[17] working on wards, units and departments. Their findings demonstrated that the LIPCPs (all of whom were nurses) were less knowledgeable about the microbiology compared to their knowledge of standard precautions. Again the study was small (only 20 LIPCPs) and the findings therefore may not be generalizable.

Randle et al (2008) go on to state that lack of microbiological knowledge could impact on infection prevention and control practice as well as a lack of ability to recognise disease severity and the signs and symptoms of CDI. For example not understanding the impact of transmission issues of the spores from *C.difficile* could lead to failures to recognise and inform and therefore potentially increase direct and indirect transmission (Randle et al 2008). One of the aims of the introduction of the daily review checklist was increased knowledge of clinical nurses about the complications of CDI, early recognition of deterioration and risk assessment.

One of the main aims of the checklist was to examine, audit and inform current practice to influence the quality of care received by patients with CDI and prevent any cross transmission. The overall aim was to embed key infection prevention and control principles into everyday practice, in order to reduce CDI rates both generally across the study Trust and prevent a major outbreak. The use of a more proactive approach rather than just reactive approaches for example responding to an outbreak can help to prevent individual and or collective CDI increase (Hardy et al, 2010).

2.12 The development of the specific components within the study Trust checklist

The checklist included key elements of infection prevention and control practice and patient assessment of disease severity and clinical risk factors associated with CDI.

2.12.1 Standard precautions and environmental elements of the 'Daily Review Checklist'

The standard precautions and environmental items included in the checklist were developed from the HII (DH, 2010, a), the DH guidelines for *C.difficile* (DH, 2009) and epic 2 (Pratt et al, 2007). The items included in the checklist review appraised the general ward or unit as well as the patient with CDI and the side room that the patient was nursed in. The standard

---

[17] Link Infection Prevention and Control Practitioners (LIPCPs) provide a liaison role between the ward and the infection prevention and control team (Randle, 2008).

precaution items have been highlighted in red and the environmental items highlighted in blue in an adapted version of the original checklist (see table 2.2). This is to assist the reader identify the different areas of the checklist. The areas highlighted in purple are patient assessment care items (see section 2.12.2).

Clostridium *difficile* Daily check list.

This checklist should be completed by the Matron & IPCN on a daily basis.

WARD DATE	COMPLETED BY		
SLUICE	YES	NO	Comments or Actions taken
All bedpan bases are clean and in good condition			
All commodes are clean – check underside, frame and foot rest.			
Apron and gloves are available			
Slipper pans are maceratable and not reusable			
Cleansing foam is single patient use (check cupboards/shelves for part used containers)			
STANDARD PRECAUTIONS			
Staff are washing hands with soap and water after contact with patient with diarrhoea.			
Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals			
Staff are wearing single use aprons and gloves when in contact with a patient and/or patient environment			
Staff decontaminate their hands prior to putting on PPE and with soap and water after removing PPE.			
All staff decontaminate their hands before and after any patient contact or different patient bed spaces.			
Clean linen stored in the linen store area only (not bathrooms/sluice/bays)			
Infected linen is disposed of correctly and is not left in the side rooms or bays.			
MANUAL HANDLING EQUIPMENT			
All manual handling equipment is single-patient use.			
CLEANING			
Tristel is being used at the correct dilution and is dated and timed (8 hour shelf life once made up)			
Side rooms are clean, free from dust/ spillages (check behind lockers, under beds and curtain rails)			
ISOLATION			
Patients with clostridium difficile are being nursed in the side room with the door closed and appropriate signage in place			
Used linen has been removed from the room			
PATIENT CARE			
Care plan and patient information leaflet provided			
Discuss with Nurse in Charge re. patients condition to include:			
Abdomen			
Temperature			
Nutritional status			
Pressure ulcer risk assessment			
Fluid balance			
Daily bed bath/hygiene care			
Daily bed linen change			
Stool chart – document type of stool			
Medication			

DRCP V 1

Key: Red = standard precautions; Blue = environment; Purple = patient care

Table 2.2: Adapted version of the original checklist Version 1 to depict the different areas of standard precautions, environment and patient care items included in the checklist.

51

The rationale for including a standard approach to the whole ward or unit was based upon the potential transmission of *C.difficile* spores via symptomatic and asymptomatic carriage (Freeman et al, 2010; Weber, et al 2013). Although evidence is less than robust and more studies are required, there is an acknowledgement that optimising environmental and hygiene measures helps to reduce transmission pressures (Freeman et al, 2010). Enhanced environmental cleaning is important however in side rooms where the patients with CDI are being nursed (Weber et al, 2013). This is due to the fact that patients symptomatic with diarrhoea are more likely to shed *C.difficile* (Best et al, 2010).

The checklist also incorporated items to assess standard precautions and monitor general infection prevention and control practice. Promoting compliance in relation to hand hygiene practice by both patients and staff is emphasised in the DH and other related guidance (DH, 2010, a; 2009; Pratt et al, 2007). Other elements incorporated into the checklist were devised from anecdotal evidence or previous areas of concern in the study organisation, for example, checking that single patient use items are not left in communal areas. Whilst highlighted locally as important, the use of single patient use items is recognised as contributory to reducing the risk of transmission (DH, 2010a; 2008, a).

Other general infection prevention and control measures included in the checklist and important in containing or preventing outbreaks and overall CDI rates, include ensuring that commodes and bed pans were clean and in good condition. Commodes and bed pans that are damaged may harbour microorganisms. An audit of toilet facilities, dirty utility rooms and commodes was undertaken over an eighteen month period in response to a period of increased incidence of CDI in one acute hospital. The audits were undertaken by a local infection prevention team in areas that had had a period of increased incidence of patients with CDI. Increased incidence was defined as more than two patients with CDI with the same ribotype from the same area in a 28 day period. The findings indicated that recognition and classifying as increased incidence and introducing a standardised set of infection prevention and control measures such as cleaning commodes and ensuring a consistent general standard of cleanliness assisted in preventing further incidences of patients with CDI (Hardy et al, 2010). The authors acknowledge the important role of antimicrobial stewardship but also advocated effective infection prevention and control had a role (Hardy et al, 2010)

Other elements contained in the checklist related to the use of standard precautions. Standard precautions underpin routine safe practice in order to protect patients and staff and should be undertaken consistently at all times (RCN, 2012). The checklist included hand hygiene and the use of PPE. Hand hygiene and PPE in relation to apron and gloves are both

highlighted in the DH guidelines. The mnemonic SIGHT is taken from the DH guidelines (2008) and reinforced in the recent updated guidance on treatment of CDI (PHE, 2013, a). The emphasis within the mnemonic is the timely isolation of patients with or suspected to have CDI and hand hygiene and the use of apron and gloves (PHE, 2013, a). All of these are included in some format in the checklist. The SIGHT mnemonic is illustrated in table 2.3

S	Suspect that a case may be infective where there is no clear alternative cause for diarrhoea
I	Isolate the patient and consult with the infection control team (ICT) while determining the cause of the diarrhoea
G	Gloves and aprons must be used for all contacts with the patient and their environment
H	Hand washing with soap and water should be carried out before and after each contact with the patient and the patient's environment
T	Test the stool for toxin, by sending a specimen immediately

Table 2.3: SIGHT Mnemonic (Source: PHE [2013, a]; DH [2008, a]).

The checklist also included a question relating to the use of a chlorine based product to check that it was available and in date. The use of a chlorine agent is recommended by the DH (2008, a). In a cross over study comparing a chlorine based cleaning solution with a neutral detergent in two elderly medical wards in one hospital, the study found that the use of a chlorine based solution had an impact on the number of cases of CDI. The ward that used the chlorine based solution over a 2 year period had a significant reduction in the number of cases of CDI compared to the control ward that used a detergent cleaning regime only. The authors concede that there may have been other confounding factors, that might have influenced the results, for example prescribing regime (not changes to antibiotic policy however), patient type and cleaning practices (Wilcox et al 2003).

Recently mixed opinions on the use of Chlorine based cleaning solutions for CDI have emerged, both in terms of its effectiveness and also the justification for using solutions that may have harmful effects on equipment and the environment (Ali et al, 2011; Gravel, et al, 2008). A study compared effectiveness of two sporicidal cleaning agents, one, a chlorine dioxide generating agent, and the other a chlorine releasing agent (Ali et al, 2011). They found that whilst some sporicidal cleaning agents may achieve the recognised standards[18] in terms of a reduction in the spore numbers this was under set conditions. When the tests are

---

[18] The European standards for testing cleaning solutions (EN 13704) is that they should have a greater than 3 log (> 3) reduction in spore numbers (Ali, et al 2011).

undertaken in 'practical in-use conditions' (page 98) the cleaning agents fail to produce a 3 log reduction and also do not prevent the transfer of spores throughout the cleaning process (Ali et al, 2011). Wilcox et al (2011) maintain that the test used for these cleaning agents (EN 13704) was not approved for use in health care. In addition the test does not use an agent that has any activity against anaerobic spores (Wilcox, et al 2011).

Whilst the guidance issued by the DH (2008, a) advocating the use of chlorine based products for cleaning in CDI cases is still current (PHE, 2013, a), the question of efficacy of products remains (Ali et al, 2011). Wilcox et al (2011) discuss the formation of a task force to undertake specific testing for the products used in cleaning especially for control of *C. difficile* in order that the environmental disinfection of areas contaminated with *C.difficile* is improved.

2.12.2 'Patient care' section of the 'Daily review Checklist'

The patient assessment items in the checklist (see table 2.2 which highlights the different sections of the checklist) incorporated specific patient care elements as well as clinical aspects important in the recognition of disease severity and the care and management of patients with CDI.

Pressure ulcer prevention, fluid management and nutritional assessment as well as monitoring the patient's temperature and undertaking an assessment of the patient's abdomen are all included in recommendations (DH, 2008, a). Assessment of the abdomen involves for signs and symptoms of abdominal discomfort, distention or abdominal pain which may indicate that the patient has developed pseudomembranous colitis (see section 2.3.1 for the definition of pseudomembranous colitis) or toxic mega colon[19]. Medication does appear in the checklist and this item was designed to identify if the patient was receiving any treatment for CDI and also prompt a review of other medication, for example any antibiotic treatment (other than that for CDI). The HII (DH, 2010, a) incorporates an assessment of antibiotic use (other than for CDI) and promotes the use of antibiotic guidelines as part of a best practice approach. The medication items also checked PPI's or other gastric acid suppressant prescriptions. The issues and potential risk factors for the use of gastric acid suppressants and PPI's are discussed earlier (see section 2.1.3).

---

[19] Toxic megacolon is a serious complication where gas becomes trapped in the colon due to inflammation. Downloaded from NHS Choices website http://www.nhs.uk/Conditions/Ulcerative-colitis/Pages/Complications.aspx Aug 2014.

Traditionally the treatment for CDI, usually proposed metronidazole as the first line treatment option with vancomycin as an alternative for more severe cases or recurrent CDI (Cohen, et al 2010; DH, 2008, a). The DH (2008, a) and more recently PHE (2013, a) provide guidelines defining mild, moderate and severe forms of the disease as well as updated treatment options. Alternative treatment options were provided in the DH (2008, a) guidelines for severe CDI. These included oral Rifampicin or intravenous immunoglobulin. Consideration of a colectomy was recommended for life threatening CDI (DH, 2008, a).

A recent update on the management and treatment of CDI issued by the DH as an add-on to the DH guidance produced in 2008 (PHE, 2013, a). The recent guidance incorporates the findings of a systematic review (Drekonja et al, 2011) which suggests the use of oral fidaxomicin as an alternative to other CDI treatment can assist in the prevention of reoccurrence. The recommendation is that NHS providers should consider individual patient needs and undertake a risk assessment as well as consider costs of the different treatments. Fidaxomicin is more expensive that Vancomycin, which is more expensive than Metronidazole (PHE, 2013, a). Faecal transplantation is also an alternative treatment aimed at restoring the 'healthy balance of bacteria in the gut' of individuals with recurrent CDI. The donor faeces is usually obtained from a family member and is mixed with water, saline or milk or yoghurt and given to the recipient via a nasogastric tube. Alternatively a rectal enema, nasoduodenal tube or colonoscope can be used (NICE, 2013). A systematic review including 25 studies and 289 patients with refractory CDI reports that complete resolution of symptoms in 91% of cases for those treated with faecal transplant (NICE, 2013).

The importance of individual assessment and recognition of disease severity and prompt action is highlighted by the DH guidelines (2008, a) as well as in other literature (Abbett et al, 2009; Muto et al, 2007). Daily linen and patient clothing change as well as ensuring that patients with CDI have had a daily bed bath or daily hygiene care is based on reducing the bioburden. Bioburden is defined as the 'degree of microbial contamination or microbial load' (Medical Dictionary for the Health Professionals and Nursing, 2014). Maintaining cleanliness can help reduce the bioburden helps to reduce the number of spores and subsequent transmission (Hardy, et al 2010; DH, 2008, a).

2.13 The frequency of the checklist review

The use of the daily checklist review was implemented on initial diagnosis of CDI. The CDI may have developed during a patient's hospital stay or the patient may have been admitted

with CDI. Both cases instigated the introduction of the checklist review. The frequency of review was dependent on an individual patient assessment and any concerns or worries identified, either patient focused or environment/standard precautions related at the time of the review. It was also based on an assessment of staff knowledge and/or their ability to manage CDI.

Initially the daily review checklist was undertaken on a daily basis. In addition to auditing practice, the aim was to support staff to understand the important aspects of patient assessment and any general environmental or standard precaution issues. It was also to ensure that any gaps in knowledge and, or practice were addressed directly with the nurse caring for the patient with CDI at the time of the review and subsequently through feedback to the ward manager via the IPCP and/or matron. This in turn may have also lead to more formal educational sessions at a later stage especially if the gaps in knowledge or practice became cumulative or concerns raised were not being addressed. In a literature review undertaken by Vonberg et al (2008) examining infection control measures and *C.difficile*, a number of studies were included that highlighted the importance of educating staff. The studies maintained that education was one of the measures effective in limiting the spread of *C.difficile* due to increased awareness (Muto et al, 2005; Climo et al, 1998; McNulty et al, 1997; Manian et al, 1996; Foulke et al, 1987).

In relation to the checklist review, once the patient began to respond to treatment and/or their condition improved and the general ward or unit infection prevention and control aspects were understood and being practiced, the frequency of patient review was reduced to twice weekly and once per week once the patient became asymptomatic.. Asymptomatic in terms of CDI is a return to 'normal' or as near 'normal' bowel habits. Following CDI despite patients becoming asymptomatic they can continue to excrete spores for many months. This may create greater risk in terms of transmission to other patients especially in hospital settings and in immunocompromised individuals (Lawley et al, 2009). Figure 2.4 demonstrates the actions which were undertaken once a patient was diagnosed with CDI.
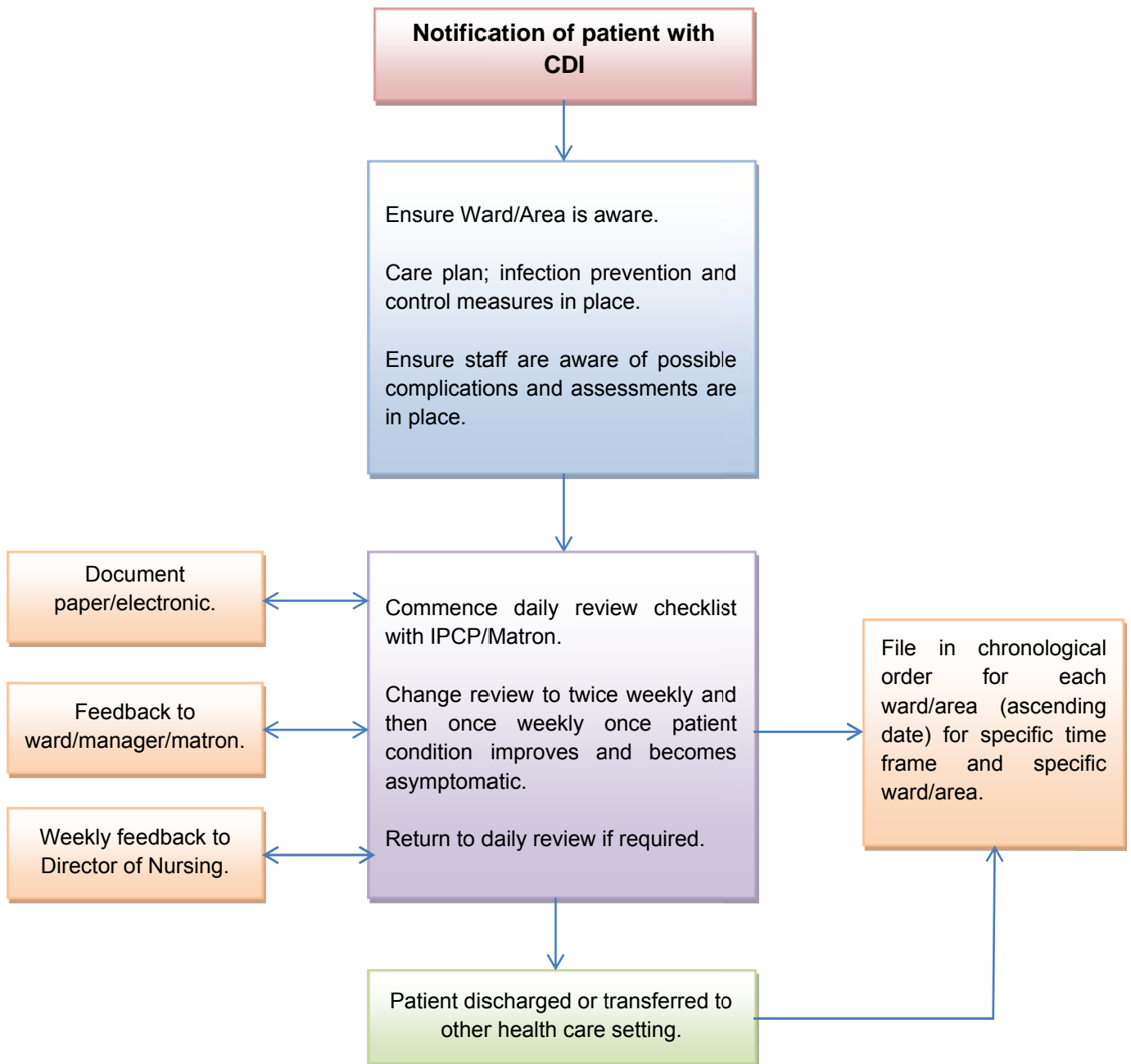
Figure 2.4: Flow chart to demonstrate the Daily Review Checklist.

2.13.1 Day to day management of the data generated from the checklist

The checklists were completed by ward or unit basis with the name of the patient not included on the checklist. In addition to timely and general feedback to the ward staff, the information gleaned from the review was recorded in the patients' notes and in the electronic data collection system used by the IPCPs. The information was also reported back to then Director of Nursing of the study Trust on a weekly basis. Each of the review documents were filed chronologically by ward or area for the specific period of time that the individual patient

was under review (see figure 2.4). These could then be cross referenced should staff need to examine any increased incidence or recurrent issues over a period of time. This reference to records could involve ward managers matrons or senior management.

2.14 Conclusion

Figure 2.4 provides a summary of the daily review checklist with an outline of the different stages incorporated in the review. The checklist process was instigated once the IPCT were notified of a patient with CDI. The checklist had been in place for approximately 18 months prior to the study period. Having being involved in the initial development and introduction of the checklist as an IPCP in the study Trust, I became interested in the checklist and the concept as a review process and wanted to explore this further and the influence if any the checklist had had on the care and management of patients with CDI. Chapter 3 provides a detailed outline of the study methodology and methods with further discussion as to the rationale for the study.

Chapter 3
Research methodology and methods

3.1 Introduction

This chapter outlines the overall methodological approach to the study and the methods used. The study had two distinct phases and the specific methods relevant to each phase of the study are explored. The chapter outlines the overall grounded theory approach used and the rationale underpinning any decision making. In grounded theory conceptualisation of theory is derived from the data produced. The data captured in this study was collected using both quantitative and qualitative methods (Phase 1 and Phase 2 of the study respectively) as data from more than one source assists in understanding of meaning and the subsequent generation of theory (Rennie, 2000).

The chapter begins with the starting point for the study and the how the research aims were developed. The epistemological basis for the study is explored and the particular grounded theory approaches used in this study. An overview of the research design is then provided in order to guide the reader through the two interconnecting phases (Phase 1 and Phase 2). Glaser and Strauss, the creators of grounded theory maintain that grounded theory is relative to the perspectives of the investigator or researcher producing it (Rennie, 2000). Hence this chapter also examines concepts related to reliability, validity and reflexivity in order to demonstrate rigour and transparency within the chosen grounded theory approaches. Ethical issues are addressed within the context of the overall research design and execution and focuses specifically on Phase 2 of the study.

3.2 Starting Point

A checklist was introduced to review patients with CDI following a period of increased incidence in the study Trust. Up until the third quarter of 2008/2009 there had been a general increase nationally which was attributed to a combination of factors including increased surveillance and reporting (see chapter 2, figures 2.1 and 2.2 and section 2.6.1 for further detail on the national picture). The study Trust had reflected these rates but also began to see a decline from 2009/2010 (see chapter 2, figure 2.3 and section 2.6.2 for more information for the study Trust CDI rates). In 2010 however a period of increased incidence in one of the sites at the study Trust led to the design and implementation of a locally devised checklist for patients with CDI.

The initial aim of the checklist was to provide contemporaneous examination of clinical patient assessment and infection prevention and control practices. The checklist was

undertaken by an IPCP and a matron and incorporated patient care elements with a recognition of disease severity and the potential complications of CDI as well as auditing infection prevention and control practices. The IPCP or matron undertaking the review provided feedback at the time on areas of good practice and any issues or concerns. The IPCP and matron assisted staff in the recognition and understanding of the complications of CDI and disease severity. This included temperature assessment, if the patient had any abdominal pain, discomfort or distention and noting and recording stool frequency and type. As discussed in chapter 2, variations in these key markers in CDI can indicate life threatening complications for example pseudomembranous colitis (DH, 2008, a).

The use of the checklist was seen as a strategy for reinforcing to clinical staff the importance of standard precautions and efficient and appropriate de-cluttering and cleaning of the environment and equipment in the prevention and spread of *C.difficile* (DH, 2010, a; DH, 2008, a). These precautions help to ensure that appropriate infection prevention and control precautions became fundamental in the care and management of patients, in particular those with CDI. Storr et al (2013) talk of a tendency in healthcare to position infection control as separate to mainstream activities of healthcare workers. Ward (2012, b) in a study examining attitudes of student nurses and mentors towards infection prevention and control highlights that often infection prevention and control is viewed as an extra burden in the day to day care activities rather than fundamental to patient safety and patient care. In the same study a student nurse commented on a conversation overheard between a ward sister and a consultant '….. I can either practice infection control or I can treat the patient, you choose' (Ward 2012, b page 304). Anderson et al (2010) comment on the issues in relation to infection prevention and control practice and suggest that there are a number of issues that can result patient care or management being seen as separate from infection prevention and control. These include a lack of in built prompts, time pressures and delays in providing feedback about acts or omissions and the resulting consequences.

Involvement in the initial implementation of the checklist alongside its continued use prompted my further interest in *C.difficile* and in the care and management of patients with CDI. Having used the checklist with colleagues, both IPCPs and matrons, I became interested in the use of the checklist to review patients with CDI. This interest was further developed as the checklist process evolved and developed from its initial introduction as an audit and surveillance tool. The checklist appeared to be more than just an audit tool, instead more of an interactive review process and I was interested to explore this further with key players directly and indirectly involved in the review, namely other IPCPs, matrons, ward staff and senior managers. Had the checklist been influential in behaviour change as well as

a process for promoting patient safety? The checklist was often completed daily and the term daily review checklist process (DRCP) became the focus of this study in order to explore its influence on the care and management of patients with CDI. As the study was exploratory in nature, and I wanted to understand more about the DRCP, it was important that the research aims reflected this approach. Checklists and human factors theory are often linked, however at the start of this study it was unclear as to how human factors theory had been influential in the checklist process that had developed in the study Trust. There had been no conscious act of including human factors theory into the actual checklist or the process. The research aims reflected this by exploring the checklists and the DRCP as it became known as and the DRCP's perceived influence on the care and management of patients with CDI.

It was also due to the exploratory nature of the study that the research aims developed and changed over the period of the study. This is reflected in the initial University ethical approval documentation. This highlights the initial overall research aim as exploring the 'impact' of a daily review checklist on the care and management of patients with CDI as opposed to the current overall aim which uses the term 'influence'. As the study progressed it became apparent from data collection and analysis that the DRCP had been influential rather than having an impact in the care and management of patients with CDI. The ethical approval document from the local University school ethics panel (SREP) can be found in appendix 2. Ethical issues are explored in section 3.13 of this chapter.

3.3 Research aims

1. To explore the findings generated from a retrospective analysis of the daily review checklist.
2. To explore with infection prevention and control practitioners (IPCPs) matrons, ward staff and senior managers their perceptions of the checklist which became known as the daily review checklist process (DRCP) and what it means to them.
3. To explore with infection prevention and control practitioners (IPCPs) matrons, ward staff and senior managers their perceptions of the influence the DRCP has had on the care and management of patients with *C.difficile* infection (CDI).

3.4 Constructivism, grounded theory and this study

In qualitative research it is important that the researcher chooses a research paradigm that is associated with their beliefs about reality (Mills et al, 2006). Research paradigms influence the manner in which research is 'studied and interpreted' (Mackenzie and Knipe, 2006, page 2). Positivism, sometimes referred to as scientific research often relies on an outcome approach and usually involves the use of quantitative methods (Mackenzie and Knipe, 2006). Charmaz (2006) maintains that scientific research during the middle part of the last century focused on positivist methodology and was concerned with cause and effect relationships. This is in contrast to qualitative research that usually explores meaning created from data and does not rely on hypothesis to prove or disprove relationships. Charmaz (2006) argues that the positivist approach whilst gaining strength in the 1960's with its emphasis on testing and refining existing theory often fails to generate any new theory.

Constructivism on the other hand takes an epistemological stand point and focuses on the subjective relationship between the researcher and the participants and the subsequent construction of meaning from the data generated (Mills et al, 2006). Guba and Lincoln (1994) maintain that the aim of the enquiry in constructivism centres on an 'understanding and reconstruction of the constructions that people (including the inquirer) initially hold, aiming toward consensus but still open to new interpretations as information and sophistication improve' (page 113). This was particularly relevant for this study due to the nature of my role in the DRCP. One of the main aims was to explore the perceptions and meanings that the key players held in relation to the DRCP and examine the influence if any the process had on the care and management of patients with CDI. This process inevitably involved IPCPs of which I was one. My own perceptions and subsequent anecdotal evidence about the ways in which the DRCP was undertaken and perceived alongside the findings from Phase 1 influenced the initial interview agenda and the nature of the questioning used in Phase 2 of the study.

3.5 The development of grounded theory

Grounded theory was founded by two American sociologists, Glaser and Strauss (1967) who sought to develop a more systematic approach for collecting and analysing qualitative data. This proposed systematic qualitative analysis could generate theory (Goulding, 2005). Grounded theory has become a way of generating new research theory which can be linked to existing theory and ultimately may be tested (Walls et al, 2010). Grounded theory begins

with a research situation or a topic of interest which becomes the focus for the researcher to investigate and construct meaning from the data collected (McGhee et al, 2007). In grounded theory there is freedom and flexibility to explore the topic or area in depth and also to investigate specific aspects that may be important to the individual researcher, group or organisation (Corbin and Strauss, 2008).

Since Glaser and Strauss's original publication and development of grounded theory (1967) a variety of different approaches and adaptations have emerged. Glaser and Strauss although were both sociologists, came from different research backgrounds. Glaser has embraced quantitative survey designs, whist Strauss was an early exponent of qualitative methods. Both of these approaches led to the development of grounded theory as it was first described. Their combined goal was to systemise code and analyse qualitative data in order to generate theory. The main techniques to enable this process were theoretical sampling and constant comparison of the data generated (Cooney, 2010). These two concepts, theoretical sampling and constant comparison are explored in more detail in section 3.11. However since the publication of their original work in 1967, there have been developments away from their original initial conceptualisations. These mainly centre on data analysis (Cooney, 2010). Glaser's subsequent work has stayed with the original concept and validation advocating continuing with a two stage process of analysis including induction and deduction. Whereas Strauss with Corbin (Corbin and Strauss, 2008) moved away from the simpler form of data analysis to a more complex three stage process involving verification. In their early publications that announced this move away from classic grounded theory, Strauss and Corbin (1998; 1990) were viewed by some as overcomplicating the process (Melia, 1996). In the more recent edition (Corbin and Strauss, 2008), they appear to have taken this early feedback on board and offer a more flexible but systematic approach to analysis that is particularly helpful for novice researchers.

3.6 Grounded theory and the approach for this study

Cooney (2010) argues that it is important when adopting grounded theory that the researcher chooses between a Glaserian and Straussian approach due to the divergence from the original methodology in relation to data analysis. This study chose a Straussian approach as it offered a more comprehensive approach for data analysis, which for me as a novice researcher in the field of grounded theory was an important consideration. Also theory that might guide practice and actions was an important outcome of this study. Particularly important as any information gained could be used to develop and refine the DRCP in the future.

The highly developed mapped approach to analysis offered by Corbin and Strauss (2008) provided an opportunity in this study to compensate against 'researcher bias'. With substantial experience and knowledge in the area as well as the probability of being acquainted with all the participants who agreed to contribute, this could have executed bias. There is evidence in grounded theory literature that having experience in the substantive area of the study can be beneficial and being attentive to influence can reduce due to the interest and sensitivity toward the subject area (Walls et al, 2010). The constant comparison integral to the approach needs to be rigorously applied and the researcher should remain reflexive in order to prevent influence. Corbin and Strauss (2008) focus on the concept of sensitivity and argue that as researchers we are never able to be totally objective. They maintain that it is more valuable to be sensitive to issues and events that emerge from the data and that if there is awareness of subjectivity involved in data analysis, the more likely those influences will surface and be seen in the interpretation (Corbin and Strauss, 2008).

However in adopting Corbin and Strauss's approach to data capture and analysis it is important to highlight that other grounded theory influences have been used in describing this study's particular methodological approach. As mentioned earlier, epistemologically this study focuses on interpretive constructivist ideology. Mills et al (2006) argue that Corbin and Straus especially in their earlier texts (Straus and Corbin 1998; 1990) do not address the 'paradigm of thought' or their epistemological standpoint underpinning the methods chosen (Mills, et, al, 2006, page 3). Mills et al (2006) argue that Corbin and Straus use a mix of language that switches between post positivism[20] and constructivism. This it is suggested is in order to maintain objectivity and prevent bias with respect to the participants and the data collected (Mills, et al, 2006). For this reason reference is also made to Charmaz (2006) throughout this study with reference to research methodology, in particular with reference to constructivist grounded theory.

Charmaz (2006) maintains that constructivists explore 'how and sometimes why' (page 131) participants view and attach meaning to certain situations. In constructivism the researcher not only explores the meanings that the participant attaches but also interprets that meaning. The resulting theory is based on the individual researcher's own interpretation with the acknowledgement that different researchers may have similar ideas but may be interpreted differently. Often in constructivism, the researcher is aware of their own interpretations and ensures that they are reflexive in their interpretations as well as those of the participants

---

[20] Post positivism aligns in some sense to constructivism in that there is some recognition that the world may be ambiguous and may have different sets of realities (O'Leary, 2004).

involved in the research (Charmaz, 2006). This was particularly relevant to this study where the researcher had been involved in using the checklist and had an interest in understanding how participants may perceive the checklist review. This issue aligns with reflexivity and is explored later in this chapter (section 3.11).

Grounded theory methodology is grounded in the words and actions of those under study (Goulding, 2005). It provides a means of explaining what is happening in reality at any particular time and not what should be happening (McCallin, 2003). Phase 1 incorporated analysis of a number of checklists that had been completed during a specific time frame (an 18 month period between June 2010 and December 2011). This provided an opportunity to focus on the data produced from the checklists from initial introduction to when data collection for the study began. Participants involved in the checklist review provided data in the form of interview transcripts from semi-structured interviews in Phase 2.

In this study the researcher was involved in the checklist review and had prior knowledge of CDI and potentially could interpret, understand and contextualise any issues that emerged from participants' accounts relating to the actual review process, the checklist or CDI in general. Initial examination of the literature and theory linked to infection prevention and control, CDI and checklists was undertaken at the beginning of the study as discussed in chapter 2. Drawing on any existing theory whilst maintaining an open approach to any new concepts that can arise from the data, helps to combine theory with emerging concepts (Goulding, 2005). Grounded theory also encourages the researcher to interact with the data and constantly analyse and adapt any future data collection (Bryant and Charmaz, 2007).

In contrast to this there is some argument that according to basic principles of grounded theory the researcher should enter the field as soon as possible and not focus on specific literature related to their chosen topic prior to commencing the research (Goulding, 2005). Goulding (2005) maintains that literature should then be consulted throughout the research process in order to ensure that there is an inductive interactional approach to 'data collection, simultaneous analysis and emergent interpretation' (page 296). McGhee et al, (2007) maintain that the use of literature or prior knowledge within a grounded theory approach should not prevent any theory arising due to the 'inductive-deductive interplay' (page 334). Prior knowledge and experience can be seen as an advantage in the research field as they can assist in recognising nuances and understand what is being said by the participants (Charmaz, 2006; Corbin and Straus, 2008; Walls et al, 2010). This was of particular relevance in this study with the researcher having been involved and aware of what the daily checklist review entailed. Participants were able to discuss issues that were

relevant to them without necessarily having to explain context. This in turn assisted with exploration of topic areas within the interview process.

3.7 Research overview

The study had two distinct phases. Phase 1 involved a retrospective documentary analysis of the daily review checklists used to assist in the care and management of patients with *C.difficile* infection (CDI) completed over an 18 month period in the study Trust. Phase 2 explored the perceptions of the key participants (matrons, ward staff, and IPCPs alongside senior managers) involved both directly and indirectly in the daily review checklist process (DRCP). This included focusing on their perceptions on the process and its perceived influence in the care and management of patients with CDI. Figure 3.1 provides an overview of the research stages.
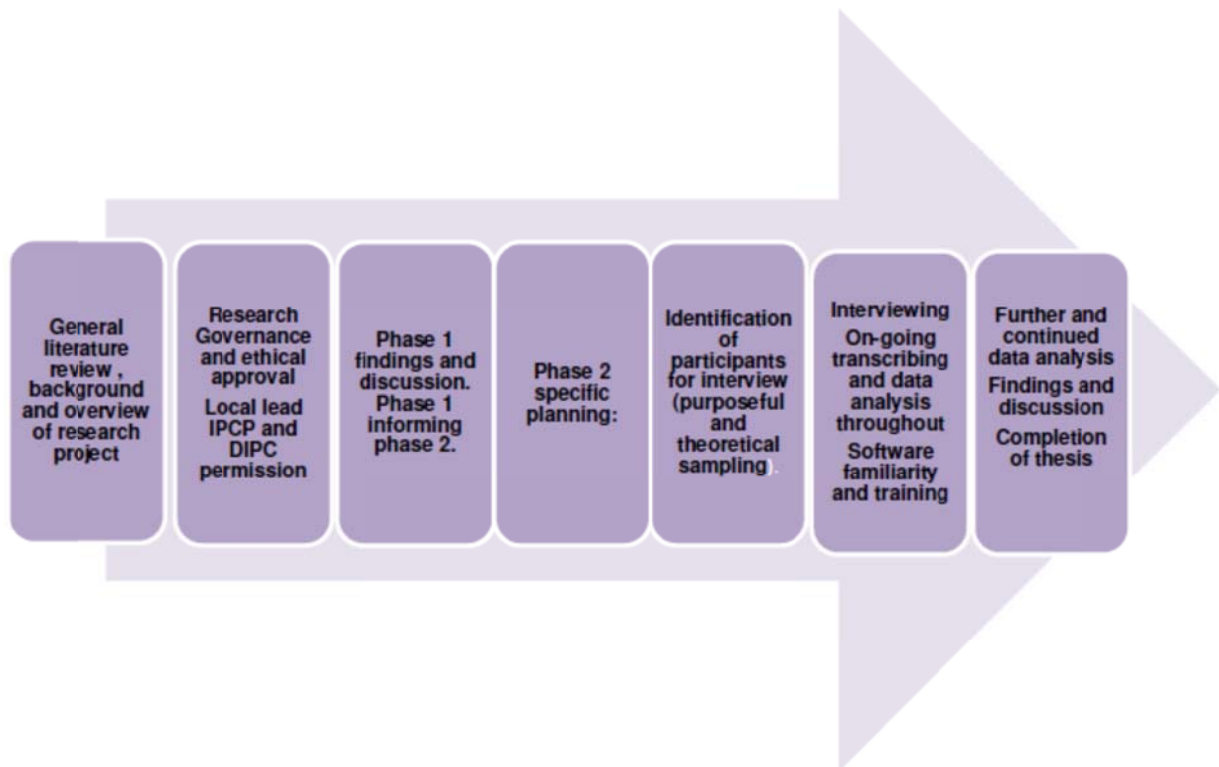
Figure 3.1: Overview of research process.

3.8 Aims of Phase 1

Phase 1 involved a retrospective documentary analysis of the daily review checklists completed over the period July 2010 to December 2011. This included all the checklists that had been completed and collated for all patients with CDI in both medical and surgical

directorates[21] in the study site. A total of 928 checklists were examined. A non-selective approach was used. This was because of the type and quality of the data generated from the checklists which was uncertain when beginning the documentary analysis. Sampling specific time periods and/ or different ward areas may have led to important information being missed; hence all the checklists were interrogated.

The main aim of Phase 1 was to examine the different elements contained in the checklist including compliance in relation to individual patient care aspects (see appendix 1 for an example of the original checklist, version 1). This also included examining compliance around infection prevention and control with respect to standard precautions and the environment, for example cleanliness of commodes, bed pans and the general patient environment. The two hospital sites, medical and surgical directorates alongside different ward areas were compared with respect to number of checklists generated. The number of checklists completed did not necessarily reflect the total number of patients with CDI. This was because the number of checklists completed varied for individual patients depending on the length of stay or the frequency of review as was described in chapter 2. Including these different comparisons, although far from comprehensive provided a more detailed picture of trends (if any) and information about areas that had generated a high number of completed checklists. This data proved useful for Phase 2 of the study when focusing on sampling and participants. Examining staff perceptions of the checklist used to review patients with CDI needed to include areas where staff had some familiarity with the daily review checklist. In grounded theory it is important that the data generated informs and directs the study (Corbin and Strauss, 2008). The aims of Phase 2 are explored in the next section.

3.9 Aims of Phase 2

Phase 2 sought to understand the perceptions of the participants involved either directly or indirectly in the checklist review and what if any influence they perceived the DRCP had on the care and management of patients with CDI. Grounded theory is a methodology that aims to explore the meaning of issues that are important in peoples' lives (Corbin and Strauss, 2008). Grounded theory draws on a constructivist approach accepting that the data and subsequent analysis evolves from shared experiences and relationships with the participants within the study (Charmaz, 2006). As I had been involved since the introduction of the checklist review, I was able to interact with the respondents during their discussions. This

---

[21] Directorates incorporate medical and surgical subdivisions within the local hospital and are based on specialities broadly related to patients admitted with medical or surgical diagnoses or potential diagnoses.

assisted the participants to discuss and create meaning and also enabled me to explore areas in more depth or change or adapt the focus in subsequent interviews in response.

3.10 Reliability and validity Phase 1

Most of the analysis of the data from Phase 1 was quantitative and descriptive or summary statistics are used to describe the findings. Quantitative or fixed design research as it is sometimes referred to (Robson, 2011) requires an unbiased and open approach when exploring the data generated in order that it can be seen to be trustworthy and not delivering a predetermined answer. This refers to accuracy of results and how transferable or generally applicable these results would be in another contact or situation (Robson, 2011). These are often referred to as reliability and validity. Reliability of quantitative data is the extent to which results are consistent over time and can be reproduced again under similar methods. Validity in quantitative research is whether or not the research examines what it set out to examine (Silverman, 2010).

Phase 1 examined the data generated from a series of checklists during an 18 month period between July 2010 and December 2011 (928 checklists in total). The checklist was devised and developed locally. Whilst there was evidence from the literature and national bodies to support the inclusion of the different elements in this checklist (DH, 2010, a; DH, 2008, a; Pratt, et al, 2007) no other tools were identified for comparison in studies. The analysis of the data generated from the daily review checklist was undertaken retrospectively, therefore the instrument used (checklist) was not pre-designed to meet any research requirements. Interpretation was required in order to make the data meaningful. Every effort was made to ensure that the process used to extract the data from the checklist was transparent, in order to demonstrate that a rigorous process had been undertaken. Nevertheless, another researcher might derive different information or inferences.

The data produced from the checklists in Phase 1 included the total number of checklists completed (n=928) and infection prevention and control compliance with respect to standard precautions. For example whether or not staff were wearing personal protective equipment appropriately and whether compliance around hand hygiene was recorded and therefore being practiced during the review. Environmental aspects were also examined and these included for example the number of commodes that were found to be clean and whether or not the single rooms where patients with CDI were being isolated were clean and clutter free.

For analysis of the patient care elements within the checklist, evaluation incorporated what data were being recorded on the actual checklist by the IPCPs and matrons. For example in relation to temperature, did the checklist form use a 'tick' to indicate that the patient's temperature had been recorded by the ward staff or did a 'tick' on the checklist indicate that the patient was pyrexial or was it unclear as to which of the two aspects were being referred to . Evaluation also included whether or not the checklist actually included a numerical value for the temperature or did it state that the patient was 'apyrexial' at the time of the DRCP. Table 3.1 illustrates the question or prompt on the original checklist.

PATIENT CARE	Yes	No	Comments
Discuss with Nurse in Charge re. patients condition to include:			
Temperature			

Table 3.1: Excerpt from checklist Version 1 (see table 2.1 and appendix 1 for the original checklist, version 1).

These potential different styles of completion and what if any influence this had on the accuracy of recordings in Phase 1 are discussed in the findings and discussions chapters (chapters 4 and 5).

3.11 Reflexivity, Validity and Reliability Phase 2

Robson (2011) maintains that reflexivity is about the researcher having an awareness of the impact that their particular social identity and background may have on the research process. Various authors maintain that the potential impact of the researcher in grounded theory on the data produced has to be explored through the process of constant comparison and acknowledging the influence of any prior work or experience on the data analysis and subsequent discussion and generation of theory (Charmaz, 2006; McGhee, 2007; Neil, 2006). Constant comparison is a method of analysis whereby data are constantly compared with data, concepts are compared with data and concepts and data are compared with themes (Charmaz, 2006).

There are two differing viewpoints on researcher interaction with the phenomenon under study in grounded theory and the impact this may have on emerging theory. Berger and Kellner (1981) and Hutchinson (1993) maintain that previous experience and knowledge has

to be put to one side whilst undertaking the research. This prevents what is termed as '..a mirror image of hopes and fears and not the social reality' (Cutcliffe, 2000, p 1479). Whereas Stern (1994) and Turner (1981) argue that it is the richness of the researchers experience and creativity that helps to interpret and provide insight into the emerging data. Exploration of emerging concepts and categories in subsequent interviews can help to avoid criticism that the 'hunch belongs solely to the researcher' (Cutcliffe, 2000, p1480). Using the participant's actual words during coding and in subsequent writing up of the findings can also add to the credibility (Corbin and Strauss, 2008).

In this study I was conscious of my own involvement in the DRCP and the influence this may have had on the study. This I would contend assisted with contextualisation and in developing concepts and themes. Participants' actual words interrogated through open and focused coding alongside the development of the specific concepts and themes from the actual data helped in overcoming some of these issues.

Validity and reliability in qualitative research is surrounded by much debate. Lincoln and Guba (1985) were one of the early exponents to argue that trustworthiness (in qualitative research) lies at the heart of validity and reliability, maintaining that qualitative research has adopted a set of criteria, though different to those used in quantitative research can assist the researcher to judge if a study is of good quality; referring to this as 'criteriology' (Seale, 2001, page 134). Lincoln and Guba, (1985) suggest that the criteria often used in quantitative studies such as truth and value, applicability, consistency and neutrality are often replaced with credibility in qualitative studies. Credibility is built up in terms of prolonged engagement and observation in the field as well as peer review challenging emerging hypotheses (Seale, 2001). In this study the researcher was immersed in the data and involved in the checklist review. Supervision throughout the PhD journey enabled peer review of the data generated and any potential biases highlighted and discussed. All of the participants were offered the option to read through the transcripts; this invitation was both in writing in the participant information leaflet and verbally at the time of the interview. None of the participants took up the invite to read through their transcript.

Transferability is more relevant than applicability in qualitative research and should be judged by readers of the research who can then ascertain whether the findings of the study may be applicable to other settings (Seale, 2001). The context and description of the setting and participants for Phase 2 of the study are included later in this chapter and may contribute to any assessment of transferability. Instead of the concepts of consistency and neutrality, dependability and confirmability are more akin to qualitative research. These are

achieved by the research process having an explicit audit trail, thus allowing it to be judged. These include providing examples of the documentation and methods used and clear explanation of data collection and analysis. The findings and discussions alongside clear and comprehensive conclusions and recommendations are all outlined in the subsequent chapters of this thesis which may assist the reader and help to illustrate transferability.

3.12 Research governance

Research governance is defined by the DH as providing safe and effective health care research with the protection of those participating and a return on investments made (DH, 2005). The research governance framework provides guidance and standards for health and social care establishments. The aim is to provide clear and comprehensive guidelines to all those involved in research. The framework includes ethical considerations and defines the 'dignity, rights safety and wellbeing of participants' as the most important aspects of any research study (DH, 2005, p7).

Permission to undertake the study which contained no specific patient information details was provided by the study Trust's Research and Development (R&D) department. An example of the letter outlining permission is included in appendix 2. Verbal permission was sought from the lead IPCP and the Director of Infection Prevention and Control (DIPC) to analyse the data from the checklists in Phase 1 of the study. The uppermost part of the checklist form included a space for the specific named hospital site and ward area (which can be seen from the example of the original checklist, version 1, appendix 1). This assisted in analysis and planning for Phase 2 as previously mentioned. However there were no inclusion details on the checklists of any patient details. There was also no reference to named hospital sites or particular ward areas from the checklists in the overall written thesis. The checklists also incorporated the names of the IPCP and matron. However in terms of the retrospective documentary analysis of the checklists, the names of the IPCP and matrons were not included in any of the data collection or data analysis of Phase 1, and again are not included in the overall written thesis. The checklists were kept in a locked drawer at University during the data collection period when the checklists were not in use. The checklists were then returned to the study Trust at the end of Phase 1.

3.13 Ethical issues

Phase 2 involved participant interviews. Ethical consideration for any research involving human participants is important in order to minimise risk, prevent harm and reduce anxiety (Robson, 2011).The key ethical principles of autonomy, non-maleficence, beneficence and justice (Beauchamp and Childress, 2013) apply in the context of social science research involving participants.

NHS research development and governance approval (Integrated Research Application System [IRAS]) and university ethical approval (School Research and Ethics Panel [SREP]) was obtained for Phase 2. Copies of the approval documentation including the University ethics approval form and study trust approval documentation are included in Appendix 2. The reference number for the local NHS Research development and governance approval was '1048'. It is important to point out that SREP and IRAS only included approval for staff participation as there were no patient or client groups involved.

IRAS provides an opportunity for the researcher to provide evidence of 'quality improvements in research practice' (Walker, 2007, page 36). SREP and IRAS are designed to assess the merit of a proposal and that the researcher has the necessary skills and experience to undertake the research in order that the proposals are likely to be achieved (Robson, 2011). Careful planning and preparation of documentation illustrating the aims, objectives and methodology of the study help to ensure that ethical issues are addressed (Walker, 2007). Research involving participants that are known to the researcher, where the research setting is familiar and actual interview dynamics may all impact on the research process (McNeil, et al, 2011). These were all considered prior to commencing the study and are explored further in the section Risks and burdens (section 3.19).

3.14 Inclusion and Exclusion

The three original staff groups were the IPCPs, matrons and ward staff. All of these staff groups had direct involvement in the DRCP. All of the IPCPs had been involved in undertaking the DRCP therefore they were all initially invited to participate. The matrons and ward staff were recruited from areas of where the DRCP had been undertaken in order to ensure that participants were familiar with the process. Knowledge of ward areas where the DRCP had been used was generated from the data obtained in Phase 1 of the study. This highlighted the value of Phase 1 in assisting in the development of Phase 2. Following data

analysis in Phase 2, theoretical sampling drove further data collection and prompted the inclusion of senior managers. This was to provide a broader strategic viewpoint on the checklist review and elicit senior managers' perceptions of the influence that the checklist review had on the care and management of patients with CDI. The rationale for the inclusion of senior managers and theoretical sampling is explored later in the next section of this chapter (section 3.15).

3.15 Participants and sampling

In grounded theory research it is important that data are collected from people, places and events that best inform the research and maximise concepts that arise from the data (Corbin and Strauss, 2008). This is known as purposeful sampling. Purposeful sampling is the selection of participants that can add value and detail to the issues that are fundamental to the research study in question (Patton, 2002). Purposeful sampling in this study drew on the findings from Phase 1 and this helped to identify participants who had been exposed and were familiar with the checklist. This enabled participants to provide insight into the review and articulate their perceptions of the influence that the checklist review may or may not have had on the care and management of patients with CDI. It was important that participants were aware of the process and could discuss their thoughts and opinions.

Grounded theory also involves theoretical sampling. Theoretical sampling is different from purposeful sampling in that purposeful sampling assists where you commence the research, whereas theoretical sampling 'directs you where you need to go' (Charmaz, 2006, page 100). Central to theoretical sampling is constant comparison when the analysis begins at the start of data collection and the data begins to generate concepts and themes. This initial conceptualisation generates questions that further refine understanding which may then generate new concepts and themes. In theoretical sampling the concepts rather than the individual participants become the focus of the research as they enable the researcher to identify and obtain data from the most appropriate source (Corbin and Strauss, 2008). Theoretical sampling is 'both directed by the emerging theory and also directs its further emergence' (Page 2254) and theoretical relevance for the development of emerging categories can influence the selection of additional groups (Chen and Boore, 2009).

Theoretical sampling can also drive interviewing as emerging topics and areas can be added to the semi structure interview process. In this study theoretical sampling assisted in the generation of concepts and themes leading to alterations to the interview agenda (see

appendix 3 for examples of the changing interview agendas used throughout the study) and extending the number of participants. As more data were collected and analysis undertaken it began to emerge that the checklist review may have had broader influences in relation to educational and relationship development. Senior managers were also recruited to compliment data obtained from IPCPs, matrons and ward staff as part of theoretical sampling. This was as a consequence of some of the key players involved (IPCPs and matrons) identifying that the checklist review may have been perceived differently, with the IPCPs and matrons perceiving that senior managers may have had a broader organisational viewpoint. HCAIs are one of the indicators in patient safety and CDI rates are included in one of the 5 domains[22] in the technical guidance issued by the DH for 2014/2015 (DH, 2014). Senior managers have an interest in overall rates of CDI and any comorbidity and mortality associated with CDI hence eliciting their viewpoint was felt to be useful to the study.

Any discussion of qualitative data collection, especially in grounded theory often includes the concept of data saturation. This refers to the point when no new information or concepts are generated and when categories and relationships begin to develop (Corbin and Strauss, 2008). The interviews included seven IPCPs, eight matrons and eight ward staff alongside four senior managers. The number of participants in each staff group was originally inductive not prescriptive as it was dependant on the data produced and the concepts and themes that developed from the analysis as well as the relationships that were identified between the concepts and themes. In grounded theory, analysis commences after the first interview. As concepts began to arise from the data collected, any subsequent questions then resulted in further exploration around concepts until eventually no new concepts emerged. This is known as theoretical saturation and refers to 'the point in the research when all the concepts are well defined and explained' (Corbin and Strauss, 2008 page 145).

All of the IPCPs were interviewed with the exception of the researcher and one other IPCP who was unavailable at the time of data collection. The rationale for including all of the available IPCPs was that the IPCPs were the initial group of participants interviewed. Due to the exploratory nature of the study, it was important that emerging concepts and themes were not overlooked. The IPCPs provided different viewpoints and areas for consideration during the initial interviews. This resulted in alterations to the interview agenda to ensure that new and emerging concepts were explored, assisted in developing new concepts and themes (see data analysis Phase 2; the interview process, section 3. 22.2 and appendix 3 for the examples of the different interview agendas).

---

[22] The 5 domains refer to the NHS Outcomes framework, domains and indicators. Domain 5 refers to the treatment and care of people in a safe environment and protection from harm (DH, 2014).

In total eight matrons out of nine invited, participated in the interviews with one matron unavailable at the time of data collection. The matrons were from both surgical and medical directorates. This was because the checklists analysed in Phase 1 of the study included checklists from both surgical and medical areas. The main determinant for invitation was that participants had to have been exposed by their involvement in the checklist process (purposeful sampling) and again until data saturation had been achieved. A mixture of matrons from both surgical and medical areas may have also produced resulted in different perceptions and this would have needed to be explored in subsequent interviews.

The ward based staff were also identified by purposeful sampling and included a mixture of different staff grades. This ranged from ward managers to health care assistants and also included link infection prevention and control practitioners (LIPCPs). LIPCPs are practitioners with an interest in infection prevention and control providing a link between clinical areas and the IPCT. One of their roles is to raise awareness of infection prevention and control within their area (Dawson, 2003). It was considered important to invite a mix of different ward based staff as all had something to contribute as would have been involved in the review process and could provide different perceptions of the checklist review. Similarly senior managers were included at a later stage in the study following theoretical sampling. Four senior managers were interviewed, again identified based on their exposure to, and knowledge, of the review

3.16 Recruitment of participants

Recruitment began with the IPCPs and matrons were then the second group of staff to be interviewed. The IPCPs and matrons were the main players involved in conducting the daily checklist review. It was therefore felt that it was important to obtain their thoughts and perceptions as an initial starting point. Phase 1 had also assisted in generating topic ideas for inclusion in the semi-structured interviews. One of the questions that emerged related to the logistics of undertaking the review. Exploring IPCPs and matrons' thoughts and ideas initially as a starting point helped to generate further questions and issues associated with the checklist and the review and different ways of working between themselves and with ward staff. These main concepts and themes were further explored with ward based staff and senior managers. Ward based participants and senior managers were interviewed depending on availability following on from completion of the interviews with IPCPs and matrons.

Following ethical and IRAS approval, an initial email providing information about the study was sent out to potential participants (see appendix 4 for an example of the initial email). The aim of the email was to provide potential participants with an overview of the study and request their participation. The email varied slightly depending on the target group of participants. This was due to the nature of the respondents ranging from IPCPs who were more familiar with the checklist review and the researcher to senior managers who may be less familiar with the process and the researcher. The alternative email for senior managers is also demonstrated in appendix 4. Any alterations to communications or information leaflets were given a version number and this was included in the 'footer'. Repeat emails were sent out especially if it was known that the participant was out of office. Care needs to be taken that the nature and purpose of the research is included in the correspondence (Silverman, 2010). Often a reluctance or refusal to participate may be due to misconceptions around these areas rather than an unwillingness to participate (Williams, et al, 2008). In this study an email invitation appeared to work well and generated recruitment. There were two occasions when repeat emails had to be sent out. One of these resulted in a response. On the other occasion the invitee was unavailable during the data collection period.

Once the potential participants had responded to the initial email, an information sheet and consent form was then forwarded with a further invitation to attend for interview at a mutually agreed date, time and venue. The information leaflet and consent form are included in appendix 2. All of these documents were submitted in the information required for university and IRAS approval (appendix 2 includes copy of the university ethics approval form and other documents for university ethical and IRAS approval).

3.17 Consent

Informed voluntary written consent was obtained from all participants in Phase 2 with a copy of the consent form given to the participants and a copy kept with the researcher in a secure environment. Information about the study and contact details of persons both at the university and the study site if any of the participants wanted to ask questions or raise any issues either prior to or during the process.

3.18 Confidentiality and anonymity

Respect for confidentiality includes ensuring that participant selection is confidential. As there were different staff groups involved in the process details of who had chosen to

participate was not disclosed to any of the other participants involved in the study. This included information of those who were participating as well as any content of the interviews. In the case of the IPCPs where the majority were interviewed, there was no specific information provided as to who had actually participated in the study. Confidentiality however cannot be totally guaranteed as the participants may have discussed their involvement with each other. Confidentiality may also have to be breached if any legal or professional issues had been disclosed by the participants and this is discussed below in the section on key risks and burdens.

During Phase 2 of the study a theoretical sampling approach, highlighted that interviews with senior managers would add to the study and provide a broader overview of the checklist review and its influence in the care and management of patients with CDI. This required an amendment to the original, and ethical approval was obtained from both institutions. Assurances in relation to anonymity were given which included using a generic term 'senior manager'. Data were checked throughout all the data, collection, management and analysis processes as with all the participants to ensure that anonymity was maintained. An example of the University revised ethics form is included in appendix 2.

3.19 Minimising key risks and burdens Phase 2

The main risk to participants in the interviews during Phase 2 of the study was that areas of practice might be discussed which may have had professional implications for the participants. The participant information leaflet highlighted that any disclosure of sensitive information with legal or professional implications may have required further actions and this was also reinforced at the time of the interview. No issues of this nature arose during any of the interviews in Phase 2.

Burdens to participants centred on the interview process. These included time away from work or the inconvenience of undertaking the interview. However the benefits can be that participants may appreciate time away to discuss issues and an opportunity to talk openly and frankly (McNeill et al, 2011). Actions to reduce the risks and potential burdens included arranging interviews at a time and place convenient to participants and providing an opportunity for interviews to be held before or after shifts or on days off. In this study this proved to be less of an issue than first envisaged and other than two interviewees that had to cancel and rearrange due to work pressures there were no problems in arranging times and interviews sessions with any of the participants.

Interviewing colleagues in the same team and interviewing peers and managers can lead to a potential conflict of interest and fear of being criticized due to discussions in relation to patient care and management. This can lead to interviewees not discussing certain elements for fear of critical review which may result in important aspects of the study being missed or not covered. Developing a rapport within the interview during the early stages of the interview good communication skills can help to prevent some of these issues (DiCicco-Bloom and Crabtree, 2006).

With reference to managers or more senior members of an organisation, interviews can present problems related to status and power within that particular organisation. Edwards and Holland (2013) maintain that power is an everyday occurrence in interactions and argue that researchers can feel intimidated or overwhelmed by those seen to be in positions of power or influence. They go on to highlight other literature which provides some useful guidelines for interviewing participants in positions of power to help overcome some of these potential problems (Edwards and Holland, 2013). These include having visible props to ensure that certain key topics are covered (Duke, 2002, cited in Edwards and Holland, 2013) and establishing a rapport with the participant (Ross, 2001, cited in Edwards and Holland, 2013). An approachable and receptive manner during the interview and maintaining an open mind to the different participant's points of view or perceptions was utilised in this study. As this study was about the perceived influence of the checklist review on the care and management of patients with CDI it was important to ensure that the participants were encouraged to discuss any issues linked with the topic under review. However an interview agenda provided assurance that any concepts or themes that arose could then be further developed or explored with the participant if required in order to ensure these were not missed.

There was also the potential that participants may have found it difficult to openly discuss issues or areas of concern as the interviewer was known to them. Shared experiences which may be inevitable with members of the same team can assist in opening new lines of enquiry and help to extend the depth of discussions that arise (McEvoy, 2001). In this study the interviewer and interviewees had all had some involvement (or awareness in the case of senior managers) in the daily checklist review. This provided opportunities for the interviewer to understand and be able to contextualise any feedback provided by the participants. The participants were also informed that the feedback could assist with the review process and any future changes or adaptations required. It was also emphasised that the information was for research purposes and that specific individual participant information would not be discussed with others participating in the study or anyone else other than the researcher's

supervisors. Other ways that the impact around intrusion and interviewing colleagues and peers can be reduced is by recognising the dynamics of the relationships and the impact this can have on the interview and on any findings (Rubin and Rubin, 2012). In this study transcribing, initial analysis and reflecting on each interview assisted with this process which are explored later on in the chapter.

3.20 Data management Phase 1 and 2

During Phase 1 data management included issues around confidentiality and anonymity alongside the safe extraction and storage of the data retrieved from the checklists. The checklists contained no patient details. However the checklist did include the ward and names of the reviewers. These were kept confidential during the analysis process and kept in a locked area during data input. Anonymity was maintained during the data input phase as no individual staff details or ward areas were included. The significance of the frequency of the number of checklists for specific wards over the period of time in question was included as well as whether they were medical or surgical areas. These however were not named in the study. Having information regarding the ward area was important to help in purposeful sampling for Phase 2 as was discussed previously.

During Phase 2, interviews were recorded using a digital tape recorder. Digital recordings are better quality and more manageable aiding transcription and analysis (Bailey, 2008). The recordings were anonymised and transcribed verbatim. All of the data collected was kept confidential and stored on a password protected university computer. Only anonymised transcripts were kept on a home computer. On completion of the study the data will be kept by the University for a minimum of 5 years. NHS computers were not used to store data or for data management. Consent forms and notes generated during and after the interviews were stored in a locked drawer in a locked room at the university. The interviews were undertaken and transcribed by the researcher and only the researcher and supervisors had access to any of the data generated.

3.21 Data collection and input Phase 1

Excel®[23] was used to input the data from the checklists (n= 928) for the period July 2010 to December 2011. The daily review checklist elements which are included below in table 2.1 for example the environmental elements such as the sluice and are 'all bed pan bases are

---

[23] Excel® is a registered trademark for Microsoft.

clean and in good condition' and the patient care elements for example 'abdomen' and 'temperature' were included in the vertical axis and the 'yes', 'no' and 'comments' area included in the horizontal axis.

Clostridium *difficile* Daily check list.

This checklist should be completed by the Matron and IPCN on a daily basis.

WARD   DATE   COMPLETED BY

SLUICE	YES	NO	Comments or Actions taken
All bedpan bases are clean and in good condition			
All commodes are clean – check underside, frame and foot rest.			
Apron and gloves are available			
Slipper pans are maceratable and not reusable			
Cleansing foam is single patient use (check cupboards/shelves for part used containers)			
STANDARD PRECAUTIONS			
Staff are washing hands with soap and water after contact with patient with diarrhoea.			
Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals			
Staff are wearing single use aprons and gloves when in contact with a patient and/or patient environment			
Staff decontaminate their hands prior to putting on PPE and with soap and water after removing PPE.			
All staff decontaminate their hands before and after any patient contact or different patient bed spaces.			
Clean linen stored in the linen store area only (not bathrooms/sluice/bays)			
Infected linen is disposed of correctly and is not left in the side rooms or bays.			
MANUAL HANDLING EQUIPMENT			
All manual handling equipment is single-patient use.			
CLEANING			
Tristel is being used at the correct dilution and is dated and timed (8 hour shelf life once made up)			
Side rooms are clean, free from dust/ spillages (check behind lockers, under beds and curtain rails)			
ISOLATION			
Patients with clostridium difficile are being nursed in the side room with the door closed and appropriate signage in place			
Used linen has been removed from the room			
PATIENT CARE			
Care plan and patient information leaflet provided			
Discuss with Nurse in Charge re. patients condition to include:			
Abdomen			
Temperature			
Nutritional status			
Pressure ulcer risk assessment			
Fluid balance			
Daily bed bath/hygiene care			
Daily bed linen change			
Stool chart – document type of stool			
Medication			

DRCP V1

Table 2.1: *Clostridium Difficile* Daily Checklist Version 1.

81

The checklist included positive statements for the environmental and standard precaution elements. This enabled the person completing the checklist to highlight 'yes' if the statement was correct and 'no' if not. For example the question surrounding bedpans 'all bedpan bases are clean and in good condition'. If this statement was correct the individual completing the form would include 'yes' and 'no' if the converse was true. The patient care elements of the checklist tended not to be positively charged statements. Instead these often included one word terms such as 'stool chart' or 'temperature'. This element of the checklist was more subjective and inconsistently completed. What was included on the form appeared to be different depending on the day of the review and who completed the checklist. The subjective nature of the checklist especially the patient care elements are discussed in more detail in chapter 4 (Phase 1 findings) and chapter 5 (Phase 1 discussion)

Along with 'yes' and 'no' and 'comments' sections on the horizontal axis, further categories were included to aide in subsequent analysis of the data; not completed (n/c); unknown (u/k) and not applicable (n/a). These three categories were included because when initial inputting of the data into the spread sheet commenced, it was noted that there was a broad range of variation in the completion of the checklist. There were elements in some of the sections where neither the yes or no box was ticked nor anything documented in the comments section. This was captured in the data input and not just ignored and included as 'not completed' (n/c) when inputting the data. As well as ensuring that accurate information was included on the spreadsheet, capturing areas of the checklist that weren't completed may have also influenced any future use of the checklist and any modifications required to the different elements of the checklist or the process itself.

The unknown (u/k) category was used for different elements of the checklist if the IPCP or Matron had been unable to ascertain the specific information at the time of completing the checklist. Not applicable (n/a) was included in the data input if that particular element of category on the checklist form was not applicable at that time and the IPCP or matron indicated this on the checklist.

3.22 Data collection Phase 2

3.22.1 The qualitative interview

'The purpose of a qualitative research interview is to contribute to a body of knowledge that is conceptual and theoretical and is based on meanings that life experiences hold for the interviewees' (DiCicco-Bloom and Crabtree, 2006, page 314). In this study it was important to explore the perceptions of the staff on the daily checklist review, both on them and if and how it had been influential in the care and management of patients with CDI.

3.22.2 The interview process

Data collection was via open or semi-structured interviews. Individual semi-structured interviews were chosen as the method of data collection for Phase 2 of the study due to the 'interpersonal contact, context, sensitivity, and flexibility' (page 53) that this style of data collection provide (Brinkmann, 2013). This was particularly relevant for this study due to the nature of the enquiry and wanting to explore participant perceptions. Semi-structured interviews facilitated changes to the interview agenda and different prompts to assist with context and sensitivity.

All of the participants were involved in a single interview and the interviews were held at a time convenient to the participants and at an acceptable venue. Interviews should ideally be held in venues that are free from interruptions and one in which the participants feel comfortable in as this helps to promote comfort and security (David and Sutton, 2004). In this study where possible the venues chosen were away from the clinical or the participants own work base area which helped in avoiding interruptions. However in the case of ward based staff the majority of the interviews (five) were undertaken in the ward area either in the office or staff room. This was the choice of those particular participants. In these instances some interruptions were encountered but did not prove to be disruptive. The ward based staff that had chosen ward areas had done so for ease of undertaking the interview and to prevent any unnecessary delays in getting to and from the venue.

Most of the participants from all the invited staff groups undertook the interviews during working time having obtained permission from managers. However, some participants participated in interviews prior to, or at the end of their shift or during a break period. The latter options were often chosen by ward based staff. It is important that choice and timings of interview and venue are provided for participants in order to aid the interview process and

help put the interviewee at ease (Clarke, 2006). Whiting (2008) however maintains that it is the communication skills of the interviewer that are more important in helping with the interview process and placing the participant at ease here than actual venue.

In grounded theory it is important that there is flexibility in order that subsequent interviews can build upon what previous participants have disclosed (Corbin and Strauss, 2008). The content may therefore vary between each participant as other questions or topics may emerge from previous dialogue (Whiting, 2008). Semi-structured or in depth interviews should use open and direct questions in order to encourage detailed narratives from the participants (Whiting, 2008). Examples of different versions of the interview schedule are included in appendix 3. They provide examples of the initial interview schedule and the changes to the interview schedules during the interview process. Figure 3.2 illustrates the different steps within the study, highlighting the changing focus of the interview agendas. All of the versions of the interview agendas are in included in appendix 3.
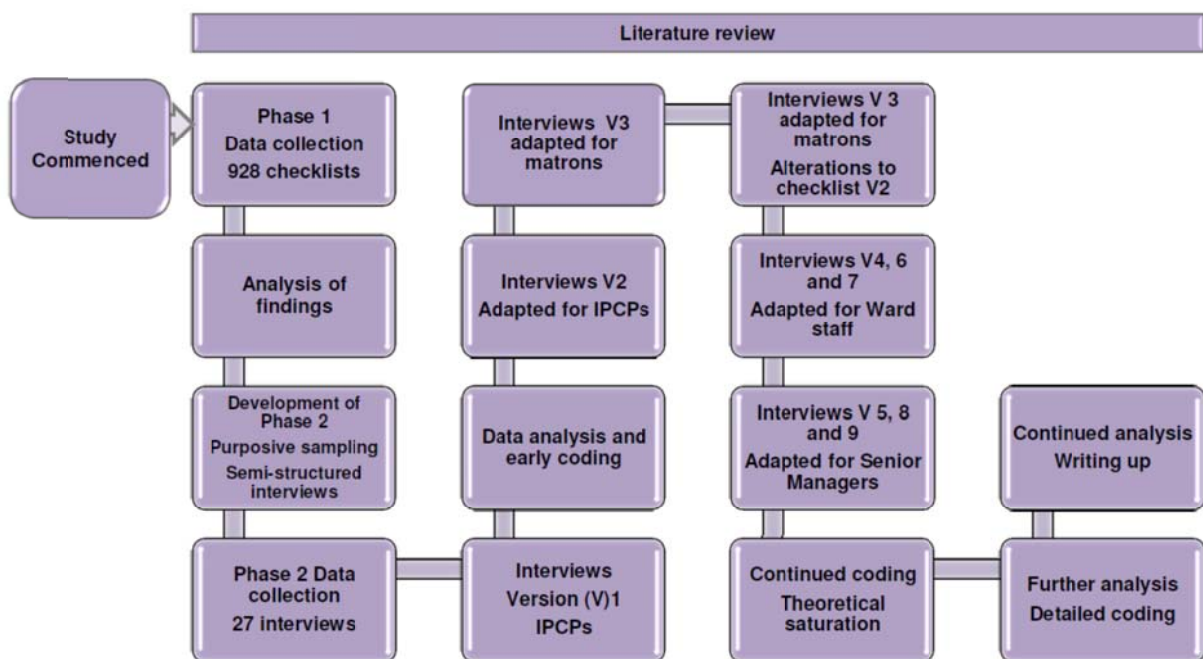
Figure 3.2: Research overview.

The initial interviews began with questions that provided an opportunity for participants to discuss their thoughts around the checklist and the review. A common opening question following the introductions, included '*talk me through the checklist review from your perspective''* (see appendix 3 for version 1 of the interview schedule). Some participants required further prompts for example '*tell me a bit about the background' to the checklist'* or

'what in your opinion was the reason as to why the checklist review came about?' If staff needed a different introduction or prompt to help introduce the checklist review then an alternative question was *''talk to me about a patient with CDI; what springs to mind''*

In grounded theory, the data generated helps to generate further data by re-forming or rewording aspects of the interview schedule. Charmaz (2006) maintains that 'questions must explore the interviewer's topic and fit the participant's experience' (page 29). Therefore different prompts or questions may be required to encourage the interviewee to discuss issues important to the study. These can then be recognised and acted upon and used in subsequent interviews.

During the first set of interviews with the IPCPs it became apparent that educational benefits of the checklist review assisted with the care and management of patients with CDI and the positive influence the review had had on relationships especially between IPCPs and matrons. These sensitive issues were included as prompts in successive interviews and these are highlighted in appendix 3 (interview schedule issue 2). As the interviews progressed with information from different staff groups, common themes began to appear in the interviews specifically on the broader influence and the emergence of the DRCP as opposed to just a checklist and the approach adopted by the IPCP and matron highlighting approachability as an emerging concept. For example an interview with one of the ward staff included:

'So whilst you (referring to the matrons and IPCPs) *are on the ward interacting with the staff they get to see your approachability…'.* **Ward staff participant no. 26.**

This prompted further additions to the schedule with the later interview schedules wording semi-structured questions differently in order to try and explore the meaning of specific concepts, for example exploring views with others about interaction and approachability. An example is the question that asked the opinion of the respondent on the checklist and the process: '*what are your thought on the process and the checklist'.* Later interviews explored this same question but also asked about the manner in which the DRCP was delivered: '*what are your thoughts on the process and the checklist and the way in which it is delivered'.* The final version of the interview schedule (issue 9) as highlighted in figure 3.2 was used in the latter stages of interviews with ward staff and is more detailed with prompts to explore the issues and themes that were raised by other respondents. This can be found in appendix 3, version 9. The interview schedule was altered throughout to ensure that relevant information which would develop and enhance the study was captured in the interviews and subsequent data (Charmaz, 2006).

Detailed reflections and memos were made after each interview and after each group of participant interviews were completed. Using reflection to identify strengths and areas for improvement for the interviewer can help in the overall process and improve interviewer technique (Whiting, 2008). Some of the constraints of interviews, however, especially semi-structured or unstructured interviews include the potential for researcher bias. The interviewer or researcher needs to be aware of this and take actions to try and minimise the impact on the data collected (Whiting, 2008).

3.22.3 Reflections on the interviews

Following on from each of the interviews a template was used to explore overall thoughts and reflections and include any important memos from each of the interviews. The template used is shown in Table 3.2 which highlights an example of how the table was used. It is adapted from Rubin and Rubin (2012). Highlighting the main points in qualitative interviewing is important and especially when using a grounded theory approach as the data generated assists in theoretical sampling and saturation and interview design (Charmaz, 2006; Corbin and Straus, 2008).

Interview No:	15.
Date of Contact:	07/03/13.
Staff Group:	Ward Staff.
What main issue struck me about this interview:	Very positive. First ward staff interviewed
Other interesting or important points:	Perceived the DRCP as checking up but this 'wasn't a bad thing'.
Memos:	Safety and patient checks seen as important, Valued input of IPCP. In patient assessment. Interesting re safety inclusion.

Table 3.2: Example of interview details and initial reflections.

Memos are important aspects of qualitative interviewing as they provide an opportunity to document aspects of analysis. They are defined as the researcher's record of thoughts, reflections and prompts to guide further data collection (Corbin and Straus, 2008). Corbin and Strauss (2008) maintain that there are many different types of memos that can be used throughout analysis, for example memos can be used to explore data and also used to identify or develop properties and dimensions of concepts and themes. However, Corbin and Strauss (2008) go onto state that what is important especially for initial novice researchers, is to ensure that memos are used rather than worry about the manner in which they are used. In this particular study memos were used to identify particular concepts and themes

which then provided an opportunity for further theoretical sampling in successive interviews. They were also used to assist in comparing and contrasting individual interview data as well the different staff groups. Any questions that arose when using memos helped with content for ensuing interviews as questions or issues could be included in the interview agenda in a semi structured format.

Examples of the memos that were highlighted from one particular interview with an IPCP are included in Table 3.3. Table 3.4 highlights memos following analysis of one ward staff interview. The ward staff interviews were undertaken after the IPCPs and matrons but in and amongst the senior managers, therefore theoretical sampling was still on-going. However by this stage saturation was beginning to be reached and many of the respondents in each group were providing similar information. Theoretical saturation is not only reached when no new data is emerging but also when categories or themes are starting to develop (Corbin and Strauss, 2008). In this study ongoing analysis throughout meant that codes, concepts and themes were constantly being examined and re-examined to ensure that no new information was missed.

Type of Memo/reason for memo	Examples of memos used
Data analysis	The IPCP comments on the DRCP 'helping to standardise practice'.
Asking questions in subsequent interviews with other IPCPs and other staff groups.	What is it about the DRCP that helps to standardise practice.
Concept/theme.	Assurance and change management.
Area to explore in further interviews with all groups.	Why and how has the DRCP helped to standardise practice.

Table 3.3: Example of memos taken from interview transcripts: IPCP participant no.2.

Memo type/reason for memo	Example of memos used
Data analysis. **Asking Questions in subsequent interviews.**	Staff comments on the daily review checklist as 'prompting to do the right thing'. Is this what the review does and is it reminding staff of what is important that helps?
Concept/theme. **Acknowledging common theme.**	Increased awareness and knowledge, acknowledgement of educational input. Education and learning.
Area to explore	'Helping role' seen as very positive; need to explore with other participants.
Actions interactions and consequences	Feedback seen as important both in the context and the manner in which it is delivered. Practice based/situated learning. 'Doing and telling' seen as important rather than just telling How does this link with education and learning?

Table 3.4: Example of memos taken from interview transcripts: Ward Staff participant no. 18.

Chen and Boore (2009) maintain that memos encourage the researcher not only to document ideas and thoughts but also to reflect on the concepts and themes and interpret how these are integrated with one another. In this study as can be seen from the excerpt above in table 3.4, the participant commented on the checklist review 'prompting them to do the right thing'. This then led to the question, how does this link with education and the style and delivery of by the IPCPs and matrons. It raised the question about the contextual nature of the checklist review and does this help with overall learning? This assisted in seeking further clarification and adaptation of the interview agenda as previously discussed.

3.23 Data analysis Phase 1

Robson (2011) maintains that analysis of any research data should be done throughout the study and not left until the end when it can become a large array of meaningless information. Often data in its raw form can have hidden meaning and careful analysis and reanalysis may help to tease out other findings and some of the main issues. Processes, as well as the products of data analysis form the basis for further interpretation (Robson, 2011).

In this study data analysis began during Phase 1 and continued throughout Phase 1 and Phase 2. Initially in Phase 1, data analysis consisted of examining specific data obtained from the environmental, standard precautions and patient care aspects of the daily review checklist. This included total number of checklists completed, wards and areas that had the greater number of checklists and the percentage of compliance in relation to the environmental and standard precaution elements of the checklist alongside the specific patient care aspects (see Appendix 1 for an example of the original checklist, version 1).

An Excel® spreadsheet was used to assist with data analysis. Excel® spreadsheets are 'convenient tools for numeric computations' (Baier and Neuwirth, 2007, page 93). They provide a systematic method for capturing quantitative data which can then be presented in tables and diagrams. Conversely, Goldwater (2007) maintains that Excel® is a poor choice for statistical analysis other than for the simplest of descriptive statistics. However in this study Phase 1 included a retrospective documentary analysis in order to examine a large number of checklists over a set period of time. Excel® was particularly useful in this instance due to the number of checklists being reviewed and the fact that the main purpose of Phase 1 was to provide audit data consisting mainly of descriptive statistics and also assist in purposeful sampling and initial topic areas for the semi-structured interviews for Phase 2 of the study.

The spreadsheet provided data on the number of wards that were involved in the checklist review, type of ward for example surgical or medical, overall compliance rates for the different elements of the checklist and comparisons between different directorates (medical and surgical) and comparisons between the two hospitals within the study Trust. It also provided an opportunity to examine checklist completion in terms of accuracy consistency and comparisons between those who completed the checklists (IPCP and matrons).

3.23.1 Coding Phase 1

Coding may be more synonymous with qualitative research. However it is also used in quantitative research. Codes are numerical attributes or symbols. They assist with analysis of data (Robson, 2011). In this study the codes included the different number of checklists that corresponded to a particular attribute. In this case the attribute related to an environmental or standard precautions item or a patient care item, for example recording of the patients' temperature (all the items correspond to the items on the checklist and can be found in appendix 1 version 1). The main codes for temperature were 'yes or no' but there were also categories that included not completed (n/c) not applicable (n/a) or unknown (u/k).

Each of these categories generated a numerical value for each of the elements in the checklist. For example the total number of checklists generated (n=928) and the number of occurrences when commodes were found to be clean and not damaged from the total (n= 719). Table 3.5 illustrates the coding used.

Information taken from the checklist 'elements'		No. of checklists		No of checklists		No. of checklists		No. of checklists		No. of checklists
All bedpan bases are clean and in good condition.	**Yes**	805	**No**	80	**u/k**	2	**n/a**	2	**n/c**	39
All commodes are clean – check underside, frame and foot rest.	**Yes**	719	**No**	168	**u/k**	5	**n/a**	4	**n/c**	32
Apron and gloves are available.	**Yes**	898	**No**	9	**u/k**	2	**n/a**	1	**n/c**	18
Slipper pans are maceratable and not reusable.	**Yes**	753	**No:**	4	**u/k**	1	**n/a**	134	**n/c**	36
Cleansing foam is single patient use (check cupboards/shelves for part used containers)	**Yes**	780	**No:**	70	**u/k**	1	**n/a**	12	**n/c**	65

Codes: u/k = unknown; n/a = not applicable; n/c = not completed

Table 3.5: Excerpt from Excel spreadsheet demonstrating codes used.

3.24 Data analysis Phase 2

In grounded theory, data collection and data analysis are concurrent, with analysis informing the data and data informing the process (Thorne, 2000).Transcribing is usually one of the first processes in analysing the data. In this study this followed some initial reflections on the actual interview itself as well as the content, in order to capture those immediate thoughts and feelings following the interview event. Initial reflections after each of the interviews are useful when transcribing as they can help to remind the researcher of the actual interview. Transcribing audible text into written word can be a difficult task. Ensuring that the correct level of detail is included helps to assist with essential interpretation and representation (Bailey, 2008).

Transcribing involves 'repeated careful listening' (Bailey, 2008, page 129) and ensuring that the data transcribed is what has actually been said and not what the researcher wants to be said. This was of particular relevance in this study with transcribing my own interview data in order to minimise potential researcher bias as mentioned previously. The insider knowledge

that I had in this particular study (being an active participant in the checklist review) assisted with interpretation and contextualisation. The interviews were all transcribed in the same way using line by line data transcribing. The initial of the staff group for example IPCP for infection prevention and control practitioner was used. This was to help maintain confidentiality and anonymity of the participants both for the researcher during analysis and for when the interview data were stored on computers. The number of the participant was also included and this number represented a cumulative number in relation to the total number of interviews for all the participants from all the staff groups. An example is shown below:

> *"Talk me through the checklist review, what springs to mind".* - **Interviewer.**

> *"It came about following outbreak of CDI at…., looking at different interventions to see how we could reduce infections and re-infections of patients. It helps to give a baseline of what people need to look for. It was designed that IPCPs go with the matrons on to review that patient on daily basis…….".* - **IPCP participant no. 4.**

Interview data from transcripts are not a '...neutral record of events but reflect the researcher interpretations' (Bailey, 2008, page 129). Transcribing is an interpretive process involving judgement and contextualisation by the researcher. It is a balancing act between adding perspective and 'letting the text talk' (Graneheim and Lundman, 2003, page 112). It was particularly helpful in my case to help confirm or revisit any aspects that were unclear and prevent misinterpretation of the interview data. It also assisted with memo writing and reflections on the interviews as was outlined earlier.

3.24.1 Initial analysis

Analysis was assisted by a qualitative analysis package NVivo®. Computer packages can assist in the overall analysis of the data by helping to organise, manage and code data but do not replace the importance of reading and re-reading transcripts in order to ensure that all concepts, categories and relationships are uncovered (Corbin and Strauss, 2008).

Initial analysis commenced after the first interview which enabled concepts and themes to begin to develop; this in turn aided subsequent data collection. After each interview I transcribed verbatim the interview content as well as reflecting on the process and beginning 'open coding'. 'Open coding' is the preliminary step in the process where general codes are generated from the data (Mills et al, 2006). Open coding was used initially to ensure that all potential concepts were uncovered and nothing was missed from the data. Constant comparison analysis was used to generate these broad based concepts which became increasingly fine-tuned as the analysis continued within each of the interview transcripts and

between the different transcripts. With open coding the person undertaking the coding should remain open to the data generated yet ensure that the codes used fit the data, rather than the data being made to fit specific codes (Charmaz, 2006). This was achieved by constant comparative methods and undertaking data analysis throughout data collection. Analysing smaller data sets and then being able to test out emerging codes, concepts and themes in subsequent interviews can assist with an open approach to the findings generated (Silverman, 2010).

3.24.2 Open Coding

For Phase 2 of the study open coding consisted of initial codes which were a combination of terms and phrases from the interview data. Some of this was obtained from line by line coding. Initially during early interviews certain codes used were one word codes, for example 'education' and 'leadership'. General terms taken from actual interview transcripts can be limiting in terms of extracting participant meaning from the actual word (Charmaz, 2006). However initial more simplified coding helped to brainstorm and identify all possible meanings rather than being too prescriptive (Corbin and Strauss, 2008). Appendix 5 provides an example of the initial open codes. Total codes and sub-codes during open coding were 201. An example of some of the main codes and sub-codes following open coding is detailed in figure 3.3. Further information and detail is provided in appendix 5.
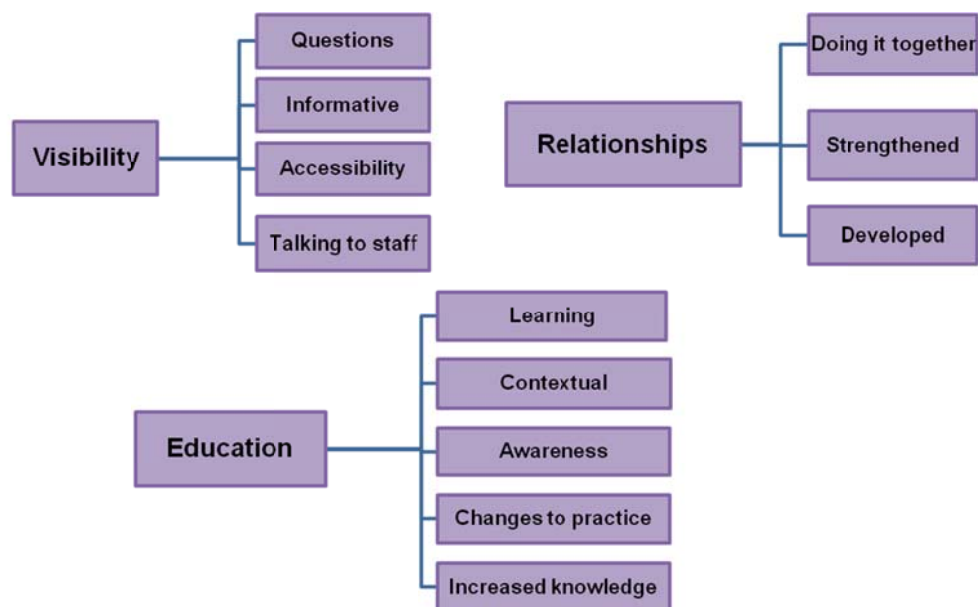
Figure 3.3: Example of some of the main codes and sub codes following open coding.

Following initial coding, and more detailed reflections on each of the interviews, memos were written facilitating ideas and examining relationships between the data and the individual participants as well as relationships between different staff groups as previously highlighted. During this period literature and previous theoretical background assisted with ideas and thoughts and in guiding further analysis as well as data collection. A constant comparative method was used throughout Phase 2. Constant comparison helps with the development of new concepts and themes and also assists with examining relationships, if any, between different elements of data (Thorne, 2000). In this study constant comparison was useful in order to analyse the large array of data and assisted in developing concepts, themes and sub themes. However it was also useful in developing the interview agenda for subsequent participants in order to capture any new and emerging themes in subsequent interviews.

3.24.3 Focused coding

Once initial coding and memos had been completed, the next stage included focused coding. Focused coding is more detailed and specific and in some instances re-examines open codes and determines their adequacy (Charmaz, 2006). Subsequent focused coding and further analysis led to more detailed coding and often more phrases rather than one word descriptions, for example in relation to how some of the staff viewed the checklist review. One of the more detailed codes included that the checklist review '*helps staff to recognise who to speak to or the chain of command to action any concerns*'.

In this study focused coding began after the initial interview alongside open coding. Initially as data collection and analysis began, using one word codes helped to delineate large quantities of text and also highlight specific areas that needed to be addressed in subsequent interviews. However as interviews, transcribing and analysis continued, more dimensions became apparent that required more detailed or more specific codes to illustrate the phenomenon in question. Using education as an example, from the data produced during interviews concepts began to develop related to education and the educative function of the DRCP. Participants commented that the checklist review had increased their knowledge and awareness about CDI and IPC practices. Participants also highlighted the contextual nature of the education during the checklist review and how this had helped to link theory to practice.

Focused coding is not a 'linear action' (Charmaz, 2006 page 58), it involves frequent re-examination of codes and interview transcripts. It also involves constantly comparing and reanalysing the meaning of open codes or the actual text stated by the participants. Focused

coding continued throughout analysis and the writing up process. In total focused coding generated 92 codes and sub-codes. Examples of the focused codes in relation to leadership are illustrated in figure 3.4 (see appendix 6 for details of the focused codes).
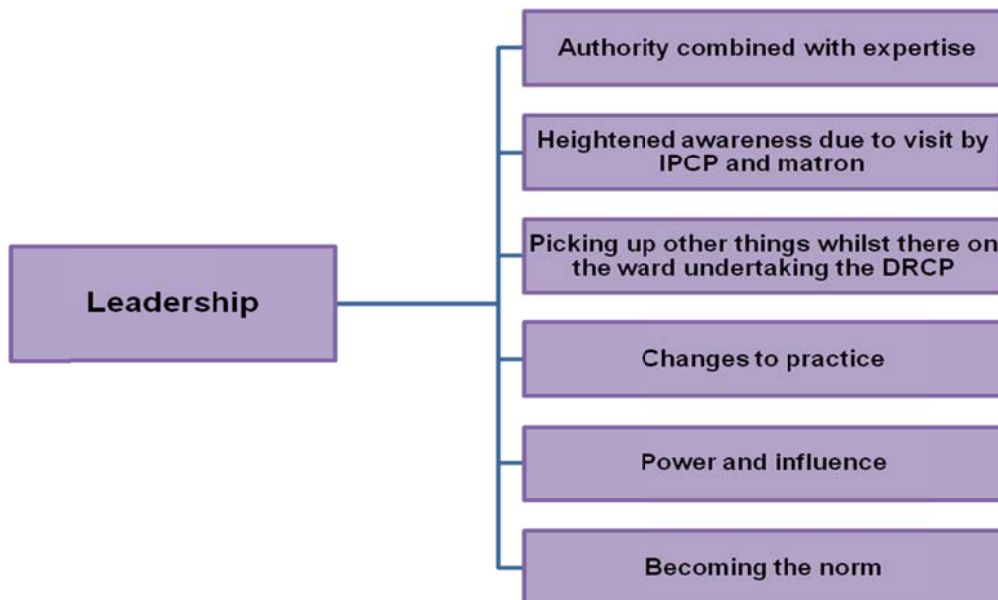
Figure 3.4: Examples of focused codes linked to leadership.

3.24.4 Axial coding

Axial coding helps to sort and arrange the large array of data and assists in identifying and linking concepts and themes (Corbin and Strauss, 2008). Walker and Myrick (2006) maintain that axial coding also helps to understand relationships between themes and concepts. Corbin and Strauss (2008) in their later work emphasise that axial coding is not something that takes place in a vacuum or in isolation following on from open coding; instead it is an ongoing process and goes 'hand in hand' (Corbin and Straus, 2008, page 198) with open coding.

In this study, in Phase 2, during coding, codes began to map naturally to form concepts and themes. Corbin and Strauss (2008) define concepts as 'interpretations, the products of analysis' (page 159). Themes or 'categories' represent construct phenomena that enable the analyst to reduce and combine data (Corbin and Strauss, 2008). This was particularly relevant given the number of concepts that emerged in this study especially those that relate to one of the main themes that emerged 'Developing and Sustaining Relationships'. Within this theme a number of codes/concepts were combined after further re-examination of the data and codes. These included communication skills, increased visibility, approachability

and team work; all of which were key components or attributes that had a direct or indirect impact in developing and enhancing relationships throughout the checklist review.

In this study the attributes or characteristics that assisted in developing and sustaining relationships for example approachability and communication skills began to form a link with team work and visibility. IPCPs and matrons that were approachable and communicated well with for example the ward staff had a tendency to be visible and were seen as part of the team. The IPCPs and matrons who displayed these attributes also often actively engaged in helping staff and in team work during the checklist review. This demonstrates the use of axial coding. Applying axial coding throughout Phase 2 of the study also helped with subsequent interviews and shaped future interview agendas.

Axial coding allowed categories and themes to be interlinked which prompted further clarification with subsequent participants in later interviews. Charmaz (2006) discusses the use of axial coding to help ask questions of the data; 'the why, where, how come and when' (page 61). These questions link to the circumstances of the phenomena under study. Actions and interactions help to answer the 'by whom' and consequences answer the 'what happens because of these interactions'. A further example linked to 'relationships' was the perceived improvement of relationships between matrons and IPCPs and ward staff and IPCPs. Linked to this was the notion of increased visibility which appeared to have contributed to improved relationships. This prompted further exploration between visibility and relationships and how this related to different participants and across the four groups of staff, IPCPs matrons, ward staff and senior managers.

Once detailed coding had taken place with constant comparison and comparing individuals as well as different staff groups and theoretical saturation had occurred, integration of the different concepts was explored. Corbin and Strauss (2008) describe integration as a process linking sub-themes to main themes and then refining and redefining in order to construct theory. An example in this study of one of the main themes in relation to the DRCP that emerged was 'Education and Learning' with subsequent sub-themes linked to this main theme. These sub themes included practice based learning and clinical and patient focused knowledge. Sub-themes enabled a more in-depth explanation of what it was about the checklist review in relation to 'Education and Learning' that had been influential in the care and management of patients with CDI. The themes and sub-themes derived from axial coding alongside the main concepts that arose are explored in the findings sections. Chapter 6 provides an overview of these themes and sub-themes and uses a hierarchal diagram to illustrate the relationships between each of the themes, sub-themes and main concepts.

3.25 Conclusion

Corbin and Strauss (2008) and Charmaz (2006) were the main approaches used in this study. Corbin and Strauss (2008) use a three stage approach during coding in data analysis. The more comprehensive approach was beneficial for me as a novice researcher. In addition to Corbin and Strauss (2008), this study also included some of the ideologies of Charmaz (2006). Charmaz (2006) outlines a constructivist approach to grounded theory. Constructivists propose that 'people including researchers construct the realities in which they participate' (Charmaz, 2006, page 187). This was significant for me in my role as an IPCP having been involved in the checklist review, particularly for Phase 2 of the study. It was important to acknowledge this and incorporate processes for example constant comparison and reflexivity in order to assist in minimising any potential biases but to ensure that my experience helped to assist in exploring different concepts and themes.

The concepts and themes that were generated from the coding used in Phase 2 data analysis were explored using initial open coding, more detailed focused coding and finally axial coding. Axial coding helped to generate the main themes and sub themes which are explored in chapter 6 as an overview and then each theme in more depth in chapters 7, 8 and 9. What became apparent throughout the data collection and data analysis was the emergence of the daily checklist review as a process, the DRCP.

The coding used in Phase 1 related to numerical attributes which corresponded to the items on the checklist. These codes resulted in predominantly descriptive quantitative data of which the findings are explored in the next chapter (chapter 4) with subsequent discussion of Phase 1 findings in chapter 5.

Chapter 4
Findings - Phase 1

4.1 Introduction

The retrospective analysis of the checklists included the period from July 2010 to December 2011 and included a total of 928 checklists. The checklists reviewed were generated from two patient groups; those that had been admitted with CDI from the community, and those that developed CDI whilst an inpatient. The overall number (928) reflected the number of checklists examined but was not directly related to the number of patients with CDI over the 18 month period. The CDI incidence figure for the study Trust for the period July 2010 to December 2011 was 127.

The checklists reviewed had been completed for all patients with CDI from medical and surgical directorates. Patients with CDI from children and women's directorate were not included, as there were a limited number of cases who were admitted with, or developed CDI during the period in question. Inclusion would not have provided sufficient data to analyse or compare and contrast with the other directorates. Also as Phase 2 explored the perceptions of staff involved in the checklist review, it was important to explore the perceptions of staff who had been most involved in the process, which in this case was staff from the medical and surgical directorates. Examining the checklists from areas where the checklist had been used with greater frequency potentially provided insight into background questions for Phase 2. The findings generated from the checklists provided information on how the checklists were completed.

The checklist was undertaken initially on a daily basis and then less frequently depending on the patient's condition and severity of disease and if there were any concerns in relation to infection prevention and control precautions and the environment. The figure in chapter 2 (figure 2.4) illustrates the process. On occasions where there had been more than one patient with CDI on a ward area where the review was taking place, a checklist was normally generated during the review for each of the patients. Sometimes the person completing the review checklist included both patients' details on the same checklist. When the patient specific elements generated different responses these were included on the checklist in the patient assessment section. The standard precautions and environmental items would be included for the whole ward.

4.2 General Findings

The checklists examined were categorised by hospital site. 581checklists were competed for hospital A (63%) and 347 (37%) for hospital B. Both hospitals had a similar bed base at the time of the study, with hospital A having 425 beds and hospital B with a bed base of 430 (Care Quality Commission [CQC], 2011). However hospital A had a larger bed base for the combined medical and general surgical areas and was the designated acute site within the trust for surgery and trauma. This may have some influence on the overall numbers of checklists generated.

At the start of the retrospective documentary evaluation, both sites had similar specialities for medicine in terms of gastroenterology, cardiology, respiratory and complex care wards. However towards the end of the evaluation period, a reconfiguration of medical wards was undertaken with some specialities being concentrated on one hospital site only. For example gastroenterology, which was moved to hospital A site. Surgical checklist completion was greater for hospital A than for hospital B, which was probably associated with more acute and trauma patients being managed on hospital A site.

In the retrospective analysis, the number of checklists does not necessary correlate with the number of individual patients with CDI. The number of checklists could have related to severity of disease experienced by a particular patient, therefore requiring longer or more frequent visits by the IPCP and matron. Increased visits may have also have been related to concerns with staff compliance and environmental infection prevention and control aspects or related to concerns with the patients' condition and CDI. This again may have resulted in the requirement for more frequent visits. The checklists included all patients who had been admitted with CDI as well as those that acquired CDI as an inpatient. Acquisition of CDI was not always attributed to the acute hospital trust or to the particular ward area as patients do not always spend all their inpatient stay in one area.

Hospital B wards were predominantly 16 bedded ward areas. These were often with some wards linked as one overall unit for a speciality (on average 32 beds in total). For example the wards may have been ward 11a and 11b but linked in terms of medical speciality, such as medical complex care. The wards for hospital B were denoted as whether they were 11a, 11b, 11c or 11d for example, and were inputted onto the spreadsheet as separate ward areas. For hospital A, the average number of beds for each of the wards ranged from 23 to 30 with usually an 'a' and 'b' side. Most of the checklists for hospital A did not indicate if it the area on the ward was 'a' or 'b' therefore on data input only the ward number only was used,

for example ward 13. These factors were relevant in relation to data analysis and comparison of medical ward areas across each hospital site.

When comparing overall numbers of daily review checklists for medicine and surgery on each site, hospital A had 379 checklists completed for medicine (65%) and 202 for surgery (35%). This compared to 296 checklists for medicine (85%) and 51 for surgery (15%) for hospital B. Combining both hospitals resulted in a total of 675 checklists completed for medicine (75%) and 253 completed for surgery (27%). Figure 4.1 outlines the overall numbers for each of the hospitals and the specialities.
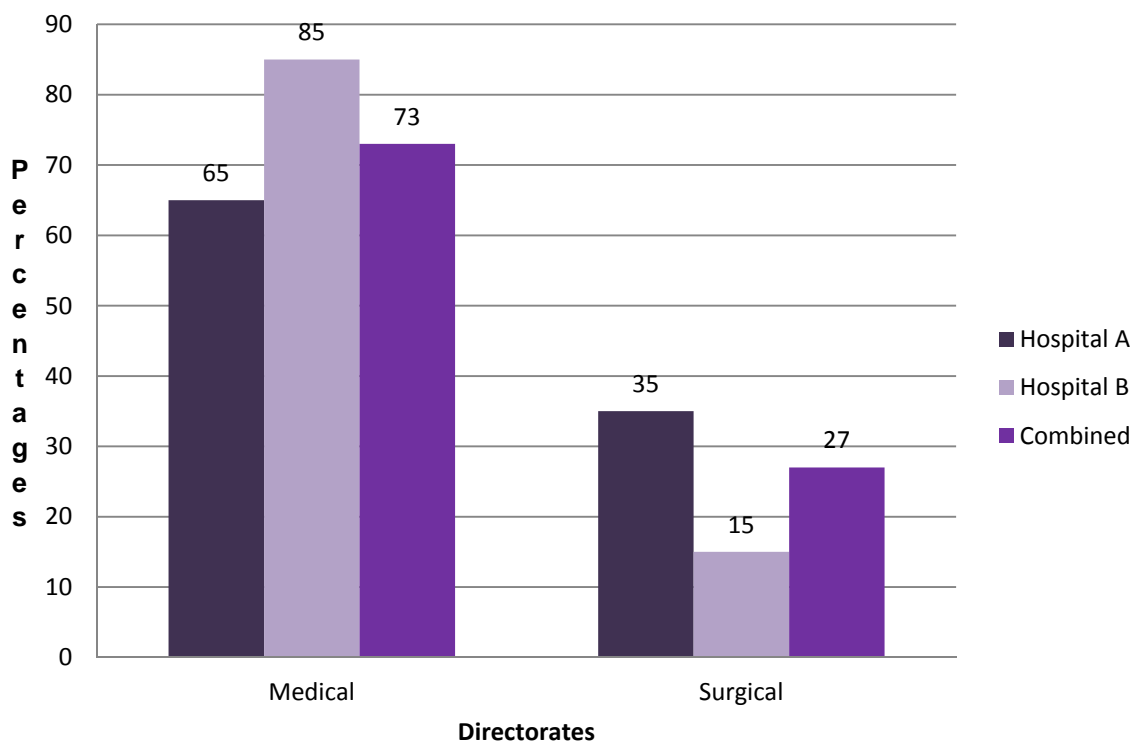
Figure 4.1: - Percentage Comparison of Medical and Surgical Completed Daily Review Checklists.

This compares to the evidence as more frequently medical patients are in hospital longer, tend to have or acquire more co-morbidities and often may require a greater number of courses of antibiotics. These are all risk factors for developing CDI (Bignadi, 1998). Of the surgical patients the highest percentage of completed checklists was in orthopaedics at 48% (n= 122).

The incidence of patients with CDI and completed checklists during the period under review (July 2010 to December 2011), all of the medical and surgical wards were included on the acute hospital site (hospital A). In hospital B one of the medical wards did not have any patients with CDI over the 18 month period. It is not unusual to have ward areas with little or no incidence of CDI. As discussed in chapter 2, since 2007 there has been a year on year reduction in CDI cases (PHE, 2013, b). Whilst the study Trust had seen an increase in 2010, up until then they had also seen a reduction in line with the national picture. The ward where there had been no cases of patients with CDI was a rehabilitation ward as oppose to an acute medical ward.

All of the surgical ward areas that had patients and had completed the daily checklist review were included in the study. Three ward areas (each 16 bedded areas) in hospital B had patients with CDI. There are only four surgical wards in total from hospital B site all of which accommodate elective surgical patients. In hospital A site all surgical ward areas had patients with CDI over the eighteen month period. As previously mentioned hospital B overall had fewer surgical wards and beds than those on hospital A which provided all the acute surgical and trauma beds.

4.3 Specific findings

The checklist findings were divided into a section covering environmental and standard precautions. This included checking the cleanliness of the sluice or dirty utility room as it is now often referred to. Standard precautions, moving and handling equipment, cleaning and isolation are also included. The checklist also incorporated the patient care section which included categories or elements linked to clinical and nursing care aspects. Table 4.1 provides the environmental and standard precautions sections of the original checklist demonstrating these elements (see checklist version 1, Appendix 1). The findings reported relate to specific elements from these sections, but not all have been included. The areas that have been included are those where there was some variation in compliance, or specifically related to Phase 2.

This checklist should be completed by the Matron & IPCN on a daily basis.

WARD DATE	COMPLETED BY		
SLUICE	YES	NO	Comments or Actions taken
All bedpan bases are clean and in good condition			
All commodes are clean – check underside, frame and foot rest.			
Apron and gloves are available			
Slipper pans are maceratable and not reusable			
Cleansing foam is single patient use (check cupboards/shelves for part used containers)			
STANDARD PRECAUTIONS			
Staff are washing hands with soap and water after contact with patient with diarrhoea.			
Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals			
Staff are wearing single use aprons and gloves when in contact with a patient and/or patient environment			
Staff decontaminate their hands prior to putting on PPE and with soap and water after removing PPE.			
All staff decontaminate their hands before and after any patient contact or different patient bed spaces.			
Clean linen stored in the linen store area only (not bathrooms/sluice/bays)			
Infected linen is disposed of correctly and is not left in the side rooms or bays.			
MANUAL HANDLING EQUIPMENT			
All manual handling equipment is single-patient use.			
CLEANING			
Tristel is being used at the correct dilution and is dated and timed (8 hour shelf life once made up)			
Side rooms are clean, free from dust/ spillages (check behind lockers, under beds and curtain rails)			
ISOLATION			
Patients with clostridium difficile are being nursed in the side room with the door closed and appropriate signage in place			
Used linen has been removed from the room			

Table 4.1: Environmental and standard precautions elements of the checklist (parts taken from full checklist).

4.3.1 Environmental elements of the checklist

When inputting the data, it was found that the checklists where the IPCP and or matron had ticked 'yes' for the environmental/standard precautions elements, this was not the only indication of compliance in those areas. Individuals completing the checklist may have made an annotation in the comments section rather than ticking the 'yes' or 'no' box. This did make coding more difficult during data input as the 'comments' section had to be examined for indication of compliance as well as for other data more qualitative in nature. The comments section on the checklist provided appeared to serve the function of useful or important feedback to the staff. From a personal perspective having being involved in the daily checklist review, it was also used to assist in documenting in the patient's notes and then when completing the IPCP data recording system once the checklist had been completed.

Section 2.8.1 in chapter 2 outlines data management of the checklist and figure 2.4 provides a flow diagram to illustrate the stages in the process.

From the environmental and standard precautions section, the findings presented are divided into the relevant subsections related to the checklist.

The Sluice or dirty utility room

The first section of the checklist relates to compliance with cleanliness in the sluice or dirty utility room. This aspect was included in the checklist because cross transmission can occur from contaminated equipment for example bed pans and commodes. Faecal matter that has not been removed can harbour micro-organisms and provide a potential vector for transmission either from patient to patient, patient to healthcare worker and health care worker to patient (Hardy, et al 2010). Whilst patients with CDI may have had access to an en suite toilet in their single room accommodation, they may have been required to use a bed pan if they were unable to use the toilet or a commode. If the single room accommodation was without on suite facilities they would have required a dedicated commode for use in the room.

All commodes or bedpans in use in the ward or unit were checked as well those used by the patient with CDI. There is potential for asymptomatic carriage of *C.difficile* by other patients through spores which are the transmissible element of *C.difficile* and can be produced from asymptomatic carriage (Freeman et al, 2010). Promoting clean and well maintained dirty utility areas and equipment can help prevent the spread of CDI and other micro-organisms more generally (HCC, 2006). Recent evidence has suggested that the environment may not always be a factor in the spread of CDI (NHS, England, 2014; Walker, et al 2012) (see chapter 2, section 2.8.3). There is still evidence that the risk of contamination is at its highest during episodes of diarrhoea (Walker, et al, 2012) therefore maintaining clean bed pans and commode chairs remains an important factor in the prevention of spread (HCC, 2007).

Bed pans

Figure 4.2 below demonstrates that out of a possible 928 checklists 87% (n=807) were found to have had been assessed and were recorded as bed pans clean and in good condition.

'Yes'   indicted compliance for that particular item;

'No'   indicated non-compliance;

'u/k'   indicated that the person completing that aspect of the checklist could not answer at the time of completion;

'n/a'   indicated that the item was not applicable, again at the time of the review;

'n/c'   indicates that that section of the checklist was not completed by the IPCP and or matron.

(See section chapter 3, section 3.21 data collection and input for an explanation of the categories included for data input).

n/c 39, 4%

n/a 2, 0%

u/k 2, 0%

No:, 80, 9%

Yes:, 805, 87%

- Yes:
- No:
- u/k
- n/a
- n/c
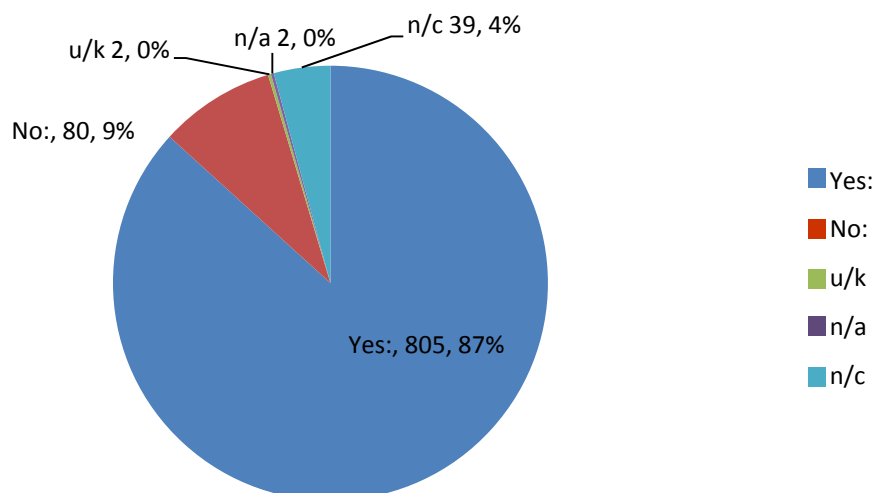
Figure 4.2: All bedpan bases are clean and in good condition.

Data inputting also made visible that there was no direct correlation between length of patient stay, the number of times the checklist was undertaken and the level of compliance. If problems or concerns were highlighted or identified on one occasion they may have been corrected on the following visit but on other occasions there may still be, or an appearance of concern around non-compliance.

Commodes

Non-compliance was greater in relation to commodes than with bed pans. Of all the checklists completed 18% (n=168) of the checklist indicated that commodes were found to be dirty or damaged with 78% (n=719) of the checklists recording that the commodes were clean (see figure 4.3). Commodes or sanichairs as they are also termed were often used as adjuncts over toilets to aide patient safety and comfort on the ward areas in hospital B. Dirty commodes on ward areas in hospital B was also linked when the toilet was found to be dirty. This information was sometimes highlighted in the comments section and not necessarily

included as a 'yes' or 'no' on the checklist. Dirty commodes and failures in general cleanliness were highlighted as areas of concern in both reports from the HCC relating to the two major outbreaks of CDI in Maidstone and Tunbridge Wells NHS Trust and Stoke Mandeville Hospital Buckinghamshire Hospitals NHS Trust respectively (HCC, 2007; 2006) and are seen as high risk concerns in terms of transmission.

If problems were identified with commodes, the respondent completing the checklist would include comments in the end column to highlight specific information. This also indicated the number of commodes that were found to be dirty or damaged. If a comment was included in the end column this denoted that the checklist element had been.
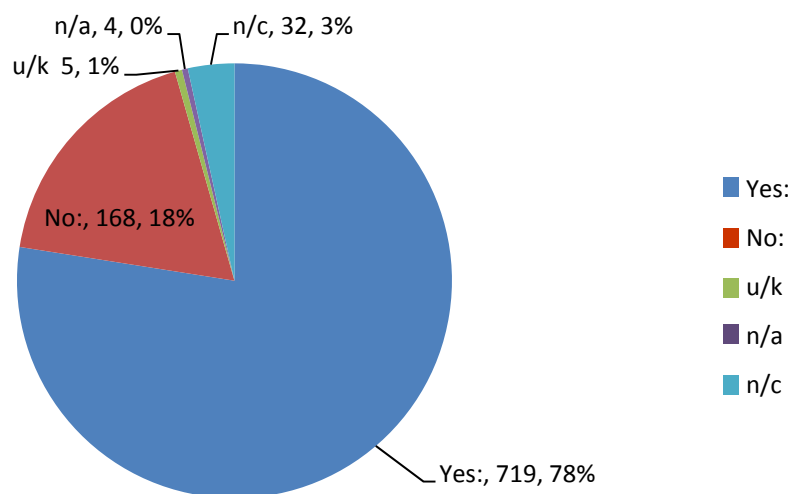
Figure 4.3: All commodes are clean.

The other element of the sluice or dirty utility room that provided information was the item relating to cleansing foam. This item also covered correct use and disposal of all single use items. Single use items that were left on the ward areas in inappropriate areas included cleansing foam, cleaning wipes, pads and shower gels. Staff were encouraged to ensure that minimum equipment was taken into communal areas for example bathrooms and side rooms to avoid potential transmission from cross contamination. This was for all patients and not just those patients with CDI. Figure 4.4 highlights the numbers and percentages with an overall positive score of 84% (n= 780).
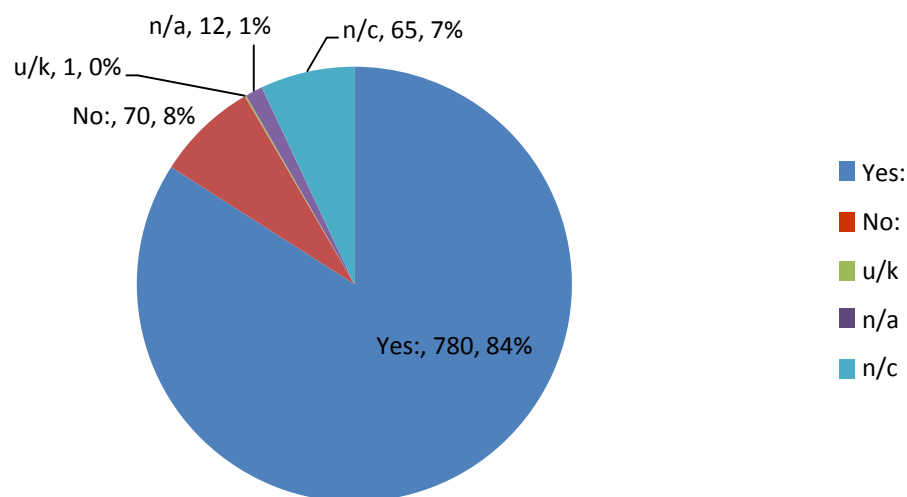
Figure 4.4: Cleansing foam is single patient use.

4.3.2 Standard Precautions

The standard precaution section of the checklist elicited information relating to care management and infection prevention and control precautions that should be undertaken at all times by all staff (RCN, 2012). Many of the statements within this sub section of the checklist were linked to epic 2[24] guidelines (Pratt et al, 2007), the HII for *C.difficile* (DH, 2010, a) and '*Clostridium difficile* infection: How to deal with the problem' (DH, 2008, a). Included in the checklist were aspects relating to hand hygiene compliance. The first statement on the checklist relates to staff washing their hands with soap and water after contact with patients with diarrhoea. Whilst the percentage of 'yes' to this question was only 75% (n= 695), there were only 8 (1%) of the checklists that generated a 'No'. IPCP's or Matrons completing the checklist often completed the response unknown (u/k) if they had not witnessed this aspect of practice at the time of the review process (see figure 4.5.). 'Not witnessing' was usually indicated in the comments section of the checklist.

---

[24] epic 2 has recently been updated to epic 3 (Loveday et al, 2014) as previously highlighted.
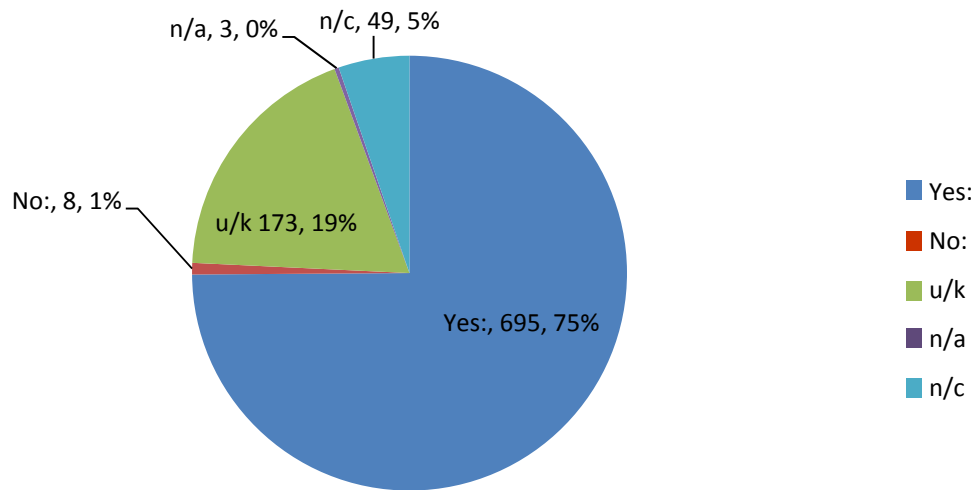
Figure 4.5: Staff are washing hands with soap and water after contact with patient with diarrhoea.

There was also a high level of 'unknown' responses for the item relating to whether staff offered hand washing facilities after using the toilet or before meals. If the IPCP or matron whilst undertaking the DRCP were unable to ascertain this, they indicated that it was not observed or similar words. However staff may have discussed this element of the checklist with staff and indicated again in the comments section. This resulted in a higher level of 'unknown' (u/k) responses (265: 28% respectively) rather than 'no' (8: 1%). This is illustrated in figure 4.6.
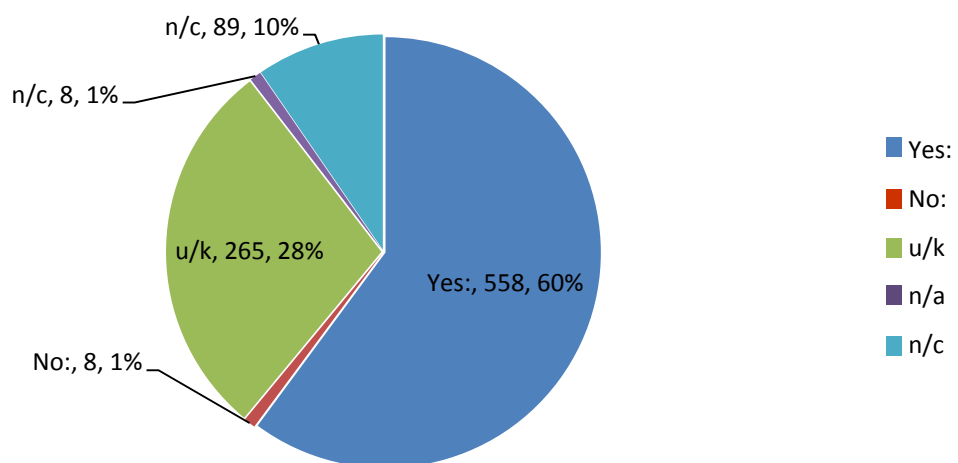
Figure 4.6: Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals.

Figure 4.7 illustrates the responses to the item relating to the use of personal protective equipment (apron and gloves in this case). This was described on the checklist when in contact with the patient and or the patients' environment. Whilst the overall compliance was 74% (n=686) as can be seen from figure 4.7 the checklists generated 18% (n=166) in the 'unknown' (u/k) category. If the IPCP or matron during the DRCP did not observe the use of PPE during the DRCP then the IPC or matron may have included unknown.
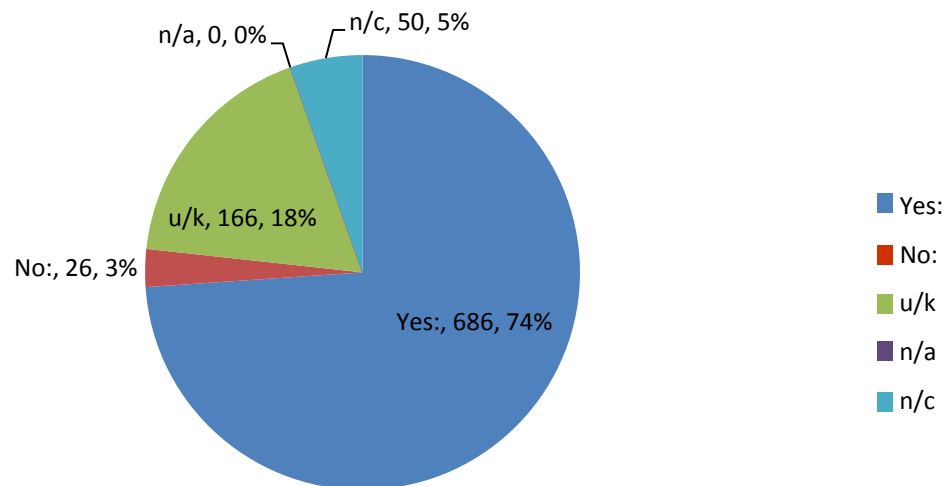
Figure 4.7: Staff are wearing single use aprons and gloves when in contact with a patient and/or patient environment.

4.3.3 Cleaning in the ward or unit and isolation of patients

Figure 4.8 shows the responses in relation to the use of chlorine based cleaning product used for CDI. Spores produced by the bacteria are particularly difficult to eliminate and whilst there is more recent evidence questioning the efficacy of chlorine based products the DH (2008, a) and more recently PHE (2013, a) still advocate their use as a cleaning product the management of CDI. As can be seen from figure 4.8, the majority of responses in relation to whether Tristel®[25] was being used in the correct dilution and dated and timed were 'yes' (82%:764) or 'No' (14%:128). One of the main issues from the data collected from the checklists in relation to the use of Tristel® was that the date and time was not always entered on the container or on a designated document that provided this information, making compliance levels unclear if the product was in date or not. This led to a negative response being included on the checklist. Ward staff did some times record that the solution had been made up at a specific time. If the date and time were not been recorded it was assumed that

---

[25] Tristel® was the Chlorine based solution of choice used at that time in the local trust.

the solution was not in date and the solution was made up again. The 'correct dilution' relates to the product being made up correctly. The nature of this particular chlorine based product is that it should be diluted into 5 litres of cold water in order that it is used effectively and safely[26].
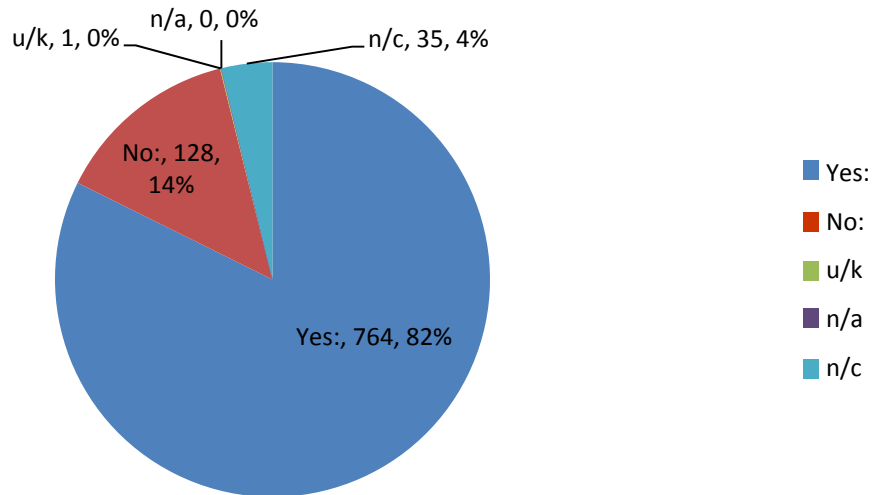
Figure 4.8: Tristel® is being used at the correct dilution and is dated and timed.

Figures 4.9 and 4.10 report items related to isolation or side rooms (the usual term used on the checklist as used in the checklist). Figure 4.9 shows responses to the item relating to whether or not the side room was clean and free from dust and spillages. 16% (n=154) of the checklists completed in the designated time frame had 'No' recorded for this element. This was the second highest aspect of non-compliance (after the first highest level of non-compliance; the number of commodes found clean). The issues identified in relation to side rooms that had generated a negative response on the checklist during the review, was related to clutter. Inappropriate items were sometimes left in the rooms which included patient related equipment which could become contaminated.

Figure 4.10 show the responses to the items concerning isolation rooms, door closure and signage. This was found to be highly compliant (93%:866) indicating that staff were aware of the requirement to isolate patients as well as the door being kept closed. 'Soap and Water' as well as 'Standard Isolation'[27] signage was used throughout the study Trust at the time and

---

[26] Information downloaded from the Tristel® website http://www.tristel.com/wp-content/uploads/2012/05/Tristel-Fuse-Surfaces-Factsheet-Export-ENG-Issue-3.pdf Aug 2014.
[27] Local policy has now been updated in 2014 with the use of 'contact precautions' as part of transmission based precautions instead of the term 'standard isolation' for patients with CDI (Health

was standard guidance in local policies for both the management of multi-drug resistant organisms and for patients with CDI soap and water signage was also indicated for patients with any diarrheal illness. *C.difficile* in spore form is not destroyed by alcohol gel and the signage in relation to soap and water is intended to educate relatives and visitors as well as staff regarding the importance of using soap and water (DH, 2008, a). Patients with initial symptoms of diarrhoea may not have a definitive diagnosis, hence the rationale for the recommendations for soap and water hand wash for all patients with diarrhoea. This was reinforced in the local CDI policy and patient and relative information leaflets and is included in the 'SIGHT' mnemonic (DH, 2008, a; PHE, 2013, b).
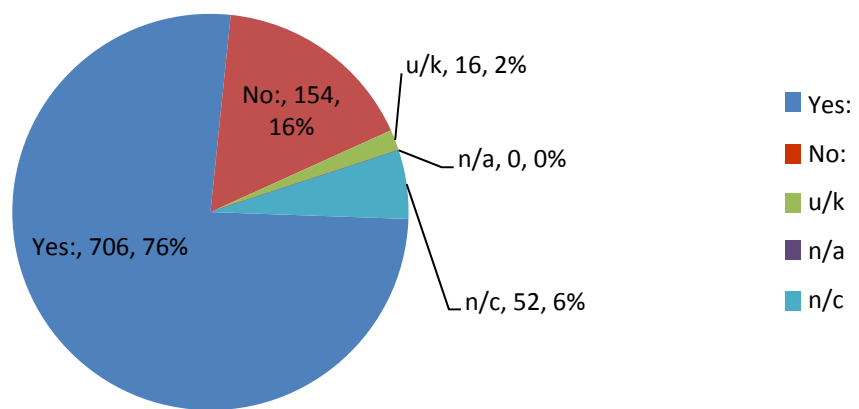
Figure 4.9: Side rooms are clean, free from dust/spillages.

Protection Scotland, 2014). The use of soap and water signage for patients with CDI is still used in the study Trust.
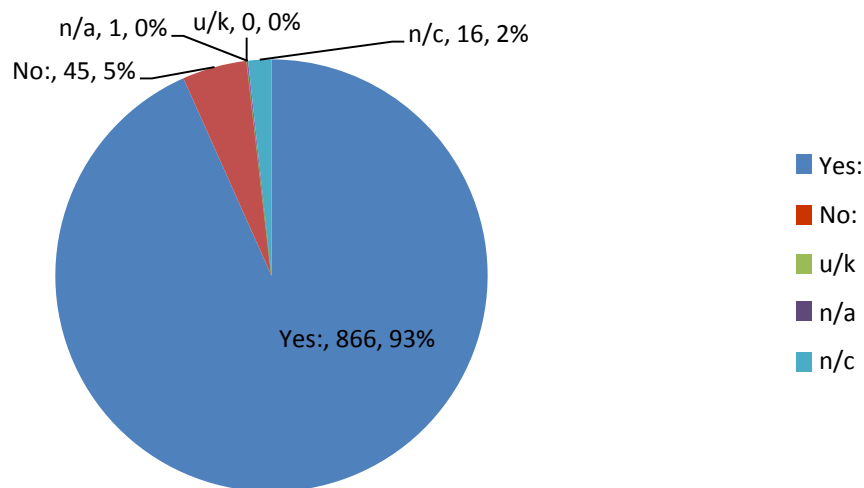
Figure 4.10: Patients with *C.difficile* are being nursed in the side room with the door closed and appropriate signage in place.

4.4 Checklist completion and Non-compliance

Whilst it is interesting to compare compliance or the number of positive responses to the different items included in the checklist, this does not necessarily indicate that the other responses indicated non-compliance. Certain aspects or items on the checklist did not fall neatly into a 'yes' or 'no' category for a variety of reasons (unknown [u/k]; not completed [n/c]; not applicable [n/a]). Figure 4.11 shows the percentage of 'No' responses for the environmental aspects of the checklist that were examined. The highest percentage of non-compliance was associated with commode cleanliness (18%; n= 168) and if the side rooms were clean and free from clutter (16%; n=154). Cleanliness in relation to bedpans and commodes referred to clean to the naked eye and free from organic matter, debris and stains. This also applied in relation to side rooms but would also include high and low surface dust. In terms of the literature and cleanliness, clean is defined as: 'Free from all visible removable dirt including dirt, dust, stains, adhesive residue, litter, blood or other body substances, hair, cobwebs, insects, food debris, grease, scum, smears and spillages of liquids or powders....' (NHS England, 2014, b, page 15). This definition is used in the Patient-led assessments of the care environment (PLACE)[28].

---

[28] PLACE inspections replaced the Patient environment action team (PEAT) inspections. These see the involvement of local people alongside health care personnel visit hospitals to ensure the quality of the patients environment. Cleanliness is one of the areas that is inspected (NHS England, 2014, b). Downloaded from http://www.england.nhs.uk/ourwork/qual-clin-lead/place/ Downloaded Sept 2014.

The lowest rates of non-compliance were side room door closure, use of appropriate signage on doors and that used linen had been removed from the room (5%:45).
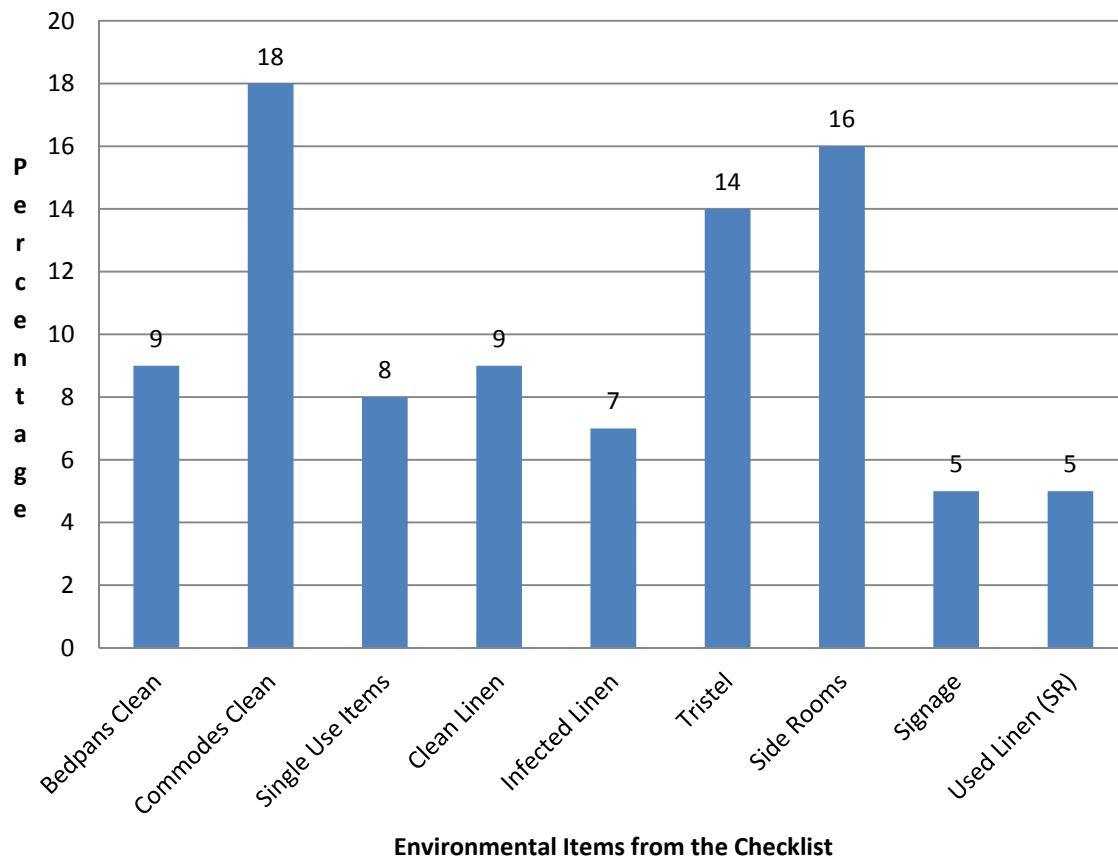
Figure 4.11: Percentage of non-compliance for the environmental items of the checklist.

4.5 Patient care elements of the checklist

The patient care section of the daily review checklist was divided into clinical and nursing care aspects. For example 'medication', 'temperature' and 'abdomen' represented clinical assessment aspects and 'daily bed bath/hygiene care' and 'daily linen change' related to patient care. Some of these items were worded differently in that they did not include a positive statement forcing a 'yes' or 'no' response as with the environmental/standard precaution elements. They used words as shorthand, for example 'abdomen' and 'temperature' to indicate a nursing required activity or interaction. The preceding statement in the checklist asked that these specific activities or interventions were checked with the nurse in charge indicating suggesting that it acted more as a prompt for the IPCP or Matron to ensure that checking this was undertaken. Any abnormal findings were then documented and acted upon either directly or delegated to the ward staff. These actions were annotated

in the 'comments' section of the checklist. Examples of the patient care items taken from the original checklist are included in table 4.2.

PATIENT CARE			
Care plan and patient information leaflet provided			
Discuss with Nurse in Charge re. patients condition to include:			
Abdomen			
Temperature			
Nutritional status			
Pressure ulcer risk assessment			
Fluid balance			
Daily bed bath/hygiene care			
Daily bed linen change			
Stool chart – document type of stool			
Medication			

Table 4.2: Excerpt from the original checklist demonstrating the patient care elements.

On examination of the data from the patient care items, there was inconsistency in responses by the IPCP's and/or matrons completing the checklist. Some of the IPCPs and matrons appeared to interpret these items literally. If the patient for example, was pyrexial or were complaining of abdominal pain then they answered 'yes'. Others highlighted the 'yes' box for example in the 'temperature' category, to denote that a temperature reading had been recorded. They would then comment if the patient was pyrexial or if the reading was within normal limits (apyrexial) in the 'comments' section of the checklist. When extracting data these were both classed as a positive response. A negative response was included if the checklist had been ticked as a 'no' which indicated that staff had not competed or there was no documentation to indicate that staff had completed the particular reading, recording or measure. As with the other elements in the environmental and standard precautions section not applicable (n/a) or not completed (n/c) or unknown (u/k) could have been entered into the data base dependant on what was included on the checklist.

Abdomen (89%:820), medication (89%:826) and temperature (88%:815) were coded positively due to the number of 'yes' scores given, indicating that these elements had been checked by the ward staff and the IPCPs and matrons had included this on the checklist during the review. The medication element when ticked as 'yes' did not always indicate that the patient was on medication specifically for CDI. Often the comments section on the checklist would include any relevant medication and that may be named as well.

The problem for coding with the temperature, abdomen and medication items was that often the IPCP or matron would use the 'yes' to indicate that they had checked these aspects and not necessarily that the ward staff had checked these vital signs. The response and interpretation was dependant on the IPCP or matron who completed the checklist during the DRCP, making analysis difficult. This is discussed in chapter 5 (discussions and summary Phase 1).

The other clinical categories included nutritional assessment, pressure ulcer risk assessment, fluid balance and stool chart. The IPCP or matron most frequently indicated 'yes' if these assessments or charts had been completed and were up to date and 'no' if they had not been completed. This made it easier to extract poor or non-compliance related to these categories. This is shown in figure 4.12. The highest percentage of non-compliance where staff had failed to document these assessments, were in the pressure ulcer risk assessment category (17%:160).
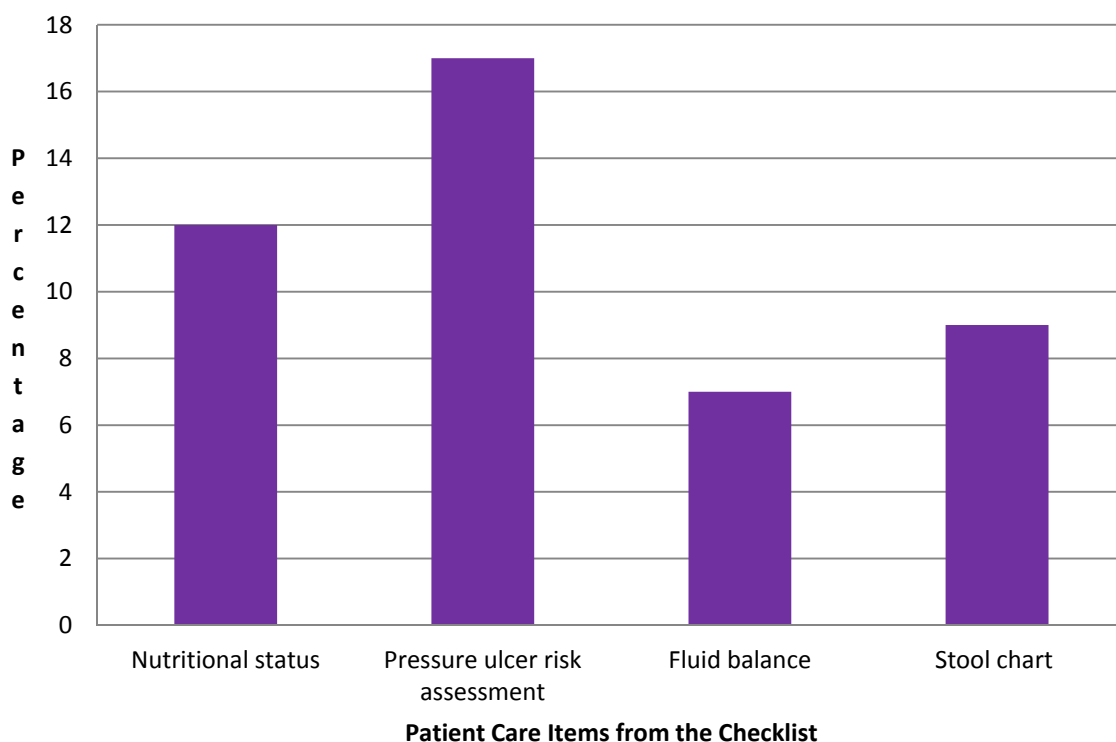
Figure 4.12: The percentage of non-compliance (item not documented that it had been completed by ward staff) for Nutritional Status, Pressure Ulcer Risk Assessment, Fluid Balance and Stool chart.

In terms of the nursing care elements for example 'daily bed bath/hygiene' and 'daily linen change', overall these had the best compliance with 86% (n=794) and 84% (n=783) respectively (see figures 4.13 and 4.14). These elements were similar to nutritional status,

pressure ulcer, fluid balance and stool chart in that 'yes' indicated that this aspect had been completed.
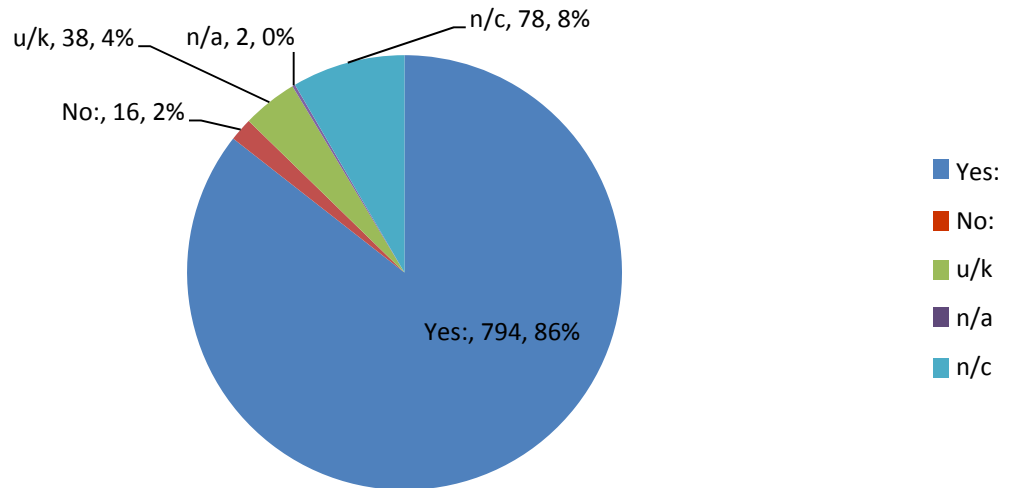
Figure 4.13: Daily bed bath/hygiene care.
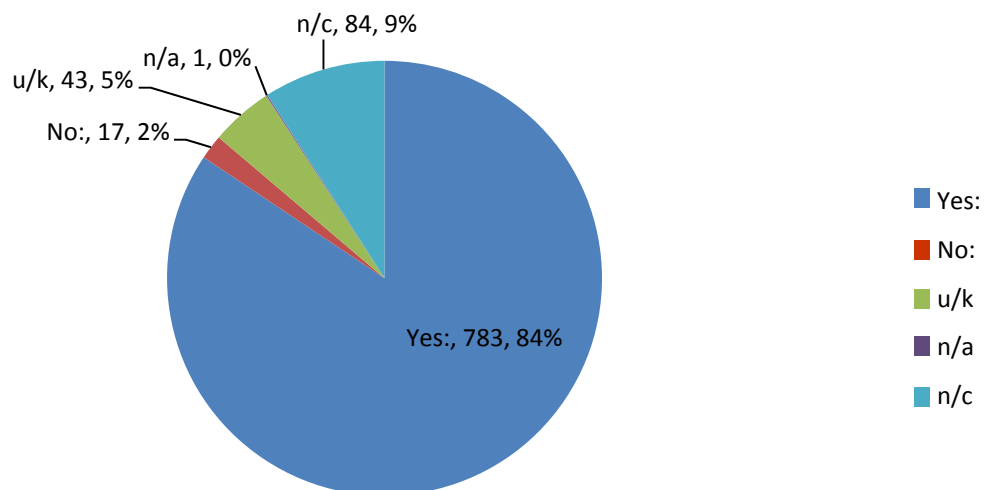
Figure 4.14: Daily bed linen change.

4.5.1 Non completion (n/c) of checklist elements.

The data extracted from the patient care section was incomplete therefore it was not possible to demonstrate compliance and non-compliance for each item. Nevertheless the data provided some insight into the variety of ways that the checklist was completed during the checklist review especially where aspects of the checklist were not completed (n/c). One of the highest areas of non-completion (n/c) was the 'discussion with the nurse in charge' (42%: 390) followed by whether or not there was a care plan available (30%:279). In relation to 'discussion with the nurse in charge', one of the main purposes of the checklist was to feedback and inform staff about both the patient care elements and the general state of the environment. Non-completion in these instances could have been a consequence that the person completing the checklist omitted to document on the actual checklist that the issues had been discussed with the nurse in charge.

The IPCP or matron may have discussed concerns with the nurse looking after the patient as opposed to the nurse in charge and therefore may have not indicated with a 'yes' or not included any information in the comments section. An alternative interpretation is that failure to document the checklist may have been because the IPCP and/or matron could have documented their findings in the patients' medical and nursing notes and failed to repeat this information in the checklist. Patient notes were not cross referenced at the time of the study and the retrospective documentary analysis as no patient details were included on any of the checklists used. Another explanation for not completing this item on the checklist may have been because no discussion occurred either because the IPCP and/or matron had no concerns at the time or they were unable to discuss issues due to nurse availability at the time of undertaking the checklist review. These possible outcomes are based on my involvement in the process and anecdotal information provided by IPCP and matron colleagues.

All other elements within the patient care section for example, abdomen, temperature, nutrition, pressure ulcer risk assessment, stool chart and medication on the whole had been completed on the checklist by the IPCP or matron. The highest percentage of non-completion was 16% (n=148) for nutritional assessment (see Figure 4.15). It is important to point out that in this refers to non-completion (n/c) on the checklist by the IPCP or matron. It does not necessarily indicate that the ward staff had not undertaken those aspects of care management on the patient care plans. Failure to undertake the assessment and or document the findings by the ward staff would have been reported on the checklist as 'no' or in the comments section and inputted as 'no' in the data extraction.
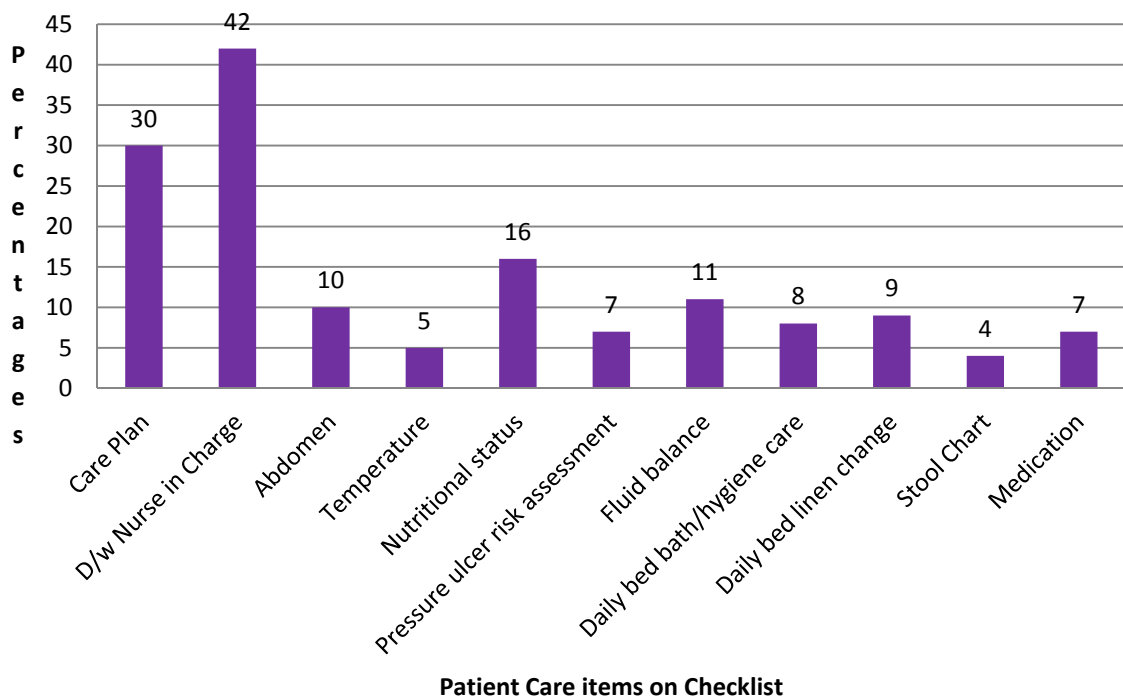
Figure 4.15: Percentage of non-completed (n/c) elements by the IPCP or matron on the checklist of the Patient Care Section of the checklist.

4.6 Findings from the 'Comments' section of the checklist

The comments section at the end of the checklist generated a large amount of qualitative data. Most of the information recorded on the checklists indicated if the item had been completed with a 'yes' or 'no' response. Whereas the comments space on the checklist provided an opportunity for the IPCP or matron to provide more detail. In the environmental/general section for example the IPCP and matron may have chosen to include details around disposal of single use items where they were found and any subsequent actions taken. These actions could have included the items were removed and feedback given to staff as to the importance of removal of single use items. This category in the environmental and standard precautions section (sluice sub section) asked specifically about single use cleaning foam. However information included on the checklist also mentioned other single use items that may have been left in the ward areas or bathrooms for example cleaning cloths and incontinence pads. These items were examples of items that were included on the checklists during data extraction.

The patient care section generated more details related to physical status information, for example: temperature and whether or not a patient had a distended abdomen or was experiencing abdominal pain. The comments also included any action that the IPCP or Matron took or instigated. An example was if the patient's abdomen had been distended or the patient had complained of abdominal pain, the IPCP or Matron included this specifically in the comments section. The comments then included what actions were undertaken, for example the nurse in charge was informed or the doctor was informed.

Actions taken were included in the comments section in relation to the environmental elements. An example was whilst undertaking the checklist review, if an IPCP or matron found a dirty commode the IPCP or Matron would have cleaned the commode and would document that they had done so. Other examples included where the IPCP and or matron requested the nurse on the ward to undertake the action. This information was recorded on the comments section of the checklist.

On analysis it was found that there was variation on how the comments section was completed by individual IPCPs and Matrons. In some instances it was also completed differently on separate occasions by the same individual. This variation could be influenced by the findings of the checklist review at the time. Some IPCPs and matrons if no problems were identified and no actions had been required did not include any comments in the comments section. Other IPCPs and matrons included positive comments as well as clinical data, for example an actual numeric temperature recording (37.7) or a descriptive temperature statement (pyrexial).

The 'stool chart' whilst not always a reliable indication of severity of disease due to the potential for inaccuracy (PHE, 2013, a; DH, 2008, a) provided an up to date record of the patients stool type and frequency which has the potential to assist with the overall picture of disease severity. The comments section of the stool chart item included type of stool and frequency as well as indicating if the staff had been documenting this information on the stool chart (stool type is discussed in detail in chapter 5, section 5.5.2).

The comments section may have also been used if the 'yes' or 'no' sections for any item were not applicable. If this was the case a reason as to why the category was not applicable. The comments section also included comments that assisted in whether the response was positive or negative if the 'yes' or 'no' box had not been completed. For example the IPCP or matron may have not indicated 'yes' or 'no' as to whether the commodes were clean. Instead the IPCP or matron wrote a comment in the comments section stating that two commodes

had been found to be dirty and were cleaned at the time of the checklist review. This should have prompted a negative response in answer to the question 'all commodes are clean'.

4.7 Secondary analysis of the environmental/standard precautions elements of the checklist

Secondary analysis was undertaken in order to provide further insight into the findings of the documentary analysis of the checklist used in the review. Glass (1976) maintains that secondary analysis is a means of looking at the data with a new set of questions or with new ideas whereas Robson (2011) argues that secondary analysis is usually a different researcher re-examining old data. In this case the data were re-examined with a different set of questions or areas to explore. The reason for undertaking this was to see if there were any relationships between the areas of poor compliance. The secondary questions also assisted with the design of Phase 2 of the study as it helped to identify areas that had increased exposure to the checklist. This assisted with purposeful sampling for Phase 2. It also increased my understanding of the risk factors that are associated with CDI.

The data were checked to establish which specialities in both of the hospital sites had generated the most completed checklists. In both hospital A and hospital B, the areas with the most completed checklists were medical wards. Two areas on hospital B site (equivalent to one overall ward on hospital A site) had the highest number of checklists completed in the time frame with a total of 115 (12.4%) of the total completed checklists in the time frame. The ward area with a similar overall bed base on hospital A site had only one less with 114 (12.3%) checklists completed over the same period. Both of these ward areas were associated with long stay complex care medical patients. The specialities may have accounted for the greater number of checklists completed as patients tend to be inpatients longer in those areas.

In the surgical division, the orthopaedic wards combined had the highest number of checklists completed with a total of 122 (13% of the total) including ward areas across both hospital sites. However the ward with the largest number of checklists completed in the surgical division was a general surgical ward with a total of 43 (5%) checklists over the time period.

4.7.1 Comparisons between environmental elements of the checklist

Analysis and comparisons of individual elements of the checklist were undertaken for each of these two medical areas with the highest numbers of checklists completed on each of the hospital sites. The items chosen from the checklist were the three areas where there had been identified as the most frequent non-compliance. This included comparing the total number of checklists that highlighted dirty or damaged commodes, the number of checklists where a chlorine based solution was not available or not dated and timed and finally where there was a lack of cleanliness or clutter in the side rooms. These were each broken down for each of the two medical areas.

Hospital A medical ward had a record indicating that there were 23 occurrences when the commodes were damaged or dirty. This equated to 20% non-compliance compared to the overall non-compliance rate of 18%.

Hospital B medical ward had a total of 31 occurrences of dirty or damaged commodes with a percentage of 27% compared to the overall non-compliance rate of 18%. This in contrast was greater than the medical ward in hospital A and the hospital average.

However it is important to mention at this stage that at hospital B site the commodes or sanichairs were often used as moving and handling aids over the toilets in the bathroom areas and could become splashed with urine. This meant that the commodes were classed as dirty if someone had just been to the toilet at the time of the checklist review and no one had yet been in to clean the toilet area. This indicates increased and alternative use of the commode or sanichairs in hospital B.

Non-compliance in relation to the chlorine based solution being made up and in time/date for both of these medical wards tended to be better than the overall non-compliance. There were 7 instances out of 114 (6%) on hospital A medical ward that did not have any chlorine based solution made up or the solution had expired. Hospital B medical ward was slightly higher, with 12 out of 115 (10%). These were both less than the overall figure of 14% (n= 128) for non-compliance in relation to the chlorine based solution being made up correctly and in unexpired.

The mean percentage level of non-compliance for acceptable standards of cleanliness and tidiness overall for the combined wards and sites was 16% (n=154). Comparing the two highest checklist completion areas hospital A medical ward obtained 12 out of 114 records

(10%) indicating non-compliance. Whereas hospital B medical ward was judged on 29 out of 115 occasions (25%) below the acceptable standard for side room cleanliness and tidy. An explanation could be that hospital B site wards and storage areas tended to be smaller in terms of overall ward size and has limited storage but this is not the case for the side room size.

4.7.2 Correlation between different environmental elements of the checklist

Other secondary analyses included comparing different aspects of the environmental section of the checklist to examine if there was any link with non-compliance between the different items. This again was undertaken using the data from the two medical wards that had the highest number of completed checklists. For example if the chlorine based product was unavailable or not made up and in date, was this associated with an increased number of dirty commodes observed during the checklist review.

Another aspect examined was in relation to cleaning standards and general tidiness of side rooms as these were where the patients with CDI were nursed. Again these findings were compared with the availability of chlorine based solution and if it unexpired. Whilst domestic staff made up the chlorine based solution for their own use in order to clean the side rooms, general tidiness and equipment cleaning was the domain of the nursing staff on the ward areas. Other areas that were compared included if there was any correlation between a lack of cleanliness of commodes and a lack of general cleanliness and tidiness of side rooms. This may have indicated a lack of attention to detail in those areas.

On comparing all of these aspects for the two medical wards that generated the highest number of checklists, there appeared to be no direct links. The only tentative link was between dirty or damaged commodes and side room untidiness/lack of cleanliness. In hospital A ward this was 4% (5 occasions out of 114 where both these elements demonstrated non-compliance) and 5% for hospital B (6 out of 115 checklists where both were present).

4.8 Conclusion

The total number of checklists generated in the 18 month period was 928. From these checklists the highest compliance was for signage being available on the door and the door closed and used linen had been removed from the side room where the patient with CDI was

being nursed (95%: 882). The highest non-compliance was whether or not the commodes were clean and this percentage was 18% (n=167). These numbers refer to the numbers generated from the checklists as being compliant or non-compliant and does not relate to the number of actual commodes for example that were found to be damaged or dirty. The highest number of checklists was generated from medical areas. Two medical wards, one from each of the hospital site also generated the most checklists from individual ward areas. However the findings have also illustrated some of the reliability issues with the checklist and data collection for Phase 1. These issues and discussion of the findings are explored in more detail in chapter 5.

Chapter 5
Discussion and summary - Phase 1

5.1 Introduction

The findings generated from Phase1 and outlined in the previous chapter highlight the specific data from the checklists comparing hospital sites, medical and surgical areas and specific wards with the highest numbers of checklists generated. The findings also included compliance and non-compliance rates of specific items included in the checklist. This chapter will discuss and compare these findings to the literature and also highlight issues in relation to reliability of the data produced from the checklists analysed over the 18 month time frame.

5.2 Comparisons of the two hospital sites within the trust

As highlighted in chapter 4, there was a marked difference in the numbers of checklists generated across the two different hospital sites even though the bed base are of a similar size (CQC, 2011). In comparing the actual number of patients with CDI in the two hospitals during the study period, hospital A had 94 cases with hospital B having had 33 cases of CDI for all patients admitted with or acquiring CDI whilst a hospital inpatient. This compares with the checklists generated with hospital A having the highest number of checklists and the highest number of cases of CDI over the eighteen month period. It also links in with the more acute nature of patients admitted to hospital A.

There is evidence that suggests that more acute hospitals with longer length of patient stay and greater number of patient co-morbidities are associated with a higher incidence rate (Gilca et al, 2010). This correlates with the higher incidence of CDI in medicine as oppose to surgery in the study Trust.

5.3 Comparisons between medical and surgical areas and comparison with actual CDI rates

The areas with the most checklist reviews were undertaken on acute medical wards or complex care areas of medicine. In examining the actual number of patients with CDI in each of the specialities over the eighteen month time period, medicine had the highest number of patients with CDI with a total of 78 cases. Surgical areas had a total of 50 cases (these areas both include patients admitted with and acquiring CDI whilst a hospital inpatient). Comparisons of the CDI rates for study period (June 2010 to Dec 2011) the

preceding 18 months (Jan 2009 to June 2010) and the 18 month period after the study date (Jan 2012 to June 2013) for both medicine and surgery are illustrated in figure 5.1.

Eighteen month periods were compared as this was the time frame used for the study period. As can be seen from the data the higher incidence of CDI was in medical areas throughout all three 18 month periods with a more significant reduction in rates in medicine between each of the three time periods especially between Jan 2009 to June 2010 and July 2010 to Dec 2011 (162 cases to 78). The fall in surgical cases is less significant between those periods (54 to 50 cases). However the reduction is more significant in surgery between the periods July 2010 to Dec 2011 and Jan 2012 to June 2013 (50 to 22 cases). As discussed in chapter 2 the study Trust saw a year on year reduction in numbers since 2007 in line with the National picture (DH, 2008, a) (See chapter 2 section 2.6).
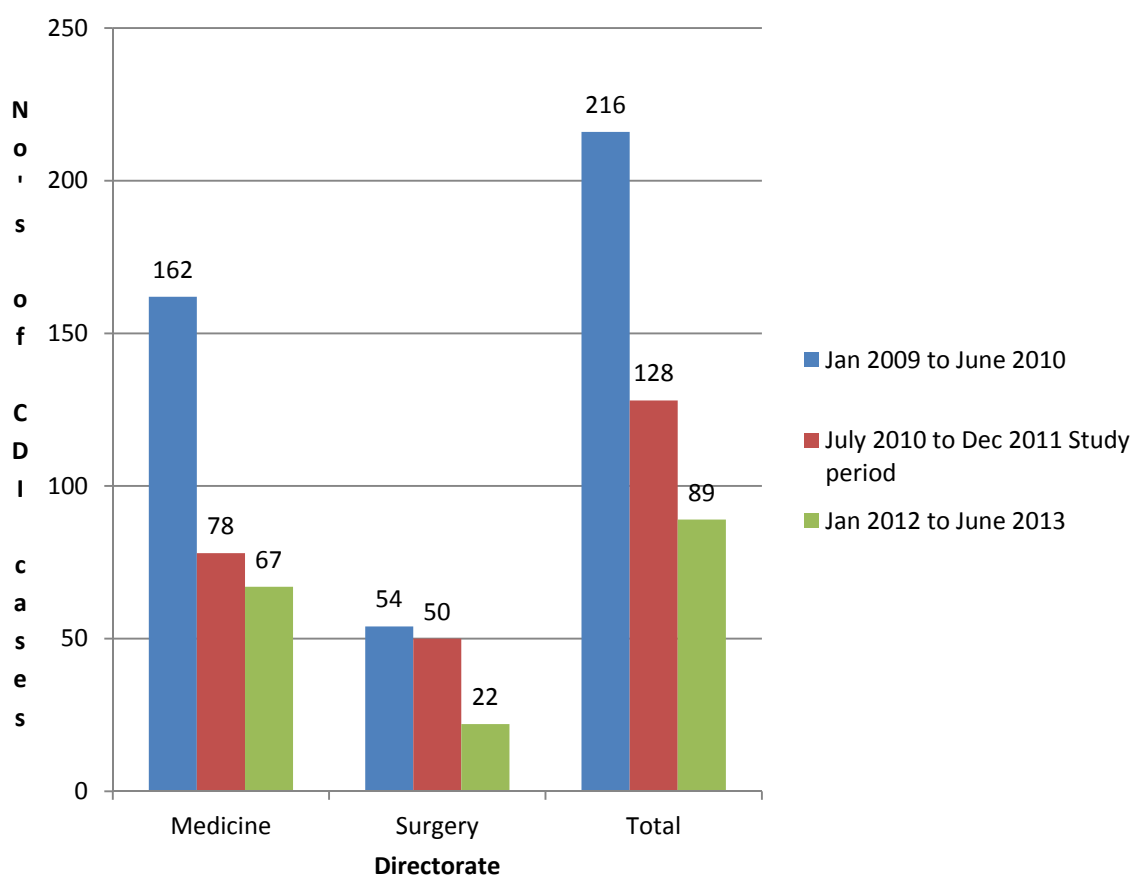
Figure 5.1: Comparison of CDI rates between medicine and surgery for the periods prior to, during and post study periods (18 month periods). [Data includes hospital acquired and patients' admitted with CDI].

The higher rates of medicine compared to surgical areas is supported by the literature that medical areas are more likely to have the highest number of patients with CDI as they tend

to have more patients with increased co-morbidities and risk factors associated with CDI (Gilca et al, 2010; MacDonald, et al 2010).

Many of the rehabilitation areas in the study Trust had few or no patients developing CDI. Although 'hospital stay' is a risk factor for developing CDI, other factors such as severity of underlying disease and number of different antibiotics and duration of antibiotic therapy are all also risk factors (Price et al, 2007). Many patients once admitted to rehabilitation areas, tend to experience fewer acute problems but may still have chronic underlying disease. However anecdotally patients in these areas are less likely to need antibiotic therapy and are less likely to have other acute interventions.

The largest number of checklists completed in the surgical areas was in the orthopaedic division (48%: 122). The wards in the orthopaedic division that had the highest number of checklists completed were areas with a higher proportion of patients admitted with fractured neck of femur. These patients tend to be elderly and are more likely to experience co-morbidities (MacDonald, et al 2010). There is also the potential for increased antibiotic use in these areas due to the nature of the surgery and the potential for post-surgical complications for example pneumonia and urinary tract infections (Campbell, et al 2013). These factors increase the risk of developing CDI. Campbell et al (2013) found that the use of antibiotics and PPI's can increase the risk of developing hospital acquired CDI, but also the length of time in hospital prior to surgery was also a significant risk factor for developing CDI. This links with the data from this study with the wards with patients with fracture neck of femur accounting for 9% (n= 85) of the total completed checklists. From all the orthopaedic wards, the numbers of completed checklists generated from wards where there were fractured neck of femurs accounted for 70% (n=85).

5.4 Environmental/standard precautions elements of the checklist

This discusses the individual items of the checklist highlighted in chapter 4 and compares and contrasts the findings of this study with supporting evidence.

5.4.1 Compliance and commode cleaning

Both of the HCC reports published following the two major CDI outbreaks (HCC, 2007; 2006) outlined the impact that the clinical environment had on the outbreaks of CDI. They particularly highlighted commodes and bed pans as a source of cross transmission. The

evidence highlights *C.difficile* spores are a risk in terms of means of transmission (Weber et al, 2011; Freeman et al, 2010; Vonberg et al, 2008).

In this retrospective documentary analysis of checklists, the commodes or sanichairs had the highest percentage of non-compliance in relation to soiled or damaged commodes (18%; n= 168). The HCC (2007) outline findings from Maidstone and Tunbridge Wells NHS Trust and an audit that the Trust had undertaken in September 2006. The audit demonstrated that 98% of commodes were found to be soiled (only a percentage is provided by the report by the HCC; no actual numbers). Whilst the audit undertaken by the HCC (2007) refers to actual numbers (given as a percentage) of soiled commodes found, the retrospective analysis in this study refers to the number of occurrences of soiled or damaged commodes as oppose to actual numbers. This study also included reports of damaged commodes whereas the HCC (2007) audit reports soiled commodes. The commodes referred to in this study only include those where the checklist had been undertaken and not across the whole of the study Trust as with the audit outlined by the HCC (2007). Finally the checklists in this study were examined over a longer period of time (18 months). The audit that the HCC refers to was undertaken during a one month period in September 2006. The fact that dirty or damaged commodes included the highest rate of non-compliance reinforces the importance of a consistent approach to sustained good infection prevention and control practice. The DH (2008, a) guidance outlines that the heaviest contamination of faecal matter is often found on areas such as commodes and highlights the importance of adequate cleaning with the appropriate solution in an effort to reduce the risk of transmission.

5.4.2 Hand Hygiene practices

Hand hygiene was examined both in terms of staff undertaking hand hygiene at the appropriate time and using the correct solution as well as patients being offered hand hygiene facilities after using the toilet and prior to meal times. Overall compliance was 70% (n=650) for staff washing their hands with soap and water after contact with a patient with diarrhoea. Staff offering patients opportunities to decontaminate their hands was 60% (n=:557). These apparent low rates of compliance were due to the fact that there were a mixture of the IPCP's and Matrons highlighting 'unknown' if this wasn't observed or the section was not completed on the checklist at all. It is useful to note that non-compliance in terms of ward staff not undertaking hand hygiene after caring for patients with CDI was only 1% (n=9) as was not offering patients an opportunity to decontaminate their hands.

Hand hygiene using soap and water decontaminates hands from both the vegetative and spore forms of the bacteria (DH, 2008, a). Guidelines maintain that soap and water is more effective and whilst there is acknowledgment that alcohol gel will remove the vegetative forms and reduce contamination by the spores, alcohol is not as effective as removing as many spores as hand washing with soap and water (Boyce and Pitett, 2002; Leischner et al, 2005). A recent review of the changing epidemiology of CDI also highlights the importance of good hand hygiene practice (Freeman et al, 2010). The review also discuss the use of appropriate solutions in CDI and indicate that hand hygiene is the most important aspect in prevention of transmission. They maintain that it is improved hand hygiene compliance that is the most important factor in the prevention of transmission and this exceeds the risk of the spores being resistant to alcohol gel. That said the DH guidance (DH, 2008, a) cites a number of key literature and government/national organisations promoting the use of soap and water for CDI alongside all potential infectious diarrhoeal patients (DH, 2010, a; NPSA, 2008; WHO, 2005).

5.4.3 Isolation of patients with CDI

The DH (2008, a) and recently PHE (2013, a) outline the importance of prompt isolation to help reduce the risk of transmission. The mnemonic 'SIGHT' (see table 2.3 below and section 2.12.1 in chapter 2) reinforces this by stating that if a patient has diarrhoea, then clinicians should suspect that it may be infectious if no other cause can be determined. Then isolate suggesting an intended order of risk assessment (DH, 2008, a; PHE, 2013, a). In a recent study by Walker et al (2012) where they discuss the role of the clinical environment contributing to the transmission of CDI, the authors conclude that it is the initial phase when patients are at their most symptomatic and therefore potentially when the risk of transmission is the greatest. This supports the need for prompt isolation to prevent transmission (Walker et al 2012).

S	Suspect that a case may be infective where there is no clear alternative cause for diarrhoea
I	Isolate the patient and consult with the infection control team (ICT) while determining the cause of the diarrhoea
G	Gloves and aprons must be used for all contacts with the patient and their environment
H	Hand washing with soap and water should be carried out before and after each contact with the patient and the patient's environment
T	Test the stool for toxin, by sending a specimen immediately

Table 2.3: SIGHT Mnemonic (Source: PHE [2013, a]; DH [2008, a]).

In this study 93% (n=803) of the checklists indicated that patients were isolated in the side room with the door closed and the correct signage in place. The checklists that generated a 'no' response were associated with doors not being closed and/or signage missing. As the item on the checklist included both of these potential scenarios (side room door closed, signage in place) data extraction was unable to determine which of the two was the case or if both were applicable at the time of the review. In some instances comments on the checklist included that staff had forgotten to include a soap and water sign. Soap and water signs are used in conjunction with other signage for patients with diarrhoeal illness (see chapter 4, section 4.4.3). Investigation into potential airborne routes for *C.difficile* transmission demonstrated that *C.difficile* was present in the air and on surfaces. Whilst this presence was sporadic and perhaps heightened during increased symptoms of diarrhoea and periods when there was most activity (during care delivery and meal times) this potentially increased the risk of transmission (Best et al 2010). Door closure therefore may assist in reducing this route particularly during care and cleaning activities assists in the reduction of transmission to other parts of the ward area (Best et al, 2010).

5.4.4 The use of personal protective equipment (PPE)

In terms of PPE, the retrospective analysis demonstrated a similar response to the hand hygiene elements of the checklist with the percentage of compliance 74% (n= 687). Again the checklists included a mixture of unknown and not completed for this item. This was due to the fact that at the time of the checklist review, the practice of using PPE may not have been observed. Non-compliance (3%: 26) was associated with not wearing PPE prior to entering a side room or leaving the side room having not removed the PPE in the side rooms prior to leaving. This was indicated in the comments section of the checklist during data extraction.

There are some studies that have looked at PPE use and compliance around PPE and CDI and the prevention of transmission (Aldeyab, et al, 2011; Abbett, et al, 2009; Muto, et al, 2007; Dubberke, et al, 2008). Salgado et al (2009) asserted that a range of enhanced infection prevention and control practices in relation to an outbreak situation linked to CDI, helped to reduce the incidence. The enhanced measures included standard isolation, use of PPE and hand hygiene with soap and water. However there is no specific reference to actual PPE use (Salgado et al 2009). The DH guidance (2008, a) and HII for *C.difficile* (DH, 2010, a) highlight the importance of using PPE for contact with the patient and the immediate environment.

In general infection prevention and control terms, PPE and in particular appropriate glove use for contact with body fluids, has been indicated since the mid-eighties (Pratt et al 2001). Pratt et al (2001) discuss the use of gloves for the protection of staff hands and the prevention of cross transmission. They maintain that glove use helps reduce the risk of cross transmission but does not eliminate it completely, hence the importance of hand hygiene after removing gloves.

5.4.5 The use of chlorine based solutions

The use of chlorine based solutions as a means of eliminating or reducing *C.difficile* spores in the environment is the recommended method of cleaning by the DH (2008, a). In various studies (Ali et al, 2011; Wilcox et al, 2011; Wilcox et al, 2003) cleaning with a chlorine based solution was found to reduce CDI rates. However more recently there have been some questions in relation to the efficacy of chlorine based solutions. Wilcox et al (2011) have asked that the standards required for testing the effectiveness of these chlorine based solutions are revised. This is to ensure that the tests undertaken are undertaken in conditions that relate to medical situations. Currently the tests are mainly based on food standards (Wilcox, et al, 2011).

In this retrospective analysis of the checklists the use of the chlorine based solution represented a compliance rate of (86%:798). However in terms of the non-compliance (14%:130), this included a lack of evidence of the solution being dated or timed or the solution had expired at time the DRCP was undertaken.

5.4.6 General cleanliness and tidiness

Untidiness (the term 'clutter' was used on the actual checklist) and inappropriate items in the side rooms was the second highest item on the checklist in terms of non-compliance (17%:158). From the comments made on the checklist for this item of the environmental section, in the majority of cases it was the side rooms that were untidy which could make them difficult to clean. Comments included dust and dirt being found during the daily checklist review by the IPCPs and or matrons. It can be difficult when patients, especially long term patients amass a lot of personal items which may lead to storage issues with subsequent items being lefts on lockers, table tops, floors and window ledges. Routine cleaning and decontamination of surfaces can often be inadequate (Carling et al, 2009). Ensuring surfaces are as free from clutter as possible can help with the cleaning and

decontamination process (DH, 2008, a). Staff, patients and relatives may not link housekeeping with general infection prevention and control precautions.

In relation to untidiness in side rooms and in the general ward layout, there is limited evidence relating to CDI specifically. However the report by the HCC (2007) into the outbreak of CDI at Maidstone and Tunbridge Wells NHS Trust highlighted that poor storage and a build-up of 'clutter' in some of the areas, in particular the older buildings had led to difficulties in cleaning the surrounding environment. Areas where dust and dirt accumulate can harbour microorganisms. This can be a source of transmission for *C.difficile* spores (McFarland, et al, 2007). However as previously highlighted (see chapter 2 section 2.5) a study undertaken by Walker et al (2012) found that the risk of contamination from *C.difficile* from ward based contact did not account for the majority of new CDI cases. There was evidence to suggest that the risk of transmission was highest when patients were at their most symptomatic which was usually in the first few days of diagnosis (Walker et al, 2012). However, Walker et al (2012) highlight that the trust where the study had been undertaken did have 'well implemented infection control measures' (page 1). This may or may not indicate that optimal cleaning regimes including effective de-cluttering were in place.

5.5 Patient care elements of the checklist

The patient care section of the daily review checklist was more difficult to analyse due to the nature and subjectivity of the different elements within this section of the checklist as has previously been alluded to in the findings chapter (see section 4.6 in chapter 4).

Variation in completion has provided limited opportunity for discussion and comparison with other literature and studies. However, there is scope to examine some of the comments included in the checklists and how these relate to the care and management of patients with CDI.

5.5.1 Abdominal pain/distention/discomfort and temperature recordings

The patient care section related to the various aspects of clinical patient monitoring and nursing care that should be undertaken for patients with CDI. The literature highlights complications of CDI, for example pseudomembranous colitis[29] and toxic mega colon[30], the

---

[29] Pseudomembranous colitis was defined in chapter 2 section 2.3.1.
[30] Toxic mega colon can be a complication of pseudomembranous colitis and is characterised by the dilation of the colon and is also potentially life threatening (NHS Choices, 2014).

latter often a complication of pseudomembranous colitis. Pseudomembranous colitis is often characterised by pain and distension of the abdomen and these signs and symptoms are important aspects to monitor for patients with CDI. A further important clinical assessment is temperature. A raised temperature can be indicative of infection. This combined with other inflammatory markers[31] can be an important sign in assisting staff to recognise deterioration in the patients' condition (PHE, 2013, a). It is important that these clinical signs are not seen in isolation. Patients with CDI may have other co-morbidities therefore monitoring and observing the patients general condition alongside other indicators for example abdominal pain, discomfort or distension.

Overall the completion of these elements on the checklist was good with the item 'abdomen' completed on the checklists in 89% (n=826) of the time and 88% (n=817) of the time for temperature recordings.

5.5.2 Stool chart and type and frequency of stool

Stool chart and type of stool were included as an item on the checklist in the patient care section. Stool charts were used in the study Trust and incorporated the 'Bristol Stool Scale' as a means of providing a consistent approach to monitoring the frequency and type of stool. The 'Bristol Stool Scale' was fist devised by Lewis and Heaton (1997) at Bristol Royal Infirmary as a means of assessing intestinal transit and was first introduced into a Scandinavian journal in 1997. The DH guidelines on '*Clostridium difficile* infection: How to deal with the problem' (DH, 2008, a) outline the use of the Bristol stool classification as a means of indicating whether the patient has diarrhoea (classified as Bristol stool type 5-7). See Appendix 7 for an example of a Bristol stool chart adapted for use in the study Trust. Disease severity in relation to CDI is defined in terms of a range of factors, one of which is stool frequency and type. Mild CDI is characterised amongst other things less than 3 type 5-7 stools per day. Moderate CDI is defined as 3-5 stools per day type 5-7 on the Bristol stool scale (DH, 2008, a; PHE, 2013, a). Severe and life threatening CDI are not defined on number of stools as these are not deemed to be reliable at this stage (PHE, 2013, a).

In relation to the checklist this item indicated if ward staff had completed the stool chart recordings for the patient. The compliance rate was 91% (n=844). The IPCP and matron also indicated the type and frequency on the checklist and any concerns and actions were

---

[31]One function of the measurement of inflammatory markers is to detect acute inflammation that may indicate a specific disease, for example infections. Inflammatory markers include amongst other things C reactive protein (CRP) and measurement is undertaken via a blood test (Watson, 2012).

also indicated in the comments section. Actions included actions undertaken by the IPCP or matron or the ward staff. This may have included escalation to the medical staff, a microbiologist and or a gastroenterologist if the frequency and type had increased.

5.5.3 Medication

Medication was another item of the patient care section of the checklist that had a high completion rate with 89% (n=735) completion. This relates to the IPCP and or matron recording on the checklist information related to patient medication, for example if the patient was on medication for CDI. Compliance was not related to patient compliance with medication. The qualitative comments were useful in this section in that the person completing the checklist indicated the type and dose of CDI medication that the patient was prescribed and the duration of that particular medication. The majority of this element was related to CDI medication but IPCP's in particular included any other relevant medication, for example if the patient had remained on antibiotics for other infections or if the patient was on proton pump inhibitors (PPI's). The use of PPIs and their clinical indication in the care and management of patients with CDI was discussed in chapter 2 (see section 2.5).

Until recently, the main treatment options for CDI focused on two antibiotics metronidazole and vancomycin. There has been the introduction of a new antibiotic fidaxomicin (PHE, 2013, a). However its introduction into the study Trust was after the retrospective documentary analysis (Phase1) of the checklists during the time frame July 2010 and December 2011. Fidaxomicin, the other main line treatments (metronidazole and vancomycin) as well as alternatives were discussed in chapter 2 (section 2.12.2).

Emerging resistance patterns related to metronidazole and in particular some of the hyper virulent strains of *C.difficile* are associated with different ribotypes (027 and 106) (Freeman et al, 2010). In terms of the checklist the comments section also indicated if the patient was not responding to any specific treatment. The IPCP or matron also highlighted if patients had completed the prescribed course and required a further review. In either case the IPCP or matron may have requested the doctor to review the patient. Alternatively the IPCP may have discussed with the microbiologist themselves. This would have been indicated on the comments section of the checklist.

5.5.4 Pressure ulcer risk and nutritional assessment

Other items on the checklist relating to patient care included pressure ulcer risk assessment and nutritional assessment. Both of these aspects of care management are included in the DH guidelines (DH, 2008, a).In the case of pressure ulcer risk assessment, the nature of CDI diarrhoea combined with the debilitating aspects of CDI especially in patients with moderate, severe or life threatening CDI can increase the risks of developing pressure ulcers especially in the sacral and buttock areas (DH, 2008, a). Pressure ulcer risk assessment is also a useful indicator for developing CDI. The use of a Waterlow risk assessment tool[32] was used to predict the incidence of CDI across two hospitals in one acute hospital trust. The study included three phases; the first to develop the tool, the second to test and prospectively sample over 1000 patients in a medical assessment unit. The third phase involved a retrospective testing of the tool on over 29 thousand medical patients. The study found that there was a link between higher Waterlow score (defined as above 20) and development of CDI and whilst not all patients with a raised score above 20 went on to develop CDI it provided an opportunity to risk assess the patients with high Waterlow scores and manage accordingly (Tanner et al, 2009).

In the case of the DRCP, with reference to the retrospective findings from the patient care section, pressure ulcer risk assessment had the highest percentage of non-compliance (17%: 158). Non-compliance was related to the risk assessment score being out of date rather than not been undertaken at all. 'Intentional rounding'[33] (National Nursing Research Unit, 2012) which involves the 'four P's' (positioning, pain, placement and personal needs) with 'positioning' including an assessment of pressure ulcer risk was introduced into the study Trust in the summer of 2011. 'Intentional rounding' was used as a means of indicating that the pressure ulcer risk assessment had been undertaken by the IPCP and or matron on the comments section. 'Intentional rounding' only included the actual Waterlow score (Waterlow, 2005) and not necessarily the actual assessment. The score or number should

---

[32] Waterlow risk assessment tool was first devised by Judy Waterlow in 1985 to predict the risk of developing pressure ulcers and therefore was used as a prevention tool. The tool was later revised in 2005. The tool scores the patient a number in a series of categories for example age, mobility, co-morbidities and body size to name some which are then added together to form a total score. The greater the score the greater the risk of developing a pressure ulcer (Waterlow, 2005; 1985).

[33] 'Intentional rounding' is an American term used to denote a system in America whereby there is hourly reporting, a documentation log, and communication and meetings regarding feedback on patient care. The UK has adapted this into a broader quality initiative following on from damaging reports in the media in 2011 regarding the nursing care of patients. It is not a new concept in the UK as many nurses are familiar with 2 hourly or 'back rounds' that were undertaken for many years which involved checking patients pressure areas amongst other things (National Nursing Research Unit, 2012).

be re-assessed in a timely manner in relation to the risk, the higher the score, the more frequent the re-assessment is required (Waterlow, 2005).

Nutritional status was the second highest area round non-compliance in the patient care section of the checklist (12%: 111). The DH (2008, a) highlights the potential complications of CDI in terms of nutritional status. Diarrhoea in CDI can be particularly protein depleting due to pseudomembranous colitis therefore it is important that nutritional status is monitored at least weekly (DH, 2008, a). In the study Trust, nutritional status is monitored using MUST (Malnutrition Universal Screening Tool)[34] and the score then denotes whether or not further action is required. An action could be referral to a dietician. All patients within the study Trust were required to have a nutritional assessment undertaken on admission and then weekly intervals using the MUST approach. Guidelines recommend that nutritional assessment is undertaken (DH, 2008, a). However there is very little reference to this in other specific CDI literature.

5.4.5 Daily bed linen change and daily hygiene

The daily bed linen and daily hygiene items in the patients care section of the checklist were included in order to promote and check that staff understood the importance of measures included to reduce risk of transmission. Transmission may be via person to person either directly from contaminated hands or indirectly via contaminated environments (Hardy et al, 2010; Vonberg et al, 2008; Fawley et al, 2001). Lucy et al (2011) examined the impact of routine patient bathing on the potential decrease in spores on the skin of patients with CDI. They found that whilst bed bathing had a limited effect on reducing the burden of spores from the skin, showers were much more effective (Lucy et al, 2011).

In this retrospective analysis of the checklists, the type of bathing or hygiene needs undertaken was not necessarily recorded in the comments section. The comments section only tended to indicate if the daily bed bath or hygiene needs and the daily change of linen had not been undertaken. Overall for both of these elements compliance was 86% (n= 798) for daily hygiene care and 84% (n=780) for daily linen change. On some occasions this section was not recorded on the checklist by the IPCP and or matron. This was due to the fact that the review had taken place prior to care being undertaken or bed linen changed.

---

[34] MUST is a tool introduced by the Malnutrition Advisory Group (MAG) of BAPEN (British Association for Parental and Enteral Nutrition. It is a screening tool used to identify malnourished adults or those at risk of malnourishment (BAPEN, 2011).

5.6 Secondary analysis

Secondary analysis explored the specific ward areas that had generated the most checklists during the period of the retrospective analysis (July 2010 to December 2011). This included two medical complex care wards, one on each of the hospital sites. The ward on hospital A site generated 114 checklists over the time and hospital B ward had 115 checklists generated over the same period. When comparing with the actual number of cases of CDI, with the number of completed checklists, this did not necessarily correlate to the areas that had the most cases of CDI (including patients that were admitted with CDI and those that developed CDI during their hospital stay). Hospital B had a total of three medical ward areas with the same number of CDI cases during the 18 month period (patients admitted with CDI and acquiring CDI whilst in hospital) (n=6). One of these three wards did include the ward with the highest completed checklist. The other areas were short stay medical areas.

On hospital A site, the ward that had the highest number of cases of CDI over the 18 month period (n=10) was a specialist medical ward and not the ward that generated the highest number of checklists. As discussed the two wards that generated the highest completed checklists were complex care medical wards with longer in-patient stays. This could have led to an increased number of reviews and checklists completed compared to other areas that may have had higher rates of CDI with shorter inpatient stay.

Secondary analysis explored any correlation between the three highest non-compliance rates from the environmental and standard precautions items of the checklist. These included commodes being clean, the correct use of a chlorine based solution and a clean and tidy environment. Examining the individual aspects of non-compliance, there was a higher incidence of non-compliance compared to the overall rate in relation to commode cleaning for the two medical wards that had the highest number of checklists completed. However, the rate was only 2% higher than the overall percentage for hospital A in terms of commodes or sanichairs (20% compared to 18%) but 9% higher for hospital B (27%). However as previously mentioned there was a difference in use of the commodes/sanichairs in hospital B as they were also used as moving and handling aids over the toilets in bathrooms. However it did highlight the need to address this problem if the commodes or sanichairs were used for this purpose. Some wards and areas on hospital B site did subsequently devise a rota for checks to toilet areas incorporating domestic staff and health care staff. Anecdotally this appears to have had some success in promoting timelier cleaning of dirty sanichairs over the toilets in toilets and bathrooms and has reduced issues of contamination.

The correct use of a chlorine based solution for both of the medical wards demonstrated higher compliance than the overall findings with figures of 94% (n=891) compliance for hospital A medical ward and 90% (n=835) for hospital B medical ward compared to 86% (n=798)compliance overall. A possible rationale for this higher rate than the mean rate could have been increased exposure to the checklist review which may have resulted in increased awareness and improvements in practice.

Side room clutter and cleanliness did produce greater non-compliance on the medical ward with the highest number of completed checklist in hospital B (25%:232) compared to the overall rate of 16% (n= 148). This figure was less for the medical ward with the highest number of checklists in hospital A (10%: 93). As indicated in the findings anecdotally hospital B tended to have more issues with storage which may have impacted on overall tidiness as well as side room tidiness. There is evidence to support maintaining a tidy environment to aide cleaning and decontamination. The *C.difficile* spores as previously mentioned are particularly hardy and can be difficult to remove and destroy (Freeman et al, 2010).

5.7 Summary of checklist use

The findings indicate that the checklist had a functional element focusing on the audit and surveillance of infection prevention and control practices and an assessment and monitoring function of the patients' condition. The checklist appeared to act as an aide memoire for the IPCPs and matrons undertaking the review. This retrospective analysis discovered that the checklists were completed differently by different IPCP's and or Matrons and this had led to a variation in the quality and accuracy of the information documented.

During the period of the retrospective analysis of completed checklists (July 2010 to December 2011) there was no significant difference in completion of the checklists. This perhaps indicated that a sustained approach to monitoring and reviewing practice and that real time monitoring may assist in preventing greater issues around non-compliance.

5.8 Conclusion

What had become clear is that the checklist was an artefact that formed part of a process, perceived anecdotally to have benefits in terms of surveillance, monitoring, containment, compliance and patient outcomes. There was a need however to understand the checklist as

part of a process; the DRCP and explore if the DRCP had been influential in the care and management of patients with CDI. This was pursued further in Phase 2. Chapters 6 through to chapter 10 outline the main findings, discussion and summary.

Chapter 6

Introduction to findings; themes and sub-themes

6.1 Introduction

This chapter provides a brief overview of the findings in relation to the main themes and sub-themes generated from the data produced during the interviews in Phase 2. Themes and sub themes as discussed in chapter 3 were derived from analysis of the data which in grounded theory includes various stages of coding. This began with open and focused coding and then finally axial coding. This latter stage enables themes and sub-themes to be integrated and also investigates relationships between themes (Charmaz, 2006). As grounded theory is an evolving process (Corbin and Strauss, 2008; Charmaz, 2006) analysis and reanalysis continued throughout the study including the writing up phase.

Staff perceptions of the checklist review and its influence on the care and management of patients with CDI generated three main themes: 'Education and Learning'; 'Developing and Sustaining Relationships'; and 'Leadership and Change Management'. Each of these themes is explained by sub themes. For example within the main theme of 'Developing and Sustaining Relationships' the sub themes which contributed were 'team work' and 'traits or characteristics of the key players' for example 'approachability'. These were identified as important in helping to develop those relationships.

This chapter provides an overview and a diagrammatic representation of the main themes and sub-themes and how they interlink alongside contributing main codes and concepts. These final themes sub-themes and concepts were as a result of axial coding. Chapters; 7, 8 and 9 explore the three main themes in depth.

As previously mentioned it became apparent during the interviews and analysis that the daily review checklist was more than just a checklist, it had become a daily review checklist process (DRCP).

6.2 Main themes and subthemes, key codes and concepts

One of the main themes that emerged from the interviews was that the DRCP provided opportunities for 'Education and Learning' in relation to the care needs and management priorities of patients with CDI. These included increased knowledge and awareness of CDI, potential complications and recognition of the importance of infection prevention and control precautions in preventing transmission of *C.difficile*. 'Education and Learning' as part of the

DRCP consisted of practice based learning in that it was contextual and situated specifically linked to CDI and the care of patients experiencing CDI. The IPCPs and matrons were seen as the providers of any education and facilitators of learning, whereas the ward staff and some occasions, the matrons were the recipients.

This education resulted in increased confidence in infection prevention and control, in particular for the matrons. Increased confidence came about as a result of increased knowledge and awareness and resulted in the matrons increased ability to highlight and instigate infection prevention and control practices at times other than during the DRCP. Ward staff also perceived that they had increased knowledge and awareness. The DRCP was seen as a dynamic and interactive process that involved key players: IPCPs; matrons; and ward staff and 'Education and Learning' were the centre of this process. Educational interaction had led to an increased patient centred approach with clear focus on CDI. This appeared to facilitate the staff to conceptualise CDI as an embodied illness in its own right rather than solely as a contaminant bacteria or pathogen causing diarrhoea.

This dynamic interactive process involving the IPCPs and matrons engaging with staff on the wards during the DRCP also helped the development and sustain relationships. Important factors that emerged in relationship development related to the nature and manner adopted by IPCPs and matrons which influenced communication with ward staff during the DRCP. Communication, approachability and visibility were all seen to be important traits or characteristics which impacted on relationship development and the manner in which the key players (IPCPs and matrons) were received. Team work which incorporated collaboration and partnership working also contributed towards relationship development. Of particular note from the participation of ward staff was that IPCPs and matrons were being helpful and seen to be involved in the care management of patients with CDI. What emerged was the importance of the IPCPs and matrons whilst undertaking the DRCP 'doing and telling' as opposed to just arriving on ward areas and telling staff, or informing staff about what they had to do.

'Leadership and Management', the third of the main themes was associated with relationship development within the DRCP. The approach adopted by the key players (IPCPs and matrons) as well as the use of skills required to develop and sustain relationships and bring about change were identified as significant. The IPCPs were perceived to be the infection prevention and control specialists equipped with knowledge and expertise to help staff to understand CDI and educate staff about the potential complications of the disease process and how to prevent transmission. Whilst there was an acknowledgement from the

participants that this expertise and knowledge was the case prior to the introduction of the DRCP, the DRCP had been influential in developing this further especially in relation to CDI. The DRCP was also seen as providing assurance that standards were being met in terms of the care and management of patients with CDI at ward and organisational levels.

Hence the DRCP moved from a form of checking up and policing. Whilst some ward staff inferred that they continued to feel that the DRCP involved an element of policing, there was an acknowledgment that it had brought about a change in attitudes towards the care and management of patients with CDI and the DRCP. The DRCP had become to be seen as an important element of patient safety and the 'norm' for patients with CDI. Diagram 6.1 provides an overall summary of the themes, subthemes and the key concepts within those themes derived from open and focused coding. The diagram also demonstrates the interlinking nature of the three main themes.

Chapters 7, 8 and 9 explore these key themes and sub themes in more depth beginning with chapter 7, 'Education and Learning'.
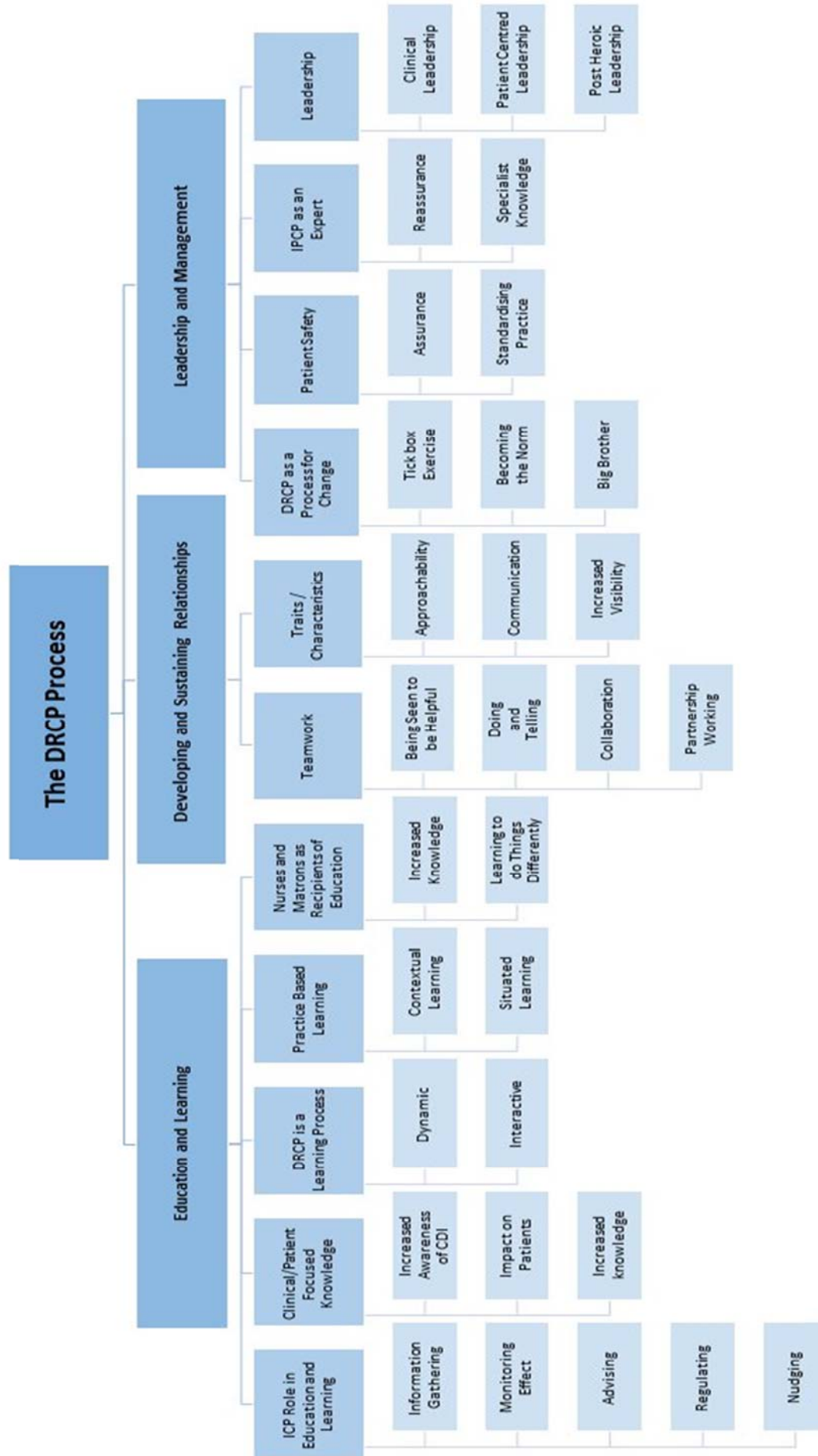
Figure 6.1 – Themes, Sub Themes and Key Concepts.

Chapter 7
Education and Learning

7.1 Introduction

Chapter 6 provided an overview of the findings; highlighting the main themes and subthemes. Staff's perception of the DRCP and its influence on the care and management of patients with CDI emphasised how the DRCP had provided opportunities for education and learning. All participants perceived that there had been improvements in their knowledge and understanding of CDI which had in turn influenced the care and management of patients with CDI. Chapter 7 explores this in more depth using specific examples from interview transcripts. Relevant education and learning theory is provided throughout. The chapter begins with an overview of situated and practice based learning and their context within IPC and the DRCP. Practice based learning was perceived as one of the main benefits of the DRCP in relation to 'Education and Learning'.

7.2 Situated learning

Lave and Wenger (1991) refer to situated learning as 'legitimate peripheral participation' (page 29) and whilst they predominantly refer to newcomers and an apprentice style of learning this does have some resonance with education and learning in general and in relation to infection prevention and control. Infection prevention and control education and learning often occurs in context and in practice based areas where ward based nurses may well be the novice in terms of infection prevention and control. The IPCP provides 'expert' knowledge and advice in the context of the situation at hand. Legitimate peripheral participation focuses on the whole context of the learning experience and the individuals involved and interact in that experience (Lave and Wenger, 1991). This is particularly relevant in the case of the DRCP where the IPCP, matron and ward staff were all involved in interactions during the DRCP in the context of the care and management of the patient with CDI and the ward environment. The learning that resulted from those interactions was perceived to be influential in the care and management of patients with CDI.

Fors et al (2013) also emphasises the importance of the environment (in this case the ward environment) in the education and learning experience, linking this to cultural attitudes and the impact they can have on the whole educational experience. In relation to the DRCP, this may also have been applicable as wards are often busy dynamic environments. Ward staff interacted with a wide range of professionals as well as the IPCP and the matron in the context of the DRCP. It was the nature and context of these interactions in the specific environment at that time that may have impacted on the learning experience. If wards were

busy and staff did not have time to spend with the IPCP and matron during the DRCP then this may in turn have limited the education and learning that stemmed from that experience.

Culture and the environment of learning are also important in experiential learning. Lewin, Dewey and Piaget who were the main exponents of experiential learning, place experience at the heart of learning and development (Kolb, 1984). Kolb (1984) goes on to maintain that learning is the 'major process of human adaptation' (page 32) and occurs in everyday settings and experiences; experiences that incorporate decision making, problem solving and attitudinal change.

One of the issues, however, in learning through experience and is particularly relevant to infection prevention and control is summarised by Senge (2006) who stated that 'we learn best from experience but we never directly experience the consequences of our most important decisions' (Senge, 2006, page 23). This is especially significant in infection prevention and control, where the consequences of any acts or omissions may not become apparent immediately, if at all. For example if there was poor hand hygiene compliance by a staff member between patients, or poor decontamination of equipment such as commodes or bed pans between patient use, the patient in question may not develop an infection or if they did it may not be until a few days after the particular event. It may then be difficult to ascertain where exactly the infection had come from and if indeed it was as a consequence of poor compliance. Anderson et al (2010) also offer an interesting insight into why infection prevention and control can pose problems. This is linked to the fact that as humans we often act on our senses, linking to what we can see, hear, smell and taste. In the case of microbes or bacteria if we cannot see them then we have to act on our mental resources or learnt behaviour. Whilst there is anecdotal reports that CDI diarrhoea can be quite distinctive and would allow for 'olfactory diagnosis' there is no scientific basis for this form of diagnosis (Burdette and Bernstein, 2007, page 1142).

Loveday et al (2014) in the recently published 'epic 3' guidelines[35] for preventing healthcare-associated infections in NHS hospitals in England' maintain that organisms can be transferred between humans either directly by hands of indirectly via contaminated equipment. Pratt et al (2007; 2001) and the World Health Organisation [WHO] (2009) cited in Loveday et al (2014) maintain that epidemiological evidence suggests that hand related transmission continues to be a major contributing factor to HCAIs in the hospital setting.

---

[35] These guidelines were originally published in 2001 (Pratt et al, 2001) and updated again in 2007 (Pratt et al, 2007). Epic 3 provide updated recommendations and available evidence for preventing HCAI's in hospitals and other acute settings (Loveday et al, 2014).

One of the continuing challenges of infection prevention and control education is ensuring that any learning and subsequent knowledge and awareness are transferred into sustainable infection prevention and control practice. In terms of the DRCP all participants indicated that 'Education and Learning' was a key component of the DRCP and one that had been influential in the care and management of patients with CDI. The key themes and sub themes within 'Education and Learning' are outlined below help to explore this further.

7.2.1 Informal learning and the context of learning

Many of the participants as can be seen from the excerpts taken form interview transcripts highlighted throughout, indicated that the increased knowledge and awareness had largely been due to informal contextual based learning during the DRCP. Eraut (2011) describes informal learning in the workplace and learning from others as an important aspect of all individuals learning and maintains that informal workplace activities account for about 70-90% of overall learning. Working alongside a colleague, asking questions and being involved in shared activities assists with understanding and enables individuals to learn, especially contextual based information and knowledge (Eraut, 2011). This was particularly relevant for matrons working alongside the IPCPs whilst undertaking the DRCP as they asked questions and learned from the IPCPs whilst undertaking the DRCP. It was also relevant for the ward staff in relation to working with, and alongside the IPCPs and matrons during the review process. The excerpt below illustrates the impact that this had on one of the matrons in terms of increased awareness and being able to share that information outside of the DRCP:

*"For me I think I am learning more about it and I can pass things on to my ward areas when I go on without the IPCPs". - **Matron participant no. 12.***

In a study undertaken by Eraut (2011), sources of learning in the workplace were examined and two were found to be the most useful. These included learning from the challenges of the work itself and also learning from others. This links with the DRCP and participants comments that the DRCP had helped with the care and management of patients with CDI. Staff remarked on the fact that they (the ward staff) now did things a lot differently as a direct consequence of learning from the IPCPs and matrons whilst undertaking the review process:

*"I think we do things a lot differently; I think when you guys come up you are educating us all the time – reinforcing things each time". - **Ward staff participant no.26.***

What is interesting from this last comments is that the ward staff perceive that the DRCP is a constant in terms of a platform for educating staff, *'…educating us all the time'.* This implies

that staff see the whole aspects of the review process, assessment of the patient and the environment as providing opportunities to interact and engage in learning activity.

Non-formal work related learning aspects often involve reactive or deliberative learning or both (Eraut, 2011). In the case of the DRCP, the learning involved specific patient assessments, whereby problems or concerns may have arisen during the DRCP. This may have led to specific actions that needed to be undertaken for example if the patient had a distended abdomen which required escalating to the relevant personnel. There may have also been issues around the environment which also required actions. These two examples depict reactive learning whereby the IPCP and/or matron would discuss with the ward staff the potential significance of the distended abdomen and what the actions would be. In terms of the environment if linen was found left in the room, the IPCP may explain about *C.difficile* spores and the importance that unnecessary linen and equipment were not left in side rooms where they may become contaminated with those spores. Deliberate learning may have involved general improved knowledge and awareness around CDI. An example is shown below of reactive learning:

"I think the DRCP helps you to understand what is important especially around patient care bits especially around patient's abdomen; I have learnt about the importance of checking if there is any pain or tenderness or swelling'. - **Matron participant no.13***.*

In a literature review Ward (2011) demonstrated that educational input around infection prevention and control was not always reciprocated in terms of actual practice, especially in relation to formal education. However the literature review undertaken by Vonberg et al (2008) which examined infection prevention and control measure and CDI, education in relation to increased knowledge and awareness was seen to be important in helping to reduce the spread of *C.difficile.* Whilst these findings appear contradictory to Ward's (2011) overall conclusions from the literature review, they do have some resonance with practice or contextual based learning and also have some significance with 'Education and Learning' and the DRCP. In one of the studies in the literature review by Vonberg et al (2008), Muto et al (2005) describe the implementation of a *C.difficile* infection control bundle[36]. This included an educational package to enhance infection prevention and control practice as a means of controlling an outbreak of CDI in a university hospital in the USA. In the study, educational input alongside other interventions was instrumental in reducing the rate of CDI's. Muto et al (2005) however do concede that the actual impact of specific interventions was difficult to

---

[36] A 'Bundle' is a formal way of 'improving processes and patient care outcomes' (HPS, 2014, b). Downloaded from HPS http://www.hps.scot.nhs.uk/haiic/ic/bundles.aspx Downloaded Sept 2014.

quantify. The fact that the education alongside the other interventions provided a contextual basis for improvements in knowledge has similarities to the DRCP in this study. The DRCP provided educational input which was focused on CDI, specifically the care and management of patients and prevention of transmission. The DRCP often involved active participation by the key players; in this case IPCPs, matrons and ward staff.

Ward based staff also commented on the fact that educating staff in the clinical area alongside '*working amongst staff*' which incorporated explaining and demonstrating how things should be done rather than only telling staff what to do was also beneficial. This assisted in understanding and in infection prevention and control practices becoming embedded in practice:

"But if you come onto the ward and are working amongst staff and are educating the staff
and raising awareness and they understand it more, it then becomes embedded in practice".
- **Ward staff participant no.19.**

This relates to experiential learning as being contextual, where the context in this case is a patient with CDI. Rogers et al (2010) maintain that experiential learning can be 'engaging actively with context..... (learning by doing)' (page 104). It is interesting that in the case of the DRCP the 'learning by doing' may have additional meaning in that it included the IPCP and or matron working alongside the staff to facilitate learning within the context of CDI. In other words this often involved the ward staff and the IPCP or matron 'doing it together'. Staff as you can see from the earlier quote perceived that the IPCP and matron working with the ward staff helped to increase understanding. The ward staff member did not actually state that it was better to do things together rather than just coming on and advising or informing staff what to do. This was implied in the nature and tone of the statement, 'but if you come on to the ward and are working amongst staff……'. From an educational perspective it is also interesting that it is the combination of working with staff and raising awareness that led to things becoming embedded in practice. This implies that education and learning in relation to infection prevention may not always be best served by formal sessions alone which ties in with the literature related to infection prevention control education (Ward, 2011).

Lave and Wenger (1991) maintain that 'abstract representations are meaningless unless they can be made specific to the situation at hand...' (page 33). The DRCP provided opportunities to ensure that the information and knowledge imparted to staff, was relevant and contextual. A comment provided by one of the senior managers illustrates the importance of practice based learning and the influence that they perceive that it can have:

"We sometimes underestimate the power of the opportunities around education and training in practice; practice is very different as oppose to the classroom. Staff learn and you can evaluate if learning has taken place; in-particular you can observe that the learning has taken place in practice". - **Senior manager participant No. 24.**

The DRCP provided an ideal opportunity to both educate within the context of CDI and assist with patient care alongside the infection prevention and control practices required to contribute to the prevention of transmission of the organism. However combined with the daily routine element of the DRCP there was also an opportunity to observe and evaluate if learning had taken place and what, if any gaps there were in the knowledge or practice. This provides some correlation with the findings from Phase 1. Phase 1 demonstrated that the DRCP acted as a form of real time monitoring in and around the care and management of patients with CDI, but it also provided an opportunity to observe and reinforce specific patient care management aspects as well as important infection prevention and control practices. Any recurrent themes or issues that were observed during the DRCP could be highlighted with the matron and ward manager during or after the review process. These in turn could be monitored to highlight any emerging patterns. This could be around good practice as well as any areas for improvement. It is important in relation to education and learning that positive feedback is included and good practice reinforced as well as areas that need to be addressed (Clynes and Raftery, 2008).

7.3 Clinical/Patient focused knowledge

One of the main areas of feedback from all the participants was in relation to their generalised increased understanding of *C.difficile* and of CDI and how this had assisted in the care and management of patients with CDI. Staff, particularly staff on the wards no longer perceived CDI as just 'diarrhoea'. Ward staff were much more aware of the potential implications and complications, viewing CDI as an illness or disease process in its own right and having a greater understanding of what that may entail. This is illustrated in an excerpt from one of the ward staff participants:

"Yes it has definitely improved our knowledge (referring to the DRCP); we knew it was diarrhoea and C.diff but didn't realise that it could potentially be life threatening and the seriousness of it. Yes it has helped us to understand it more. It has definitely improved our knowledge". - **Ward staff participant 21.**

Duerden (2008) discusses the importance of prioritising patient safety whereby infection prevention is fundamental within the specialist care delivered. This is different to in the past

where infection prevention may or may not have been included within that specialist care. The importance of that prioritisation is highlighted by one of the matrons in this study:

"...But I think this (referring to the DRCP) helps you to focus what is important especially around patient care, especially around patient's abdomen; the importance of checking if there is any pain or tenderness or swelling". - **Matron participant no. 10.**

The actual checklist included a patient care section (see chapter 2, section 2.12.2). Although this section was included at the end of the checklist after the section on the environment and the standard precautions (see chapter 2, section 2.12.1) it did focus on important clinical patient assessment measures, for example temperature recordings, abdominal assessment and stool frequency and type. An example is shown below in relation to the patient focus during the DRCP:

"I think we monitor the patients more closely certainly around patient assessment aspects and potential complications". - **IPCP participant no. 7.**

These aspects contributed to CDI being perceived as an illness rather than just an infection or bacteria. CDI had become embodied as a disease process. Embodiment is the 'identification of an abstract idea with a physical entity' (MacLachlan, 2004, page 2). In other words it is about making something real and tangible that may impact on other things. In relation to health care and specifically CDI, embodiment is about the infection (CDI) being an illness with real and manageable pathology (MacLachlan, 2004). Recognising CDI as an illness in its own right with specific signs and symptoms, potential complications and with the potential to transmit to others was made more perceptible with the DRCP. This is illustrated below when a ward staff participant discusses how the increased knowledge and awareness of CDI had impacted on them and when caring for the patient with CDI:

"You know more about the C.diff itself now and the things that can impact on the patient, so you become more attentive with your patients in relation to C.diff as well". - **Ward staff participant no. 19.**

Embodiment also encompasses understanding and meaning for individuals (Benner and Wrubel, 1989). This was particularly relevant in terms of the patients with CDI and how staff interpreted and understood what CDI meant as an illness. This is illustrated below:

"I think that it (referring to the DRCP) has really changed the way that everyone understands the management of the patients with C.diff". - **Senior manager participant no. 24.**

Embodiment had not only had an impact with the key players in the DRCP (IPCPs, matrons and ward staff) as was seen by the last excerpt. There had also been recognition at organisational and national levels of CDI as an illness causing morbidity and mortality (PHE, 2013, b). CDI as one of the HCAIs gained increasing recognition in the last 10 years with a variety of interventions, guidelines and government initiatives instrumental in raising awareness and in reducing HCIA rates. These were focused particularly on *C.difficile* and MRSA (DH, 2014; 2010, a; 2008, a; Duerden, 2008). The DRCP in this particular study Trust was perceived to been influential on knowledge and awareness specifically related to CDI and infection prevention and control practices in the care and management of patients with CDI. The impact that the DRCP had within the study Trust is illustrated here:

"Clearly everything we have done or you guys have done has made a difference it absolutely has......... The way we talk about C.diff, its right at the top of the agenda". - **Senior manager participant no.16.**

7.3.1 Infection prevention and control focused knowledge/increasing understanding and awareness

As well as clinical and patient focused knowledge, the DRCP assisted with staff's understanding of infection prevention and control practices associated with the prevention of transmission of CDI as is highlighted by the two quotes below:

"I do think it has helped with understanding; through the education we get from you (referring to IPCPs and matrons); we know about spores….. and that all surfaces need to be clean....... Yes I think we have more of an understanding now". - **Ward staff participant no. 15.**

"We have increased awareness such as hand hygiene with soap and water, staff are more aware to keep an eye on the type of waste bins and the importance of de-cluttering etc.". - **Ward staff participant no. 25.**

It is interesting that in one of the above excerpts the ward staff member uses the word 'understanding' and how this understanding has been facilitated through education by the key players during the DRCP (IPCPs and matrons). Understanding why things need to be undertaken as well as what needs to be undertaken helps to internalise important points. This in turn leads to these important aspects having a greater likelihood of being repeated in the future because of that understanding and contextualisation (Eraut, 2011). The second excerpt is more about awareness which in general contexts may be something that is delivered in and around infection prevention and control education, often in the form of mandatory updates provided by health care organisations.

Linking this to infection prevention and control practices, often the educational input designed to raise awareness and improve practice can have limited short term benefits and may not necessarily change infection prevention and control practice (Ward, 2011). The DRCP assisted staff in extracting meaning and making sense of information provided at the time. This combined with the daily review aspect of the DRCP helped to address some of these issues as is illustrated here:

*"It is interesting when you lot come and come on and help us learn, you are not coming just to tell us something and to tell us off. Come and help us get more information and knowledge ….". - **Ward staff participant 25.***

7.4 The DRCP and IPCP/Matron role in education and learning

'Education and Learning' was seen to be important within the context of the DRCP both in terms of the DRCP proving an opportunity for learning as well as the IPCPs and matrons being the educators and trainers. These opportunities enabled staff to increase their knowledge and awareness around CDI which is demonstrated in one excerpt from a ward staff participant below:

"....During the review you (referring to the IPCPs and matrons) are educating the staff and raising awareness and they understand it more and it then becomes embedded in practice". - **Ward staff participant no. 19.**

This example above reinforces the contextual based and work place nature of the DRCP as discussed earlier. The actual role of the IPCP and matron is also illustrated in terms of their role. One senior nurse commented on the role of the IPCP in particular:

"It's about supporting and educating and I very much see the IPCP as an educator and trainer". - **Senior manager participant no. 20.**

Interestingly in relation 'Education and Learning' and the role of the IPCP, the role definition when the first infection control sister was recruited in 1959 did not include any reference to education and training. The role instead focused on liaison, surveillance and record keeping alongside prompt recognition and 'disposal' of patients with infections (Worsley, 1988). It was not until the report by the DH and the then Public Health Laboratory Service (PHLS)[37] (1995) that education was brought into the role specification of the IPCP. The report also

---

[37] The PHLS was more recently known as the Health Protection Agency (HPA) and has now been replaced by Public Health England (PHE).

suggested that the IPCP should also possess teaching skills and a teaching qualification, acknowledging the importance of education and teaching in the role (DH/PHLS, 1995).

Both terms 'education' and 'learning' were included in the competencies from IPCPs produced by the Infection Control Nurses Association (ICNA) in 2005 (Perry, 2005). The ICNA was replaced by the IPS (Infection Prevention Society) in 2007 to reflect the broader expertise and involvement of other health care professionals involved in infection prevention and control and to promote an extended membership (Ayliffe, 2008). Garcia (2000) highlights the important change in the role over the years from one of a reactive influential professional to that of a proactive practitioner. Whilst the article focuses on the role of the IPCP in America, Perry (2005) argues that it is relevant to the role of all current IPCPs. Proactive aspects include the development of the education and teaching role of the IPCP.

Education was seen as important but it was also the consistent, constant and contextual nature of the education with the daily review element of the DRCP that helped to reinforce important aspects of the care and management of the patient with CDI and in preventing transmission. Staff, in particular ward based staff believed that it was important to reinforce potential complications of CDI and highlight prevention strategies for cross transmission during the DRCP:

"I think we do things a lot differently; I think when you guys come up you are educating us all the time – reinforcing things each time". - **Ward staff participant no. 26.**

IPCPs as well as matrons and senior managers highlighted the routine nature of the DRCP and the potential for a 'drip drip' approach for education. Attending the ward every day helped to reinforce key messages and provided an opportunity to clarify any issues or concerns:

"Because it's done on a regular basis it's not just a one off education it's a 'drip drip' approach which I think is of real benefit. I think that is the major benefit". - **IPCP participant no. 5.**

Learning by repetition or 'routinisation' (Eraut, 2000) in the case of the DRCP included the reviewers (IPCP and matron) assisting in reminding staff of the important elements in the care and management of patients with CDI. The repetitive nature of the DRCP with the reviewers (IPCPs and matrons) attending ward areas every day, initially to undertake the review, provided an opportunity to embed and reinforce key messages. Routinisation and

standardising practice is explored in more detail in chapter 9, leadership and change management.

Within the context of 'Education and Learning' the IPCP and matron also provided advice. This was sometimes referred to as 'nudging in the right direction' by the participants during the interviews. Any concerns in relation to clinical patient assessment, for example increased stool frequency may have required the nurse or doctor on the ward to liaise with the microbiologist. The increased stool frequency may have been highlighted by the IPCP or matron who then would have then suggested escalation to the doctor during the review. Alternatively there may have been environmental aspects that staff may have been uncertain about. For example initially this may have been ensuring that the staff were aware how to make up the chlorine based solution or reiterating the transmission potential of the spores from CDI. The IPCP and matron could assist staff in knowing what to do. The example below highlights this:

"We can highlight any problems or concerns about the patient or environment to staff or the Microbiologists and help them to get things sorted, we can nudge in right direction, also highlight to matrons'...........can also spot potential problems and any patterns" - **IPCP participant no. 5.**

The quote above also demonstrates the monitoring function of the DRCP and recognising any '*patterns*'. *'Patterns'* in this case could be related to specific patient issues or issues relating to the environment (see appendix 1 for an example of the initial checklist, V 1). For example on the actual checklist the statement asks if the commodes or bed pans are clean. In relation to this element there may have been issues around noncompliance and this may have been at set times of the day or certain shifts or over a number of days. These issues could be discussed at the time and actions instigated. There may have been training issues or it may be that there were resource issues around staffing levels. The IPCP and matron jointly undertaking the DRCP could explore these issues further. Conversely if the IPCP had undertaken the review on their own on that particular day any concerns could be highlighted to the matron for that area.

The phrase 'nudge in the right direction' is noteworthy as it implies that the IPCP believes that they are assisting rather than taking over. It may have been that on occasions the IPCP undertook the actions. However, there can be a dichotomy for the specialist nurse between that of the helping role and being seen to be taking over (Dimond, 2006). The IPCPs were often seen as the specialist in terms of CDI and infection prevention and control. One of the aims of the DRCP when it was first introduced in the study Trust, was to assist in the

reduction of CDI cases and to assist in the reduction of CDI morbidity and mortality by the early recognition of potential complications and appropriate escalation. Timeliness of actions was important in order that concerns and issues were not only left for the IPCP and or the matron during the DRCP. Having that increased knowledge and awareness would enable staff to recognise and instigate actions at times other than during the DRCP. The above quote also uses the phrase '*help them to get things sorted'* implying that it was about assisting staff and not always doing things themselves (IPCP or matron). This again links to embodiment and CDI being more than just a bacteria causing diarrhoea but an illness in its own right requiring the correct monitoring and assessment in order to prevent or recognise early any deterioration in the patient's condition.

Whilst the educational role helped to ensure that staff understood CDI and were more knowledgeable, the DRCP also had a monitoring and regulatory role with education providing an opportunity to ensure staff were aware about fundamental aspects of infection prevention and control. This is demonstrated in the excerpt below from a senior manager.

"It's going back to basics and putting things in place, education, education and education and ensuring things are done" - **Senior manager participant no. 20.**

The interesting aspect of the above quote from the senior manager is that the DRCP whilst it assisted in providing education there was still the element of regulation and ensuring that fundamental aspects relating to patient care and IPC practices were undertaken. Linking back to Phase 1 of the study and the retrospective data analysis, the main findings included that the DRCP provided a means of real time monitoring of patients with CDI and an opportunity to ensure that things were being undertaken in relation to infection prevention and control practice. Even if there were issues around non-compliance, for example in the side rooms and untidiness where the patients were being nursed (see appendix 1 for an example of the original checklist, V 1), the DRCP provided an opportunity to highlight, inform and action at the time and reinforce best practice for the future.

7.4.1 Nurses and matrons role as recipients of learning

Staff commented on the improvements in both their knowledge and awareness since the introduction of the DRCP. Whilst the IPCP and matron undertaking the review may have on occasions themselves been instigating clinical decision making or problem solving, this was undertaken in conjunction with the ward staff. This collaborative approach improved ward

staff awareness and provided greater understanding in the care and management of patients with CDI. One participant described this in relation to the complications associated with CDI:

"Yes we are more aware. I think the biggest things we are aware of now are the complications; I certainly wasn't aware in the past. A few years ago for example, I wouldn't have known to check the abdomen but I do now". - **Ward staff participant no. 26.**

Matrons also commented on their improved knowledge following the introduction of the DRCP for patients with CDI. One commented on the fact that the DRCP had helped them to focus on what was important in relation to patient care when reviewing patients and more specifically what they needed to focus on. The case illustrated below highlights the improvements around the knowledge of the importance of checking the patients' abdomen. Interestingly matrons highlighted previous awareness in relation to certain aspects of infection prevention and control, for example side room doors being closed and the cleanliness of areas and wards. However perhaps less familiar were the actual patient assessment aspects in relation to CDI, for example abdomen, temperature and stool frequency and type which matrons and staff felt that they were now more confident around due to the increased knowledge and awareness. This is illustrated in the example below:

"Yes it certainly has improved my knowledge and awareness; I might have in the past gone on and done a walk round and picked up things up when out and about; checked doors were closed and commodes clean. But I think this helps you to focus on what is important, especially around the patient care bits, especially around patient's abdomen; the importance of checking if there is any pain or tenderness or swelling". - **Matron participant no. 13.**

Matrons also stated that the increased knowledge and awareness had helped them to explain about specific issues related to patients with CDI. This was also apparent when cascading information and sharing knowledge with staff specific to the patient and potential complications. The matrons had increased confidence in their own knowledge and awareness which they felt was sufficient to share that with other staff. Further comments included:

"For me I think I am learning more about it and I can pass things on to my ward areas when I go on"………. I can explain about the spores for example. Before I didn't have that knowledge, I wasn't that knowledgeable. I would mention it before but perhaps didn't fully understand it myself. Now I can explain more and the staff understand it more. If they understand it they stick to it". - **Matron participant no. 12.**

This demonstrates that the DRCP not only had implications for immediate learning and sharing of information but also had more viral effects for other general situations. Matrons demonstrated that they were able to adapt what they had learnt to other situations albeit

infection prevention and control related. Often in infection prevention and control education as previously discussed there can be difficulties in the long term sustainability of any knowledge gained (Ward, 2011). The DRCP appeared to assist in more long term sustainability of knowledge gained which was demonstrated here with matrons utilising the knowledge gained in other environments.

As is highlighted above, knowledge had a direct link with increased confidence. If the person felt confident in what they were saying, they were more likely to give feedback or an explanation. They were also more likely to challenge staff because they believed that they could provide the rationale as to why they had challenged them. This is demonstrated again by a comment from another matron:

"Yes at first wasn't sure but now I can challenge now and explain what things are for and what should happen; for example I know now why linen shouldn't be left in the room. I feel confident now with ward staff that I can say 'come on now, should that be there and why shouldn't it be there' ". - **Matron participant no. 17.**

7.5 The DRCP providing a space and opportunity for learning; dynamic and evolving

The DRCP became a dynamic and evolving framework providing an opportunity for learning to take place. The DRCP was often seen by the ward staff as an intervention that promoted learning. When this was the case, the DRCP was seen in a positive light and not just as a means of checking up on staff. The comment below is from one of the ward staff feeding back on their own perceptions of how staff identified with the DRCP. Initially the DRCP may have been viewed as a fault finding checking up exercise, however it had evolved into a framework that was seen to assist with learning:

"Staff (referring to the staff on the ward) see it (referring to the DRCP) as a learning tool and not as finding fault". - **Ward staff participant 18.**

Infection prevention and control nurses or practitioners have historically been associated with a reactive function which may have included a more critical approach rather than being seen as more helpful and proactive. The nature of infection prevention and control can also mean that their presence on a ward or area may signify an infection or potential infection or it may be related to a specific outbreak. Therefore often the IPCPs can be seen as 'bad news' (Perry, 2005). In a study undertaken by Ward (2012, a) examining the learning needs of

mentors and students in relation to infection prevention and control education, attitudes towards infection prevention and control nurses was also examined. Feedback from mentors indicated that they saw IPCPs as only visiting wards or areas to criticise, never with any good news and do not offer any solutions. Interestingly the converse seems to have occurred in the context of the DRCP:

"When you lot come on (referring to the IPCPs and matrons) and you help us learn; you are not coming to tell us off but you come and help us get more information and knowledge as we don't always get time to go to training or go on the intranet etc.". - **Ward staff participant no. 25.**

The above quote is noteworthy as it suggests that the staff perceive that the IPCPs and matrons are assisting with their learning not just imparting information. It also links with experiential learning and learning by experience (Rogers and Horrocks, 2010). In this case the experience is associated with the care and management of patients with CDI. The participant here also comments on the fact that they do not always get time to attend more formal training or go onto the intranet. Again this links back to the IPCPs and matrons being the exponents of education and learning being seen to provide what the person requires at that time (here it is a ward staff participant) in terms of being helpful and providing information.

Combined with the educational benefits however, ward staff also perceived that there was a need for the DRCP to monitor and provide assurance that *'things were being done'*. They saw this as a by-product and that the educative function was the most important role of the DRCP. Interestingly the initial aim of the DRCP was surveillance and monitoring:

"The staff get to know you (referring to the IPCPs and matrons) and can ask things and get updates. …..You guys coming on can update and educate whist you are here and ensure that things are being done". **- Ward staff participant no. 26.**

7.6 Evidence of learning

Senior managers assumed that the fact that IPCPs and matrons could observe when and if the learning had taken place also helped to provide assurance that there was optimum care and management of patients with CDI. The example below illustrates that it was the daily review element of the DRCP alongside and the consistency of approach which enabled some evaluation of learning to take place. The timeliness of the evaluation was also important. If the IPCP or matron had found that the information provided one day had not

been acted upon when they undertook the review the next day, they were able to ascertain if the information had been assimilated and taken on board. If learning needs were found to be evident especially in relation to CDI then staff could instigate any remedial actions that may have been required. This may have been linked to the actual work place or it may have been a specific more formal update. Classroom or more formal methods of learning can be difficult to assess compared to practice, as to whether or not learning has taken place as it may not always be contextual at the time of the learning activity (Eraut, 2011). The DRCP provided opportunities to assess learning in an informal contextual manner:

"….in-particular you can observe that the learning has taken place in practice and that it has been acted upon as you are able to observe this the next time. When someone says to you 'you might have done like this' or 'had you thought about this' as well; again you can see if this has had any impact.". - **Senior manager participant no. 24.**

Observing that learning has taken place especially in relation to infection prevention and control is important especially with the findings from a literature review which suggested that education especially more formal education had limited long term impact on infection prevention and control practices (Ward, 2011). Providing contextual educational input in the practice arena reinforces the value of tacit learning and good infection prevention and control practices (Nichols and Badger, 2008).

The findings from Phase 2 in relation to 'Education and Learning' suggest that the DRCP had been influential in the learning and development of staff in terms of CDI and infection prevention and control. However the study did not incorporate any specific formal evaluation methods to explore if learning had taken place and if this had resulted in changes to practice.

7.7 Conclusion

'Education and Learning' provided one of fundamental benefits of the DRCP. Increased knowledge and awareness of CDI, disease severity and complications along with the increased awareness in infection prevention and control practices to help prevent transmission, were perceived to have been influential in the care and management of patients with CDI. CDI had become embodied as an illness with a specific disease profile. The situated and contextual nature of the learning that took place during the DRCP assisted in this change from CDI as merely an infectious agent that needed to be contained to that of a real tangible disease with the patient as the focus. Central to this change of focus were the educational methods included by the IPCPs and matrons during the DRCP. This included

doing things *'with staff'* which assisted in the learning process. What became apparent in the data analysis was that the characteristics, traits and behaviours of the key players (IPCPs and matrons) were influential in the delivery of the 'Education and Learning'. These are discussed further in the next chapter (chapter 8) in relation to relationship development and the DRCP.

Chapter 8
Developing and sustaining relationships

8.1 Introduction

This chapter will explore relationship development within the context of the DRCP. It will focus on team work and the key traits, characteristics and behaviours that assisted in both team work and developing and sustaining relationships. These include approachability, communication skills and visibility. The chapter will also illustrate how developing and sustaining relationships was perceived to be influential in the care and management of patients with CDI. Underpinning theory will be utilised throughout.

8.2 Relationships, health care and infection prevention and control

Relationships are at the heart of effective health care delivery. The 'nature and quality of relationships are central to health care and the broader health care delivery system' (Beach and Inui, 2006, page S3). 'Relationship-centred care' (page S6) is influenced by relationships between clinicians either from the same professional group or different professions as well as the relationships between clinician and patient. These inter-professional relationships are in turn affected by the practice area, the culture and values of that area and the values of the organisation as a whole (Beach and Inui, 2006).

In a study undertaken by Ward (2012, a) student nurses and mentors highlighted that often infection prevention and control nurses were seen negatively by qualified nurses; the IPCPs were seen to increase workloads, give impractical advice and often be overly critical. Opinions of this nature can impact on the development of positive relationships.

8.3 Relationship development and the DRCP

The DRCP was seen as a catalyst that had helped to enhance and develop relationships between different staff groups including the relationship between the IPCPs and matrons and the IPCPs and matrons and the ward staff. In terms of positive responses, this was often attributed to approachability, good communication skills and being visible on the ward areas. These key attributes or characteristics and behaviours were seen as important by mentors and student nurses in Ward's (2012, a) study and form the basis of one of the sub themes of developing and sustaining relationships in relation to the DRCP. Team work was also a sub theme with areas such as collaboration and partnership working, being seen to be helpful and 'doing and telling' rather than just informing staff of what was required included within the context of team work.

Participants commented specifically on relationship development with the DRCP being instrumental in perceived improvements in these relationships:

*"I think that it (referring to the DRCP) has improved the relationships". - **Ward staff participant no. 27.***

*"It (referring to the DRCP) has helped with relationships; it's not just about infection control, it has helped with positive working relationships generally". - **IPCP participant no. 5.***

Interestingly the last comment by the IPCP indicated general improvements in the working relationships between the different staff groups (matrons and ward staff). These were not just related to infection prevention and control but covered general working relationships in the clinical area. Matrons and IPCPs commented on there being a commonality of purpose in that both parties wanted the same thing in relation to patient care and infection prevention and control practice and CDI. Other reasons for improvements in relationships included that they had provided an opportunity to get to know one another during the DRCP. On occasions the DRCP would be undertaken between the same IPCP and matron for a number of days which helped to build relationships. Ultimately the IPCPs and matrons over a period of time would meet up in different areas to undertake the DRCP dependant on the nature and distribution of patients with CDI. This again assisted in staff getting to know one another and developing and sustaining relationships. The relationship between IPCPs and matrons was commented upon specifically:

*"Yes it has certainly helped relationships; you have something in common, certainly with matrons; we can talk to them now more and discuss things. ....". - **IPCP participant no. 3.***

It is interesting here that the IPCP comments on the fact that they believe that they are now able to talk to the matrons and discuss issues, almost as though this wasn't the case in the past. The comment around the DRCP being seen as a process providing a common goal in and around the care and management of patients with CDI is also worthy of note. The 'modern matron' (DH, 2000) was introduced with the aim of helping to reduce HCAIs (Koteyko and Nerlich, 2007). The role including partnership working with the IPCT indicating that partnership working was already in place. However this study would indicate that whilst there may have been some joint working in the past, the interview data tended to indicate that the good working relationship had developed during the DRCP. A commonality of purpose in this instance had helped to develop those relationships. Good established health care relationships can in help with continuity and communication and ultimately the care and management of patients (Beach and Inui, 2006).

It is also noteworthy that the improved relationship between the IPCPs and matrons was also perceived to have been one of the benefits of the DRCP by senior managers who provided an overview of their thoughts on the strategic and organisational influence of the DRCP:

"It wasn't the intention when we embarked on this (referring to the DRCP) *that a benefit of it would be improved relationships between IPCPs and matrons". -* **Senior manager participant no. 23.**

Whilst the relationship between the IPCPs and matrons was perceived as a positive one, this had been a gradual development since the DRCP had been introduced. Initially there had been problems undertaking the review as a joint venture between IPCPs and matrons. This was often due to practical issues and workload demands of both staff groups. As previously highlighted, the checklist was originally devised with the intention of only the IPCPs to undertake the reviews. In order to promote greater ward ownership the matrons from specific ward areas were then asked to assist in undertaking the DRCP with the IPCPs. The addition of the matrons to the review process may have contributed to some of the initial problems. As is illustrated here the main issue was related to timing and resources:

"Sometimes it's difficult to get a time suitable for both parties to meet. Sometimes we have gone on our own; I have gone on my own and IPCP later on. I think it is important that we get there together but important at least to get there at some point even if not together. Difficult with pressure and other important things when we all are so busy.....". - **Matron participant no. 13.**

The above quote from one of the matrons illustrates that on occasions the DRCP is undertaken singularly with then IPCP or with the matron but the benefits of the joint approach especially around relationship development between IPCPs and matrons was noted as well. Senior managers had also recognised the logistics of IPCs and matrons undertaking the DRCP:

"I think the biggest constraint in undertaking it; is the peoples time to undertake it not just this but with everything it's about having the time to get the appropriate people together to undertake it. That doesn't mean to say that it shouldn't get done but it can be difficult". - **Senior manager participant no. 20.**

Relationship development between specialist nurses (in this case the IPCP) and other staff is an important aspect in the development of the specialist nurse role (Lloyds Jones, 2005). In a literature review undertaken by Lloyd Jones (2005) which examined role development and effective practice in specialist and advancing practice roles in acute hospital settings, negative views were included from both medical and ward based staff towards specialist and

advanced nurses (Flanagan, 1998; Marsden, 2000; Tye and Ross, 2000; Flanagan, 1998). This was due to a variety of reasons with one reason highlighted (particularly in relation to the ward based nursing staff) as the perceived lack of authority of the specialist nurse. The specialist nurse was not the ward nurse's line manager and as such was on occasions not seen to have the authority to implement any changes (Tye and Ross, 2000).

With the DRCP some of the issues linked to a lack of authority and line management were minimised due to the review being undertaken on the whole with a matron and an IPCP. The matron was seen to provide the authority with the IPCP providing the expertise. This is illustrated below:

"You (referring to the IPCP) have the expertise and the matron comes with more authority; it's almost that the matron agrees with what the IPCP says; almost like giving permission for the infection control to say what they say. Specialist nurse comes with a matron and it is almost saying that yes these guys are saying the same". - **Ward staff participant no. 18.**

As well the perceived authoritative presence of the matron in this relationship during the DRCP, the joint approach with both IPCP and matron providing the same advice or feedback also helped to reinforce key messages. It is interesting that from the excerpt here the ward staff participant is saying that if two people are saying the same thing then it must be right. Messages that are consistent and reinforced by more than one person can help to minimise confusion and promote better understanding and are more likely to be acted upon (Kings Fund, 2013).

8.4 Characteristics/traits important in developing and sustaining relationships

The key to developing and sustaining relationships especially with ward based staff during DRCP were the characteristics or personality traits and behaviours of the key players particular the IPCPs and matrons and the manner in which they approached the DRCP. These included communication skills, approachability and visibility on the ward areas.

8.4.1 Communication skills

Edwards et al (2012) maintain that central to effective clinical care is communication. Often with respect to infection prevention and control, health care workers are confronted with a large array of different communication channels and messages. Some of these can result in confusion and conflict. This in turn can lead to cognitive dissonance. Cognitive dissonance as described by Cooper (2007) occurs when a belief or an opinion is in conflict with the

actual behaviours displayed. This is often evident in relation to infection prevention and control and aligns with the evidence that was highlighted in the previous chapter with regards to education. Whilst there is evidence to suggest that education can assist with infection prevention and control knowledge, this may often only be short term and may not always result in changes to practice (Ward, 2011). There is also evidence to suggest that even if staff are aware of what constitutes good practice in infection prevention and control they may not necessarily demonstrate this in practice (Ward, 2011). In relation to the DRCP, the IPCP and matron undertaking the process together and delivering the same message in relation to patient management and CDI and infection prevention and control practices helps to reinforce key messages and prevent some of these issues

Both the mode and method of communication can assist staff in understanding what is expected from them in terms of infection prevention and control (Edwards, et al, 2012). The DRCP provided opportunities to communicate expectations of all the key players and to assist in the safe and effective care and management of patients with CDI. The daily review event of the DRCP also provided repeated visits providing an opportunity to reinforce key messages rather than a one off visit with no specific planned follow up visits. One off visits with no specific planned return visits were often 'custom and practice' prior to the introduction of the DRCP. The DRCP subsequently provided an opportunity for repeat visits and assessment as clinical need determined which also provided an opportunity to evaluate and advise on actions or issues that may have been instigated or raised at previous visits. An increased presence of an IPCP can help to reduce infections and improve patient outcomes (Vandenberghe et al, 2002).

Participants tended to highlight different the attributes of communication skills and whether the communication was effective or non-effective during the DRCP. This included the manner in which any information or advice was delivered and the timing and context of the communication during the DRCP:

*"Yes it is a skill to communicate with others when you've done something wrong or haven't done something….. It has a bearing on the staff…..some staff (*referring to IPCPs and matrons) *do it better than others in the way that they tell staff; they* (again referring to IPCPs and matrons) *need to change and do it differently so that staff see it* (referring to the DRCP) *as learning tool and not as finding fault". -* ***Ward staff participant no. 18.***

The importance of effective communication is highlighted in the above quote and the manner in which the information being relayed is perceived; referring to it as a '*skill to communicate with others'.* Interestingly, the excerpt goes on to state that the manner in which the DRCP is

undertaken helps staff to see the DRCP as a learning tool rather than a fault finding exercise. Not all staff involved in the review process (IPCPs and matrons) may have had the necessary attributes for effective communication which in turn may have impacted on the way they were then perceived. There was also the recognition from one senior manager that communication skills are not static and may require different approaches dependant on the circumstances. The ability to adapt to different circumstances and challenges is important as is illustrated below:

"…….It's about that balance and how you find that level of communication to communicate with all and recognise the different challenges so each time you can be an effective communicator". - **Senior manager participant no. 20.**

The DRCP alongside other infection prevention and control issues can present an array of challenges. These can range from observation of poor compliance for example with hand hygiene where staff may need to be challenged in order to promote safe practice to discussions and education specific to patient care and management linked to CDI. These different opportunities may require different approaches and may also be dependent on the receptiveness and specific target audience. In a study undertaken by Farrugia et al (2012), face to face contact with IPCPs was perceived by ward staff to be the most effective method of communication and disseminating infection prevention and control information. However Edwards et al (2012) argue that the timing and context of that communication is also important. This was illustrated by some ward staff on this study when discussing the DRCP. One ward staff member commented in detail:

"It depends on how busy we are really at the time; if we have a lot of discharges and we have someone with C.diff and then you come up and ask us questions and ask about the patient and other things and we may not have a lot of time to answer the questions.......... but there never is a good time is there? It's just that sometimes you are doing the ward round and answering phones and then infection control come and you think 'oh no they are going to ask me some questions'; it's not that you are worried about them coming on its just that you don't have the time to spend with them and it's not just you (referring to the IPCPs and matrons), it's others as well such as OT and Physio; everyone coming on". - **Ward staff participant no. 26.**

It is interesting to note though in the quote above, what the ward staff participant perceives to be important and what takes priority. Often other health care professionals input may be required or necessary to assist in the in the safe and effective care and management of patients but the timeliness, context and delivery of the interruption that are important in order for the recipient to be receptive and listen (Edwards et al, 2012). One ward staff member comments on this in relation to the DRCP and the manner and context in which the information was provided does make a difference:

"Well I think we have already talked about it – it's about being there on the ward and delivering things in context; helping out and discussing things whilst you are there and doing. If you say it in context it is less likely to offend. On the other hand if the person is busy doing something else at the time and you pop on and say err can you do that or you've not done that, that's when it can cause problems and get peoples backs up perhaps". - **Ward staff participant no. 25.**

Edwards et al (2012) goes on to highlight work undertaken by Westbrook et al (2010) and Sevdalis et al (2007). Both of these studies maintain that constant interruptions can impact on patient safety and workload. Not all interruptions are urgent or important and different individuals and scenarios will present different degrees of urgency and importance. Appropriate and timely responses can help to reduce the impact of any interruptions.

8.4.2 Approachability

Approachability in the context of this study included attributes or mannerisms that resulted in individuals being perceived as approachable. In relation to the DRCP this included '*being easy to talk to'*, '*being pleasant'* and '*interacting and engaging with other staff'* during the DRCP. Feedback also included some of the converse traits or attributes that resulted in individuals being perceived as 'unapproachable', for example being *'aloof'* or being a '*bit scary'.* Approachability was also seen as an important antecedent to establishing and building relationships, providing an opportunity for interaction and being able to ask questions and discuss issues. The excerpts from ward staff participants below highlight some of these key areas:

"…again it is back to who it is and what it is about; some are easy to speak with and discuss things with but others are a bit scary …. I do think it is also about trust. It's about do you trust these people coming on and it is getting that trust established. …. It's about the manner in which they approach the situation and build that trust. It's about a trust and pleasantness in undertaking things…". - **Ward staff participant no. 18.**

"….it is about me and that person working together. The ones that are approachable are the ones that help. The ones that are more aloof tend to be the ones that tell you off rather than working with you. ……..So whilst you are on the ward interacting with the staff they get to see your approachability and what you are like and who you are. More likely to engage and tell you what the issues are". - **Ward staff participant no. 26.**

In the above excerpt the ward staff participant comments on the approachability of the IPCPs and matrons and the staff being able to *'see what you are like'* and '*who you are'* during interactions within the DRCP. This links back to developing relationships and getting to know staff and then engaging in conversations and discussions. Ward staff were more

likely to do this if they had developed a relationship with the IPCPs and matrons. Wards' study (2012, a) which examined the attitudes of mentors and students towards IPCPs concludes that qualities of IPCPs including approachability are important in developing sustainable and collaborative relationships between clinical staff and infection prevention and control staff.

The comments about some of the key players (IPCPs and matrons) in this study being a '*bit scary*' or '*more aloof*' and the staff that '*tell you off rather than working with you*' again illustrates the importance of the perceptions of key players (in this case ward staff). What was seen to be important was how the IPCPs and matrons approached situations when they were working with other staff and delivering key messages around CDI and infection prevention and control. The comments implied that not all staff during the DRCP had the same approach which again links to the literature stating that often IPCPs can be aloof and not very approachable (Ward, 2012, a; Vandenberghe et al, 2002).

Matrons and IPCPs also perceived approachability and helpfulness as being important whilst undertaking the DRCP. Approachability was highlighted as being influential in that staff were more likely to ask questions and discuss any worries or concerns if the IPCPs and matrons were approachable which is illustrated below by one of the matrons. Also noted below in the excerpt by the IPCP, the DRCP was seen as being instrumental in the IPCPs being perceived as approachable. This is reflected in the comments below:

"I think they (referring to ward staff) see us as approachable and helpful which means that they come and talk to us more". - **Matron participant no. 14.**

"'Staff are more likely to come up and ask questions.... Probably the approachable bit about the DRCP is the best bit as it has had an impact and it's not necessary about C.diff; staff approach us about other things as well when we are out and about". - **IPCP participant no. 6.**

This also ties in with Ward's observational study (2012, a) whereby approachable and helpful IPCPs had a more positive influence on the ward or the area as a whole. One mentors comments provided similar comments to those provided in this study, highlighting that an approachable IPCP and one that 'works with us rather than against us' (page 653) providing helpful advice assisted in developing positive relationships (Ward, 2012, a). This was reinforced in this study with the DRCP by IPCPs as well as other staff.

A senior manager commented upon the manner in which staff approached the review process, specifically stating the rationale for undertaking the DRCP. What are interesting about the quote are the senior manager talks about '*wining hearts and minds'* and the DRCP not being about *'beating people up'.* This again illustrates the importance of positive approaches to infection prevention and control practice indicating how you are there to assist rather than informing staff of what they have done wrong:

"....It's the skill in how you approach the review and winning hearts and minds. It's about letting people know that you are coming on to prevent patients getting CDI or improving their patients' situation for those that already have CDI and it's not about coming on to beat you up with this". - **Senior manager participant no. 16.**

Style was also highlighted as being important in the manner in which the DRCP was approached:

"….If I come along it is about saying have you thought about doing this rather than I have come to tick your homework! Some infection control nurses will have a different style when they go onto the areas and some will be received differently". - **Senior manager participant no. 23.**

This last comment by one of the senior managers illustrates how the general perception of IPCPs included an acknowledgement of different styles in approach and how they (senior manager) believed that this may impact on the manner in which IPCPs are received in ward areas. This has some resonance with other studies. Ward (2012, a) included a similar comment from a mentor in the observational study examining perceptions of IPCPs by students and mentors. The mentor stated: 'she needs to tell us what's good occasionally instead of always beating us with a stick' (page 653) ('she' referring to an IPCP). IPCPs working amongst staff in an intensive care unit providing support and educational input were also found to assist in improving relationships and had an overall positive effect in relation to being seen to be approachable (Vandenberghe, et al, 2002).

Approachability in this study was important in developing relationships, but the IPCPs and matrons were also perceived to be more approachable as a consequence of those relationships. Ward staff believed that as they got to know the IPCPs and matrons and developed a relationship they established which IPCPs and matrons were the ones that they believed they could talk to more so then others. This is highlighted below:

"We all know you better now and we know who we can talk to more than some of the others perhaps … . I would ask certain people but if it was others I may wait for someone else to come on the ward, someone I can talk to". - **Ward participant interview 22.**

Waiting for other members of staff to come onto the ward who they believed *'they could talk to'* may have consequences for patient care and management and infection prevention and control practice. It is important that staff are able to speak up and express any concerns or ask questions in the clinical environment to assist with the patient safety agenda (Leonard, 2004).

8.4.3 Visibility

One of the areas that participants commented upon with reference to the DRCP was the visibility of IPCPs and matrons since the DRCP was introduced. Whilst visibility may not have been exclusively linked with the development and introduction of the DRCP, there was recognition that the DRCP had been a catalyst in assisting with the change in focus and local perceptions of the role of the IPCP as illustrated here:

 "You (referring to the IPCPs) *are a lot more visible than were a few years ago when all we saw you as were folks in an office; I like the increased visibility"*. - **Ward staff participant no. 26.**

Previously the role of the IPCP had been that of surveillance, education and adviser with sporadic visits to wards and areas when there were specific problems to investigate and or monitor. The changing landscape of health care delivery as well as the changing role of the IPCP has dictated a more varied approach to the prevention and control of infections and assisting with patient safety (Garcia, et al, 2000). Locally this has been reflected in part by the introduction and development of the DRCP especially around visibility.

There was also a recognition that alongside visibility was the concept of availability. The participants perceived that it was not just about being visible but it was also about the IPCP and matron being available and approachable. A comment here by a matron indicates that this was felt to be having been due to the review process:

 "..Availability and visibility on the ward has improved with the reviews". – **Matron participant no. 8.**

Senior managers also highlighted the impact of visibility on relationships but interestingly saw this as 'spin off' rather than the initial aim. They do mention that visibility had helped to raise the profile of IPCP. Also the fact that an IPCP and a matron review patients with CDI

every day had helped to raise awareness as well as the importance of CDI and this is illustrated here:

"The spin offs around relationships and visibility have been greater than expected. I think visibility is really important and I think it has really raised the awareness of the importance of infection control around C.diff management and other things". - **Senior Manager participant no.23.**

IPCPs also mention the impact of the DRCP on visibility and getting out there as is described here:

"Overall I think it has helped (referring to increased visibility)……. . *Us getting out there has improved things as we do not always…... We go out and are seen on the ward". -* **IPCP participant no. 1.**

The comment below also reinforces previous views on the role of the IPCP which was often distant and remote at times (Ward 2012, a). Increased visibility with the DRCP had helped to change that image:

"I think that seen more as part of the team now rather than a department somewhere in the hospital. Definitely more part of the team and will ring and ask things now…..". - **Matron participant no. 11.**

The comment by the IPCP participant focusing on visibility and being out on the wards compared to the ward staff participant commenting on the IPCP being seen as part of the team illustrates that it is also the context of the visibility and how that is perceived that is important. Ward (2012, a) highlights that student nurses commented that IPCPs were seen as more approachable if they were visible on the ward in particular linking approachability and visibility. Comments included that visibility helped staff on ward areas get to know the IPCPs. This in turn also helped to develop and improve relationships (Ward 2012, a).

In terms of the DRCP increased visibility and the development of relationships meant that staff began to feel more at ease with the presence of the IPCPs and matrons and discuss any concerns or worries. The DRCP provided a platform for contextual based clinical and IPC specific concerns or questions as well as other infection prevention and control issues that staff may have been concerned about. Visibility and improved relationship development can provide opportunities for language to become more meaningful (Hornstein, 1998 cited in Timmermans et al, 1998).

8.5 Team work

Kavanagh et al (2004) maintain that team working is a 'fact of life when delivering modern health care' (page 200) and that team work is ultimately beneficial to the patient (Kavanagh, et al 2004). They go onto highlight that the inquiry into the failure of paediatric cardiac surgery at Bristol Royal Infirmary (Kennedy, 2001) was attributed to ineffective team work rather than individual failings. Whilst perceptions of staff in relation to the DRCP predominantly relate to the immediate nursing ward based team there is also reference to other professions within the ward for example medical staff and domestics working in the ward environment. The IPCP and matron often in the context of the DRCP involved other professions during the review process. This may have been in relation to specific patient care and management issues, for example requesting medical staff to liaise with a microbiologist to discuss treatment options. Other aspects that may have been discussed may have been around cleaning and decontamination incorporating discussions with housekeepers and or domestic staff.

Team work and inter-professional collaboration can have different meanings to different professional groups which in turn is influenced often early in career pathways and training Nurses in particular learn early in their careers to work as a team and problems solve collectively for the benefit of the patient, whereas doctors often learn independently (Hall, 2005).

In relation to the DRCP, team work was perceived as particularly important and participants used a variety of word and phrases as well as team work, for example, *'team building',* *'getting involved' 'part of the team' and 'working together'.* However in the context of team work this tended to be related to feedback from ward staff and senior managers on the importance of the IPCP and matron being seen to be part of the team rather than relating to the larger multidisciplinary team (MDT) in general:

"You (referring to the IPCP and matron) *are more part of the team and getting involved.......".* - **Ward staff participant no. 27.**

 "If you (referring to the IPCP and matron) *come and say there is a problem here but we will all work together to help – this is more teambuilding isn't it…….".* - **Ward staff participant no. 25.**

These two statements above illustrate what the ward staff perceived were the key components with respect to team work and team building. These included the IPCP and matron getting involved and undertaking joint problem solving. The second quote above is

particularly interesting with the ward staff member stating that there may be a problem but indicating that everyone should work together to collectively solve the problem. This indicates that they (ward staff participant) perceive that there is a joint responsibility. This is also inferred with the statement from the senior manager:

"I think that is a real key to getting this right – you are not saying to somebody I have found this stop what you are doing and come and sort it; you are doing it – we are all responsible but we are also responsible to inform staff about the issue but it was sorted at the time". - **Senior manager participant no. 24.**

This last statement implies that the senior manager believes that there is an element of joint responsibility and the IPCPs and matrons should be undertaking certain actions at the time. However they (senior manager participant) are also stating that it is also important that as well as any remedial actions, the information is handed over to the nurse so they are aware. In this way the responsibility is shared. The downside to the IPCP and or matron undertaking the actions every time is that staff may perceive this to be the sole purpose of the DRCP. The aim is not to undertake the actions as a matter of course but to assist others or ensure that the actions are undertaken. Dimond (2001) argues that the dangers of the specialist nurse taking over rather than educating and providing specialist advice may result in the general nurse becoming de-skilled. It is important that the DRCP provides the support, guidance and assistance where appropriate but does not become a substitute for safe and effective patient care and management and IPC practices. The DRCP may only occur once a day or every other day, therefore staff need to be able to understand and implement any necessary actions at other times. Borrill et al, (2000) maintain that effective team work is about ensuring that all the key participants within that team are aware of their individual responsibilities with a recognised mutual accountability.

The final statement from the senior manager below highlights the importance of the key players in the process (the IPCP and matron) being seen to be part of the team but with recognition of the importance of the monitoring role of the DRCP:

"...important that you are seen as part of the team and not seen as part of a peripheral nursing service that is there to police....". - **Senior manager participant no. 24.**

8.5.1 Collaboration and partnership working

In the report into the failings at Mid Staffordshire NHS Foundation trust, Francis (2013) maintained that there needs to be effective teamwork between all the different disciplines within the context of collective care and patient safety. Mohman et al (1995) maintain that a

team is a group of individuals collectively working together to deliver services with joint accountability. This focuses on collaboration and partnership working. With respect to the DRCP, both of these were highlighted by the matrons as being for the benefit of the patient. The excerpt below comments on '*now the working partnership is very good'* implying that it is something that has developed over time as previously alluded to:

 "*Now the working partnership is very good and we work very collaboratively together for the benefit of the patient"*. - **IPCP participant no. 2.**

Team working in the context of the DRCP encompassed the IPCP and matron being seen as part of the team and working together but was also highlighted in the context of working with staff on the wards rather than just coming on and telling staff what the particular problems were. This again was linked to being helpful and working together to achieve common gaols for the patient with the patient being the focal point. In the context of team work this may have been more transient than longer term although the excerpt above and previous transcript data from matrons and IPCPs implies that it could also have had a more general impact on their team working and collaboration.

8.5.2 Helpfulness/supportive role

The DRCP appeared to facilitate the IPCP and matron being helpful and supportive. The IPCP and matron were seen as a resource and staff felt able to ask questions whilst the DRCP was being undertaken. This may have been linked specifically to the patient with CDI, CDI in general or other infection prevention and control advice. Linking with visibility, staff felt because the IPCPs and matrons were visible on the ward, they felt able to ask other questions whilst they were there. A quote from one of the ward staff *'a good resource to sort things out'* provides an interesting perception about the role of the IPCP and the impact that the DRCP may have had on those perceptions as well as their perceptions of the role of the IPCP as well:

 "*Don't see as a threat (referring to the IPCP and matron) see as a good resource to sort things out"*. - **Ward staff participant no. 15**.

This links with the earlier comments about the role of the specialist practitioner and the dichotomy between one of help and support to one of taking over.

The term *'supportive'* was also used in the context of being seen to be helpful. It was also implicit from some staff members, particularly senior managers that the DRCP had not

always been perceived as having been undertaken in a supportive and helpful manner as is indicated in the excerpt below:

"I think then if you go on in the manner that I am here to support you and what can I do to help you rather than I am here to berate and batter you and make you feel inadequate because you haven't done this or done that or something isn't right. It should be how can I help and what can I do to help support? It is that attitude and relationship that has changed I think". - ***Senior manager participant no. 16.***

However the final sentence in the above comment does suggest that there has been a change in the approach and delivery of the DRCP by the key players (IPCPs and matrons). Senior managers also provided their views on how they thought the review process should be undertaken again focusing on the importance of being supportive during the DRCP. Often IPCPs are viewed as mainly an advisory service (Perry, 2005). The DRCP highlighted that alongside this advisory role is the educative, supportive and helpful role:

"It should be supportive as well being about managing patients; it's about managing staff as well in a supportive way...................... there to help and support. It should always be about help and support and a critical view but in the right way". - ***Senior manager participant no. 24***

Helpfulness and *'helping out'* rather than coming on to the ward to tell them what was wrong was seen as positive:

"....With helping, it makes you (referring to the IPCPs and matrons) *more approachable and helpful rather than coming and telling us that we are doing things wrong. It makes us feel that we are doing our jobs better because you are helping us out and telling rather than just telling us what is wrong".* - ***Ward staff participant no. 22.***

8.5.3 Doing and telling

The previous statement about helpfulness and 'doing and telling' rather than just going on to the ward and telling staff what to do was a common theme amongst the ward staff who participated in the study. It is interesting that it was the combination of both informing and getting involved that made the ward staff perceive the DRCP and the IPCPs and matrons involved in the process, as helpful. It is also interesting that the positive action of 'doing' made the member of staff feel as though they were doing their own job better culminating in perceived improvements to patient care.

The positive influence of an IPCP can have a positive influence on staff motivation and also patient care (Vandenberghe et al, 2002). Jelphs and Dickinson (2008) maintain that creating

177

safe cultures in patient care settings are about creating a shared interest to ensure that things are undertaken for the benefit of the patient. There needs to be an element of trust between staff in order to facilitate recognition, reporting, and learning from areas where improvements need to be made rather than purely fault finding exercises (Jelphs and Dickinson, 2008). One of the IPCPs summarises the importance of collaborative working and the 'doing and telling':

"Yes if we see things that need attention we do things and help them (referring to the ward staff). I perceive that staff see us as not just telling them that this needs doing; if things need doing we will do it. Don't just do CDI things..........". - **IPCP participant no. 7.**

This concept of 'doing and telling' was also highlighted by the ward staff and here the participant links this directly to developing relationships:

"It (referring to the DRCP) *does promote good relationships with yourselves especially when you are coming and helping, as well as saying what needs to be done".* - **Ward staff participant no. 25.**

The quote below from a senior manager and a ward staff participant highlights the importance of the approachability, helpfulness and team work of the key players in the DRCP (in particular IPCPs and matrons) and in developing and sustaining relationships. The senior manager uses the term enabling which again is more about supporting staff to undertake actions and '*do things properly'* rather than the IPCPs and matrons necessarily undertaking the actions:

"My view and I am sure it is well known especially with IPCPs is that they should be seen as enabling and not as a policing role.... I know it comes down to individual styles in the end but overall the team needs to be an enabling team and the ward team need to see you as enabling/assisting them to do things properly". - **Senior manager participant no. 23.**

"You practice what you preach and that is better rather than coming and writing things in the notes. If you (referring to the IPCP and matron) stay a while and are helping and looking around, it is really helpful. It alters your image in a way when you are coming to help; you are seen as beneficial to the staff on the ward. If you come and say there is a problem here but we will all work together to help; this is more teambuilding isn't it. You are teaching at the same time, you are running through things; giving reasons to people as you are doing it". - **Ward staff participant no. 25.**

The final quote above also highlights the importance of being helpful but here the ward staff participant appreciates that the role of the IPCP and matron within the context of the DRCP is a collective responsibility. They go onto state that it is about doing things together with the

emphasis on team work and team building alongside the educative benefits that is the key to the success of the DRCP.

8.6 Conclusion

Leonard et al (2004) discuss the importance of effective communication and team work for the delivery of safe patient care. If there are barriers to effective communication and a lack of perceived team working this can impact on safety. Staff may also be less likely to speak up if they have concerns in relation to infection prevention and control. Creating an environment where staff feel safe can assist staff in speaking up if they do have any concerns (Leonard et al, 2004). The DRCP had evolved enabling IPCPs and matrons to engage with staff on the wards and develop those relationships. Relationship development between the IPCP and matron has also been fundamental within the DRCP. This relationship has enabled a more open approach to discussing infection prevention and control issues in general as well as in relation to CDI. It has also assisted matrons as well as IPCPs in their knowledge and understanding of CDI, infection prevention and control practices and prevention of transmission. This provides an opportunity for key messages to be reinforced by other staff with leadership roles. Leadership roles, leadership and change management are discussed in chapter 9.

Chapter 9
Leadership and change management

9.1 Introduction

'Leadership and Change Management' form the third and final theme from the data analysis. This chapter provides an opportunity to explore how leadership and change management assisted in the review process and also how leadership and change may have evolved as a consequence of the DRCP. The chapter begins with an overview of the subthemes included in this main theme and then provides an introduction to leadership and management and infection prevention and control. The role of the DRCP in patient safety is also explored. As with previous chapters, underpinning theory is included throughout.

9.2 Sub-themes

The main sub-themes generated from the data analysis included leadership which encompassed clinical leadership, postheroic leadership and patient centred leadership. Other sub themes included patient safety encompassing assurance and standardising practice. Whilst the benefits of the DRCP have been demonstrated in 'Education and Learning' and 'Developing and Sustaining Relationships' it is also important to recognise the role of the DRCP in providing real time monitoring and assurance as was discussed in Phase 1 of this study. The DRCP as a method of monitoring patients and practice was highlighted by all the respondents and ties in with the DRCP as a process for change. Initially when the checklist was introduced, the review was seen as a tick box exercise with the aim of seeking out and addressing any issues or concerns. However this had changed over time with staff seeing the benefits of the DRCP and the review process becoming the 'norm' for patients with CDI. Finally in the context of leadership, expertise is explored. The IPCP was often seen as the expert in CDI and infection prevention and control practices during the DRCP.

9.3 Leadership and management and infection prevention and control

Effective leadership is central to health care delivery and in particular patient care (Kings Fund, 2013). Leadership and management skills are relevant for all healthcare practitioners irrespective of their position, with clinical leadership and managing change playing an important part in today's health care delivery (Gopee and Galloway, 2009). Francis (2013) highlighted shortcomings around leadership in the report into the failures at Mid-Staffordshire NHS Trust. Francis (2013) discussed a 'negative culture' and a 'top down command and control leadership style' (page 4) which can have a tendency to prevent staff from owning up

to their mistakes and others learning from these mistakes. This can ultimately impact on patient safety (Kings Fund, 2013).

In relation to infection prevention and control, Griffiths et al (2008) maintain that leadership is fundamental for the delivery of effective infection prevention and control practice. They go on to highlight the findings from the Health Care Commission (HCC) reports into the outbreaks of CDI at Maidstone and Tunbridge Wells NHS Trust (HCC 2007) and Stoke Mandeville hospital Buckinghamshire Trust (HCC, 2006) and the negative effects that poor leadership had on these outbreaks. Cole (2011) discusses the impact of leadership in helping to promote effective infection prevention and control practices. This was in particular around the patient safety agenda, highlighting amongst other aspects the introduction of the 'modern matron' (DH, 2001) as a senior figure in the clinical setting providing leadership and visibility. Gould (2008) and Dealey et al (2007) also highlight the importance of leadership and the matron role and maintain that this was a key aim when the 'modern matrons' were first introduced. This was in particular around the clinical leadership and ward based presence (Gould, 2008). In relation to the DRCP one of the main aspects and feedback from the participants in this study was the increased visibility or 'presence' of both the IPCP and matron during the DRCP and the influence the participants perceived this had on the care and management of patients with CDI.

9.3.1 Clinical leadership

Edmonstone (2009) maintains that in relation to health care, clinical leadership has existed since the inception of the NHS. Clinical leadership involves clinicians from a variety of health care backgrounds in the clinical domain, with some form of leadership position, usually with a patient or a team focused approach. This emphasises the micro as oppose to the macro approach to leadership. In contrast to this 'managerial leadership' is often associated with a macro organisational approach involving hierarchical structures and positional power in order to achieve results (Edmonstone, 2009). Both aspects of leadership tend to focus on the individual in a particular role with a specific set of personal attributes and characteristics inherent within that role.

Infection prevention and control roles can be included in both elements of these styles of leadership. There is the day to day clinical specialist role alongside for example the 'lead' or consultant IPCP role which may involve more strategic and organisational input. However both of these IPCP roles focus on safety and the prevention and control of infection and both demonstrate leadership styles and qualities (Perry, 2005). Leadership and management are

included in the core competences of IPCPs identified originally by the Infection Control Nurses Association (ICNA) (Perry, 2005). The ICNA was replaced by the IPS (Infection Prevention Society) and leadership and management are amongst one of the four domains of the outcome competences for IPCPs (Burnett, 2011). One of the aims within leadership and management is to 'improve quality and safety through networking, influence, pro-activity and challenge' (page 15). A performance indicator linked to this aim includes:

'Advise key people of the effect that their decisions will have on safety and quality and the risks of not taking actions related to infection prevention and control promoting and developing leadership and management' (page 16).

Murphy et al (2012) highlight leadership in infection prevention and control as being influential rather than authoritarian and assert that helping staff to manage competing agendas alongside prioritising infection prevention and control and patient safety requires skill and leadership qualities. With reference to the DRCP this dual role is discussed by a senior manager in the excerpt below:

"'For me it is crucial that you have a leadership role as a nurse not just the infection control part but as a nurse……. That is what will enhance your role and enhance your image for me rather than the person that comes with the care plan and Tristel cleaning or other things. It's the leadership that's important; it's how can I help; what can I do; if doing a bed bath helps to understand the infection control issues then so be it. You are a nurse first and foremost aren't you?". - **Senior manager participant no. 16.**

What is interesting in the feedback from this senior manager is that it is the nursing role and the leadership qualities inherent in that role that were seen as important within the DRCP. The senior manager refers to the fact that the IPCPs in particular are seen as nurses first and foremost. Interestingly in this study not all of the IPCPs were nurses but all had a professional background with the accountability and responsibility of health care professionals. Again linking to the previous quote, leadership in the context of the DRCP was also seen as having a 'doing' and 'helping' function, in other words more of a facilitative role and collaborative leadership rather than just an enabling role. This ties in with leadership not just being the mandate of a few individuals at the 'top' of an organisation but relevant to others involved in the day to day management of patients. This broader approach to leadership is something that is portrayed as important in postheroic leadership (Fletcher, 2004). One ward staff member also commented on the leadership element of the DRCP indicating that it isn't just about the immediate ward based team that can be influential as is highlighted here:

"…Yes I think it is about leadership with the review. I don't know you know.....you don't always get leadership from other areas… ". - **Ward staff participant no. 22.**

The comment here also implies that leadership wasn't necessarily seen from other colleagues in practice in the immediate ward based team. This is consistent with some of the findings of Francis (2013) and other recent publications around leadership in health care where leadership including ward leadership was found to be suboptimal (Kings Fund, 2013; Turnbull James, 2011). Ward leadership is seen as pivotal in improving staff motivation and wellbeing alongside improving patient care experiences (Kings Fund, 2013). Whilst the DRCP cannot replace the day to day ward leadership demonstrated in the ward manager and ward sister charge nurse roles, having input and influence during the DRCP albeit in the that limited capacity can help to support and assist ward staff especially around infection prevention and control practices and consistency of approach.

9.3.2 Postheroic leadership

Postheroic leadership emphasises empowering others to understand and manage the risks and possible consequences (Fletcher, 2004), which in this case were linked to infection prevention and control. This is associated with a broader model of leadership which focuses on a collective approach and the development of '... dynamic, interactive processes of influence and learning…' (Fletcher, 2004, page 648). Postheroic leadership is characterised by social and human interactions, shared leadership and increased learning (Fletcher, 2004). This would appear to correlate with the findings from this study in terms of 'Developing and Sustaining Relationships' and 'Education and Learning' and the links that these have with leadership. Fundamental to relationship development between the different groups of staff (IPCPs, matrons and ward staff) was approachability and helpfulness of the key players (IPCPs and matrons) and their influence in CDI management and the educative benefits that were derived from this. These included increased knowledge and awareness and the embodiment of CDI as an illness.

Turnbull James (2011) also highlights leadership as a dynamic and collective activity often achieved by the development of relationships. Turnbull James (2011) goes on to argue that the more complex and changing nature of a contemporary health service, the more traditional individualistic styles of leadership, whilst important, also need to be supported by a 'network of people engaging in leadership practices throughout the organisation who may never acquire the label of leader…..' (page 5). The IPCP, matron and ward staff may all have a leadership role due to their involvement and participation in the DRCP. This may be

around providing advice, instigating actions or enabling/supporting ward staff to instigate actions. This is illustrated here by a ward staff participant. The actions mentioned in this quote could be around the IPCP or matron instigating the actions or the ward nurse themselves undertaking the actions:

"It's also good for the patient and it is good for them to know that things are being checked and actioned if required. It's awful for them obviously having an infection but it makes them feel better knowing that everything is being done for them that can be done to minimise the impact and make them comfortable; we are doing something about it". - ***Ward staff participant no. 15.***

9.3.3 Patient centred leadership

As already alluded to, whilst shared or postheroic leadership is important; there is also the recognition that more traditional styles are still valuable within an organisation and it is the development of more complimentary models that can help to promote more effective results (Turnbull James, 2011). Within the DRCP, staff found the IPCP and or matron useful in assisting in escalating any issues or concerns for patients with CDI. One IPCP below demonstrates this influence and uses the term 'chain of command' linking to a more hierarchical structure more conducive with the traditional heroic styles of leadership:

"Staff are not always sure about the chain of command and don't know how to or don't feel comfortable in escalating issues especially about patients and we can help them to do that.....". - ***IPCP participant no. 6.***

The main focus of leadership in health care is ensuring that the needs of the patient are paramount. Patient centred leadership as this is often referred to can be achieved by being visible, setting examples, providing shared leadership with others and ensuring that staff feel valued and supported. This in turn leads to improved patient experiences (Kings Fund, 2013). The DRCP was very much seen as having been influential in the care and management of patients with CDI in terms of visibility, providing good examples of practice and overall in utilising an approach that supports and encourages rather than berates staff. From the transcript excerpts below it can be seen that this also relates back to the embodiment of CDI as an illness with the patient the central focus of the DRCP. It also provided an opportunity to spot any early problems helping to prevent any co-morbidity around CDI:

"At ward level it is the ability to say that we have made a difference and understand that we have made a difference and it has helped to keep patients well and they have not died or suffered with diarrhoea for weeks and weeks and that is just the way it is. Well it doesn't

have to be the way is. All round it has made a difference". - **Senior manager participant no. 16.**

"It also allows us to have a conversation with the staff about what it is that is important for that patient and what needs to happen in care alongside this…. What is important is about managing C.diff with the condition they have as well". - **Senior manager participant no. 24.**

This last excerpt highlights the importance of recognising that CDI is rarely a standalone illness. Patients are often admitted to hospital with other problems or may develop CDI whilst they are in hospital. Again this links with embodiment and understanding CDI as an illness impacting on other illnesses and/or problems that the patient may have. Some of the excerpts below also further support the DRCPs influence on the embodiment of CDI as an illness combined with the holistic management of patients:

"It (referring to the DRCP) *provides holistic management of a patient with C.diff".* - **Matron participant no. 6.**

"Yes it(referring to the DRCP) *has definitely had an impact on patients... the checklist makes you look at everything that needs to be done and everything that should be happening for the patient".* - **Ward staff participant no. 15.**

One ward staff member alluded to the actual checklist element of the DRCP with the patient as the focus stating the 'checklist' helps them to look at what should be happening for the patient. Another comment by a ward staff participant illustrates how the review has helped them to focus on what is important and comments that it (referring to the DRCP) has helped them to provide better care.   The statement emphasises the positive impact of the DRCP rather than seeing the DRCP as a fault finding exercise. It also illustrates the patient focused element in relation to CDI:

"I think it has provided better care…. keeps us focused on what is important. We see what a dangerous thing it can be and how important it is that we put extra precautions in……..as much as I hate it we need you to tell us if things are not right; you are here for the patients; we are all here for the patients. As much as I don't want someone to come and say I have found this, I know it has to be done". - **Ward staff participant no. 26.**

"That's what patient see; these people care about me enough, they think it is important enough to send two senior nurses to see me every day. It's about confidence. It's about the 6 C's from the Chief Nurse; it's about care and confidence; it does make a difference to the patient". - **Senior manager interview no. 16.**

In this last quote above the senior manager refers to the 6C's; these are encompassed in the vision and strategy for nursing in England, 'Compassion in Practice' outlined by the Chief Nursing Officer for England and the Lead Nurse for Public Health England, (DH, 2012). The

6C's comprise of care, compassion, competence, communication, courage and commitment. Inherent within delivery of this strategy is collaborative leadership at all levels with staff working together and supporting each other to ensure that the patient is central to everything (DH, 2012). The DRCP had the patient as the focal point of the review, ensuring that any problems or concerns by the reviewers (IPCPs and matrons) or ward staff with respect to the patients' condition or treatment were addressed. This was seen to have made a difference to the patient.

9.4 The IPCP as an expert/specialist role

IPCPs as the specialist in infection prevention and control are viewed by ward staff as having up to date knowledge and expertise (Perry, 2005). In this particular study this related to specific CDI knowledge and expertise but also to more general infection prevention and control practices. This is illustrated below from both the ward staff and senior manager participants. Interestingly the first quote from one of the ward staff refers to the IPCP and matron having that expertise and knowledge implying that that was what they were there for, to ask questions:

''You have the expertise so we can ask, that's what you are there for''. - **Ward staff participant no. 15.**

"You (referring to the IPCPs and matrons) *have the expertise and knowledge to help the staff understand what is important.... it is your specialist input that is there to help".* - **Senior manager participant no. 24.**

The senior manager talks about helping the staff understand what is important but also about the '*specialist input being there to help'* again implying that the specialist knowledge is about being there in a helpful capacity and not just about imparting knowledge and telling people what they may have done wrong. Leadership amongst other things is about facilitating and enabling staff to be equipped with the necessary skills and knowledge to undertake the appropriate patient care (Kings Fund, 2013). During the DRCP the review process provided an opportunity to assist staff in understanding what was important in respect of CDI and the specific patient focused aspects as well as the infection prevention and control aspects in relation to the environment and standard precautions. This approach enabled staff to undertake patient assessment and infection prevention and control precautions for other patients with an infectious agent of infectious disease.

Both the Association for professionals in Infection Control and Epidemiology (APIC) (Murphy, 2012) and the IPS (Burnett, 2011) see the role of IPCPs as synonymous with providing expertise in and around infection prevention and control and this is highlighted in both of their competences frameworks. Both organisations view the competences as on a continuum from novice to expert with the newly appointed IPCP being at the novice end of the continuum. Experience and development provides IPCPs the opportunity to develop to expert. Novice to expert is a framework based on the work by Dreyfus and Dreyfus (1980) who explored skill acquisition model with airline pilots. Benner (1984) became well known in nurse education adapting this skill acquisition model to explain the continuum from novice to expert for nurses. In this study the key players undertaking the DRCP (IPCPs and matrons) were seen as experts in infection prevention and control irrespective of where they may have been on that continuum.

Instigating actions was seen as fundamental within the expertise of the key players undertaking the review (matrons and IPCPs) but in particular the IPCPs. The DRCP was seen as a platform providing an opportunity to instigate actions and respond to any problems or concerns in particular for patients with CDI. This may have incorporated the IPCP and or matron instigating the action, for example speaking to the consultant microbiologist. Alternatively it may have involved the IPCP or matron instigating the ward staff to undertaken the action. For example the IPCP or matron may have suggested that the ward doctor to speak to the microbiologist. In both instances the 'actions' were viewed positively:

"Also doctors might not see things but any anomalies or worries can be highlighted to them; it may not be us ward staff but it may be you guys that pick things up and mention to the doctors so they then act on it". - **Ward staff participant no. 27.**

"It might have been a couple of days before when things were picked up for example abdominal distension and pain but now we act a lot sooner". - **Ward staff participant no. 21.**

The last quote from the ward staff participant is interesting in that they acknowledged that the DRCP has had a positive influence specifically on the care and management of patients. The ward staff believed that, issues were being recognised in a timelier manner than previously because of the input of the IPCPs and matrons and their increased knowledge and awareness. In a specialist role, patient outcomes are often achieved through the practice of other staff on the wards and areas rather than being the sole function of the specialist nurse. However this then results in a reliance on others undertaking the actions that in this case the IPCP may have requested or instigated (Sundquist Beauman, 2006).

IPCPs perceived the DRCP facilitated closer patient monitoring as oppose to practice by the IPCPs. Prior to the introduction of the checklist review in the study Trust, when a patient was diagnosed with CDI, a care advisory sheet would have been taken up to the ward area. This included important information related to infection prevention and control practices but predominantly focused on contact precautions[38] cleaning and the prevention of transmission. Any further review would be reliant on contact by the ward to the IPCP or alternatively an ad hoc visit from the IPCP. There was also little or no information regarding the patient care elements that were included in the checklist review (see appendix 1 for an example of the original checklist V1). The DRCP as well as providing a more consistent presence with patient and ward review also provided an opportunity to monitor any issues or concerns with the patient and the environment or any concerns that staff had either directly related to CDI or other infection prevention and control issues. Matrons undertaking the review also had the opportunity to follow up any issues with the ward staff and ward managers as well as highlighting areas of good practice:

"I think we monitor the patients more closely certainly around the patients". - **IPCP participant no. 7.**

"….We (referring to themselves as ward staff) *are not waiting around for things to happen; we pick up things and get them done or you do them".* - **Ward staff interview no. 15.**

The last two comments highlight the issues around the IPCP and matron monitoring the patient and the issue of whether the DRCP is about taking over or facilitating. Dimond (2006) examines the role of the specialist nurse in relation to the dichotomy of the specialist nurse providing advice and being 'responsible for' or 'taking over' patient care. Dimond (2006) focuses on the legal liabilities and maintains that omissions in care could take place if there is not clarification of who has responsibility for the care of the patients but also highlights the dangers of the ward nurse potentially losing knowledge and competence in areas for example in infection prevention and control.

Kennedy (2001) also highlights that it is important that when working in teams that accountability issues are addressed in order that staff do understand individual roles and responsibilities. However the second excerpt from the ward staff member does indicate that they believed that any actions could be provided by either themselves as ward staff or by the IPCP and matron. The DRCP provides an opportunity for both the IPCP and matron to have

---

[38] Contact precautions are derived from transmission based precautions and 'are used to prevent and control infections that spread via direct contact with the patient or indirectly from the patient's immediate care environment (including care equipment).' (Health Protection Scotland [HPS], 2014, page 19).

direct input into the care and management of patients with CDI as well as providing advice. However the IPCP and matron had a responsibility to ensure that ward staff understood the potential complications and the importance of measures to help prevent the spread of the disease in order that ward staff could recognise and manage any issues or problems at any time during the care and management of patients with CDI. This was to prevent relying solely on the DRCP to highlight issues or instigate actions.

9.5 Patient Safety

Patient safety is paramount in today's modern health service and is fundamental in patient centred leadership (Kings Fund, 2013). There have been a series of reports and responses to patient safety especially in the last two years. These include the inquiry into the Mid-Staffordshire NHS Foundations Trust (Francis, 2013), the Keogh report (Keogh, 2013) and the Berwick review (National Advisory Group on the Safety of Patients in England, 2013). The Berwick review (National Advisory Group on the Safety of Patients in England, 2013) maintains that '… the quality of patient care especially patient safety should be placed above all other aims' (page 4). Whilst many of these reports examine patient safety in a broader sense, Cole (2011) maintains that any HCAI, for example CDI impacts on patient safety due to the adverse links with increased morbidity and mortality. The Health Foundation (2014) also highlights the incidence of HCAIs including CDI as a patient safety indicator.

Patient safety is defined as 'the avoidance, prevention and amelioration of adverse outcomes or injuries stemming from the process of health care' (Vincent 2006, page 14 cited in Vincent 2010, page 31). Interestingly Cole (2011) maintains that clinical leadership with respect to the matron role has the potential to impact on infection prevention and control and patient safety. In terms of the DRCP, the role of the matron in the process would indicate that in terms of the care and management of patients with CDI, their input alongside the IPCP has certainly been influential around patient safety as perceived by the participants in this particular study:

"Ultimately it (referring to the DRCP) *shows that patients are safe and that's what it is all about". - **Matron participant no. 8.***

*"Yes I think that it is about safety and it is a good thing that you pick things up". - **Ward staff participant no. 26.***

This statement by the ward staff participant highlights the positive aspect of issues being 'picked up'. This again associates the DRCP with real time monitoring and surveillance,

providing opportunities to action any issues that arose. This was one of the main findings of Phase 1 of the study. The fact that any concerns and issues raised during the DRCP were seen as important in relation to the safety agenda also illustrates the DRCP being perceived as a process linked to patient safety.

9.5.1 Providing assurance and standardising practice

Linked with patient safety was assurance. This was seen to be an important element of practice for all participants and a fundamental aim of the DRCP:

"It (referring to the DRCP) *must be better from an assurance point of view to say that we are doing it and providing evidence re CDI; if the CQC visit, it* (referring to the DRCP) *also provides evidence…..".* **- IPCP participant no. 3.**

The comment by the IPCP here illustrates that infection prevention and control is also about providing the evidence that infection prevention and control practices are being undertaken. Here the IPCP also refers to the CQC (Care Quality Commission). The role of the CQC is to provide periodic review to ensure that hospitals, care homes, dental and GP surgeries and other care services meet the government's standards for 'safety and quality' (CQC, 2012, page 2). The IPCP in this instance perceives the DRCP as well as providing assurances to the organisation also provides assurance to the various agencies designed to ensure that safe practice is in place:

"It also allows assurance that everything is in place, we can pick things up and escalate any issues if any problems........I don't think it is a constraint to me, it's about just capturing what needs to happen every day". - **Senior manager participant no. 24.**

The senior manager in the above quote refers to capturing what needs to happen every day, which illustrates the importance of the DRCP providing a consistent and standard approach. Effective leadership is about ensuring that standards are delivered consistently and providing staff with the opportunity to do this in order to maintain patient safety (Kings Fund, 2013). The DRCP provided a framework to help achieve and maintain standards in relation to the care and management of patients with CDI for both the ward staff and the staff undertaking the review (IPCPs and matrons). The quote below highlights the benefits that ward staff had found from the DRCP in that it had provided an opportunity to increase knowledge and awareness with respect to the processes and procedures that were required:

"It is about standardising practice and I believe it (referring to the DRCP) *has; it shows processes that people should be adhering to it; they may have been unaware of the things*

that needed to be done that way in the past but they are now". - **Ward staff participant no. 18.**

9.5.2 The DRCP 'becoming the norm' (changing perceptions)

The perception that the DRCP helped to standardise practice around the care and management of patients with CDI also linked with the changing perceptions of the DRCP. Undertaking the DRCP over a period of time resulted in the DRCP becoming the 'norm' in relation to reviewing patients with CDI:

"I think that has become more normalised now.........staff know that this is what happens around here; it becomes the norm for these patients when they come in". ***- Senior manager participant no. 24.***

"I think people are getting used to it and getting used to seeing you coming and going; getting used to the way that things are done". - ***Ward staff participant no. 18.***

Practices can become normalised into day to day health care delivery; for example in this case the DRCP. In the last excerpt above the ward staff participant refers to the staff '*getting used to it'* and *'seeing you coming and going'.* Both of these phrases indicate an acceptance as to the normal routine for patients with CDI. This again links into the earlier quote from the senior manager who also refers to the fact that the DRCP has become part of normal practice. It is also worthy of note that the IPCPs and matrons undertaking the DRCP on the ward had become an accepted part of everyday practice. Often in terms of infection prevention and control, IPCPs are only seen when there is a problem or an outbreak (Perry, 2005). The DRCP was perceived as a more proactive approach designed to assist in recognising problems earlier due to increased visibility of the IPCP and matron and the facilitative, helpful and educative nature of the process.

Murray et al (2010) maintain that normalisation process theory (NPT) can help to explain why certain practices become normalised into everyday practice. This is due to collective action, participation and continuous investment (May et al, 2009). Collective action and participation are indicative within the DRCP with the daily review aspect of the DRCP providing the continuous investment. There are four main aspects to NPT (Murray et al, 2010). The first is making sense of something, which in relation to the DRCP could refer to all the staff groups when the DRCP was first introduced. Matrons were asked to undertake the review in response to senior management requests. Ward staff initially may not have understood the concept and the rationale for the introduction of the DRCP. Staff perceived

the DRCP as having a 'policing' and 'big brother' function. Whilst the DRCP had an audit and monitoring function, it became apparent that the DRCP was far more than just a surveillance tool. The participants demonstrated that the perception had changed over time to a more positive one. This is illustrated here:

"I don't see you as a threat anymore when you come on to the review, I see you as a good resource to sort things out". - **Ward staff interview 15.**

The second component of NPT is engagement. In this case, this could refer to both the matrons and IPCPs when the DRCP was first introduced as there were some initial problems engaging in the process. The IPCPs and matrons developed a more workable model in order to ensure that the DRCP was completed. Engagement also links with the relationships that developed between different staff members following the introduction of the DRCP. Staff had engaged more openly with each other during the review process and in other situations that were infection prevention and control related. Thirdly the NPT includes collective actions. In terms of the DRCP the different staff groups including IPCPs matrons and ward staff were all involved in the review process either directly or indirectly.

Collaborative working helped to develop and sustain relationships and in the care and management of patients with CDI. The final component of NPT is benefits and costs (Murray et al 2010). In terms of the DRCP individual and collective benefits have been illustrated throughout this chapter and the previous two chapters by the respondents. Also prolonged investment in the DRCP has assisted in CDI being embodied as an illness and contributing to a general reduction in CDI rates and mortality related to CDI within the study Trust. This is illustrated below in the excerpt from the ward staff participant:

"Because they see that you are just doing your job that you have managed to stop out breaks and other problems; targets have come down and down from gov. They now see that oh yes they are here just as normal and coming to do the job; see it as the norm now. They perhaps in the past took it personally but I don't think that they do now. If we need to change things now then we have to get on with it". - **Ward staff participant no. 27.**

9.6 The DRCP as a catalyst for change

The fact that the DRCP has become 'normalised' into the daily routine for IPCPs and matrons as well as ward staff illustrates how the DRCP became a catalyst for change. Change is a constant in any organisation and the ability of organisations and individuals to adapt and manage change is important in overall development and sustainability (Paton et al

2008). Successful change incorporates clear and realistic goals with shared visions and linked implementation strategies. In terms of the DRCP the vision and implementation strategies were clear in terms of the initial checklist and the role of the IPCPs and matrons. The checklist was aimed at assisting the organisation alongside other strategies, for example antibiotic prescribing and enhanced surveillance and monitoring in the reduction of CDI rates. Initially the matrons had some reservations in the joint undertaking of the DRCP. This was due to a variety of reasons including original perceptions that the checklist review was the domain of the IPCPs. The end product, the DRCP with the shared vision around apparent improvements in the care and management of patients with CDI and patient safety helped to change the perception of the DRCP for the matrons. There remained logistical issues for the IPCPs and matrons to meet up to undertake the review due to time constraints and competing priorities but this did not detract from the perceived benefits of the joint review.

9.6.1 Policing role/ 'Big brother'

The checklist review was initially perceived as a 'policing role and the term 'big brother' were also included by some of the participants during the interview process. However, as the comment below indicates, this tended to be directed at the key players (IPCPs and matrons) rather than the actual process itself:

"Unfortunately it feels a bit of a policing thing at times with some when they come on and the way they are (referring to the key players IPCPs and matrons) *.......".* - **Ward staff participant no.18.**

As was explored in the last chapter around relationship development, the approach of the IPCPs and matrons was important in the delivery of the DRCP. This approach often then had a direct impact on the subsequent attitude and response from the ward staff. If the approach was positive and helpful, the ward staff tended to be more receptive and positive. Leadership and change management incorporate developing relationships with 'collective understanding and positive actions' (Fletcher, 2004, page 649). Positive environments are dependent on the ability of individuals to create positive conditions where learning and new knowledge can take place (Fletcher, 2004). The DRCP was about assisting staff in the care and management of patients with CDI. This included creating a positive environment which was assisted by the manner in which the key players delivered those messages. This then became important for its success which is demonstrated below:

"Yes I have maybe heard you (referring to the IPCPs and matrons) *referred to as 'big brother' or the 'police' but I don't think it is bad thing. No I think it reminds staff of the things that are important so I don't think it is a bad thing. I think that people see that you are there and are looking around and that's good to me". - **Ward staff participant no. 25.**

The above quote highlights that the policing role/big brother role was not always perceived as a negative. This particular quote refers to one of the ward staff who was a more senior member of the ward team:

"Don't think it is seen as 'big brother'; sometimes we are so busy it (referring to the DRCP) *is reassuring to us that if we don't get in there and check that at least you guys do it". - **Ward staff participant no. 15.**

In this last comment the participant perceived the DRCP to be about helping and providing reassurance that certain things were being checked rather than the more negative connotation of 'big brother'. However the intimation in this last excerpt, that the IPCP and matron would *'do it'* if the ward staff member was not able to undertake the checks links back to the dichotomy of the specialist role being there to assist rather than taking over (Dimond, 2006). There is a danger that the ward staff become reliant on the IPCP and matron to undertake important assessments for patients with CDI as opposed to the ward staff undertaking them. The IPCP and matron role was to ensure that certain assessments and infection prevention and control practices had been undertaken providing education, help and support where necessary.

Whilst there was an element of the DRCP or the key players being seen as a providing a policing role, there was also acknowledgement of the importance of the DRCP in assisting in patient care and the management of patients with CDI and the prevention of transmission of micro-organisms:

*"…I think it reminds staff of the things that are important so I don't think it is a bad thing. I think that people see that you are there and are looking around that's good to me". - **Ward staff participant no. 25.**

"They (referring to ward staff) *thought 'wow' it must be serious especially as not seen them as much on the wards before". - **IPCP interview no. 2.**

This last quote is interesting in that the IPCP acknowledges that they were not as visible in the past on the ward areas. The DRCP as highlighted earlier had been instrumental in changing the visibility of IPCPs on ward areas in particular. The nature of the daily review process which incorporated assessment of the patient and the environment resulted in increased lengths of time that IPCPs in particular spent on ward areas.

9.6.2 Tick box exercise/subjective

With respect to the DRCP, some of the specific feedback from the IPCPs in particular was around the issue of the DRCP being a 'tick box exercise'. Interestingly the comments here included a mix of some respondents perceiving the DRCP to be a tick box exercise and some respondents feeling that it may have started as a tick box exercise but this had now changed:

"I think it is a bit of a tick box exercise really". - **IPCP participant no. 3.**

However there were some positive comments from the IPCPs in relation to 'tick box exercise' which is illustrated here:

"To me it is more than a checklist and you are looking after the patient from a CDI aspect". - **IPCP participant no. 5.**

Interestingly here the IPCPs viewed the DRCP as being more than just a checklist. Whilst there was a checklist element to the review process, the DRCP focused on looking after the patient with CDI. Recent reports and publications linked to patient safety and management highlight the importance of patients being at the centre of everything that is undertaken with and for patients (Keogh, 2013; NHS Commissioning Board, 2013). The DRCP helped to facilitate dedicated time to review potentially seriously ill patients. It also highlighted CDI being embodied as an illness in its own right with the importance of the patient assessment as well as checking infection prevention and control practices.

However one of the disadvantages of a checklist approach is that individuals may stop looking at what they are supposed to be looking at. In other words the danger is that they focus on completing the checklist rather than focusing on what the checklist is actually saying. This could result in things being missed as a senior manager discusses here:

"There is a danger that it may become a tick box exercise; you are doing it because someone has said it is a good idea and you are ticking the box rather than looking at things and seeing what is needed in a particular area. So I think there may be a kind of inevitably and that is the main constraint that people view as something that we have to do because we have been told to do it". - **Senior manager participant no. 23.**

Whilst checklist use in healthcare can be useful in overall prevention of error and in improving patient care and management, it is important that they are constantly re-evaluated and updated in order to prevent 'checklist fatigue'. Any changes should also

involve key players (Hales et al, 2008). The initial interview data from IPCPs and matrons from Phase 2 along with the findings and discussions from Phase 1 resulted in changes to the checklist used in the DRCP. The revised checklist is discussed in the summary and discussion chapter (chapter 10).

9.7 Conclusion

The leadership qualities of the IPCPs and matrons were perceived to be important in the delivery of the DRCP by all the participants, in particular senior managers and ward staff. The senior managers and ward staff believed that the DRCP provided an opportunity for the IPCPs and matrons to exercise their leadership skills and qualities to assist staff in the care and management of patients with CDI. A postheroic leadership style promoting interaction and learning (Fletcher, 2004) was seen to be beneficial with the patient as the focal point of the review process. Ward staff in particular commented on how the DRCP had changed from purely a surveillance tool used to check up on staff, to one of a helpful and supportive process. The DRCP was still perceived to assist with patient safety in relation to recognition of disease severity and the complications of CDI and the prevention of transmission of the disease, especially by senior managers. Leadership style by the IPCPs and matrons was seen to be fundamental in the manner in which the DRCP was received by ward staff. This links back to the key traits, characteristics and behaviours of the key players (IPCPs and matrons), for example approachability and visibility. These were instrumental in developing relationships and the educational approach adopted whilst undertaking the DRCP which is explored further in chapter 10 (Discussion and summary)..

Chapter 10
Summary and Discussion

10.1 Introduction

The chapter will discuss, summarise and offer an overview of the main findings of the study. Chapter 5 presented and offered a discussion of the findings of Phase 1. This chapter begins with a summary of the key points that emerged from Phase 1 and outlines how the results also helped to inform Phase 2. The findings from Phase 2 explored in chapters 7, 8 and, 9 provided an in-depth analysis of the three main themes that emerged from the data namely: 'Education and Learning', 'Developing and Sustaining Relationships' and 'Leadership and Change Management'. These main themes along with the sub-themes provide data that illustrate the interactions of the key players (IPCPs, matrons and ward staff) and how an intervention (checklist) incrementally improved relationships, educated and provided leadership for the management of patients with CDI. Although beyond the remit of the study, the daily review checklist process as it became known hopefully also improved outcomes for patients.

Chapter 2 provided background literature and an introduction to the study and the rationale for undertaking the study. Central to this project was the introduction of a checklist and discussion of checklists and their association with the theoretical understanding emerging from the field of human factors. This linkage will be revisited in this chapter in order to examine the findings derived from Phase 2, namely the three substantive themes and how these relate to human factors theory. In particular this will explore the contribution that the understanding derived from the interrogation of the DRCP has had to current thinking about the use of checklists and human factors in healthcare and specifically infection prevention and control and CDI. Further development of the literature related to human factors theory is included throughout the chapter where relevant.

10.2 Phase 1 overview

Phase 1 provided an opportunity to examine the information reported on a checklist developed by the IPCP team, and introduced in an NHS Trust following a period of increased incidence in CDI rates in one of the two hospital sites. A retrospective documentary analysis was undertaken to examine the content of 928 checklists that had been completed over the period July 2010 to December 2011. The evaluative nature of Phase 1 of the study provided an opportunity to explore the data generated from the checklists. This included the total number of checklists completed, specific areas where

there had been an increased use of the checklist, specific data generated within the actual checklist itself and any evaluative data related to the actual completion of the checklist.

10.2.1 Summary of key discussion points from Phase 1

Phase 1 provided insights into clinical staff compliance with aspects of the care and management of patients with CDI. This included examining the different elements reported through checklists, including patient care, environmental and standard precautions (see appendix 1 for the original checklist). Overall in relation to environmental compliance, the highest rate was signage being in place and the door closed alongside used linen being removed from the room (95%: 882). The two areas with the highest non-compliance were the cleanliness of commodes (18%: 168) and side rooms occupied by patients with CDI being clean and tidy (16%:154). The importance of general environmental cleaning and equipment such as commodes combined with de-cluttering to facilitate cleaning to take place were emphasised in two reports which examined major outbreaks of CDI at Stoke Mandeville Hospitals Trust (HCC, 2006) and Maidstone and Tunbridge Wells NHS Trust (HCC, 2007 as well as the DH (2008, a) guidance on CDI management.

The patient care items on the checklist proved more difficult to analyse due to the subjective nature of checklist completion, particularly with wording used to elicit information relating to patient observation measures, for example vital signs temperature measurement. Using temperature recording as an example, some of those completing the form (IPCPs or matrons) included the actual numerical reading of the patients' temperature on the form. Others ticked the item to indicate that completion of temperature recordings had been checked. The 'comments' section of the checklist also actively encouraged subjectivity, for example, some IPCPs and matrons would write in the patient care comments section either the numerical value or document 'apyrexial', whereas others would leave that section blank having only ticked the temperature box. Tables 10.1 and 10.2 provide examples from the original checklist on completion. As can be seen from table 10.1 it is unclear if this indicates that the temperature has been checked or if the patient has a temperature. Table 10.2 is more comprehensive and provides clearer information as to the patient's temperature status.

SLUICE	YES	NO	Comments or Actions taken
Temperature	✓		

Table 10.1: Example 1 of how information regarding temperature was recorded on the original checklist V 1.

SLUICE	YES	NO	Comments or Actions taken
Temperature	✓		Answered.

Table 10.2: Example 2 of how information regarding temperature was recorded on the original checklist V 1.

Overall Phase 1 provided insight into local checklist use and demonstrated that the checklist offered real time monitoring of patients with CDI. The checklist process created timely opportunities to highlight and action any anomalies or concerns to the ward staff or via the IPCP or matron to initiate referrals or escalation. The checklist also provided a structured approach to ensure that certain elements were undertaken and verified. This provided an insight for IPCPs and matrons as well as ward staff of the important areas that needed to be assessed for patients with CDI.

The checklist information was also fed back to senior management providing a more strategic insight into the daily issues around the care and management of patients with CDI as well as infection prevention and control practices. The feedback to senior management also provided an opportunity to examine current patients with CDI within the study Trust. Figure 2.4 following page and chapter 2, section 2.13.1 demonstrate the communication and management of the data generated by the checklists. Saving Lives (DH, 2010, a) illustrated the importance of a 'Board to ward'[39] approach in the proactive management of HCAIs.

---

[39] 'Board to ward' approach was introduced in relation to the reduction of HCAIs and focuses on all members of staff having a responsibility and ensures that all levels of an organisation are aware of what those responsibilities are including board and ward members (DH, 2008, b).
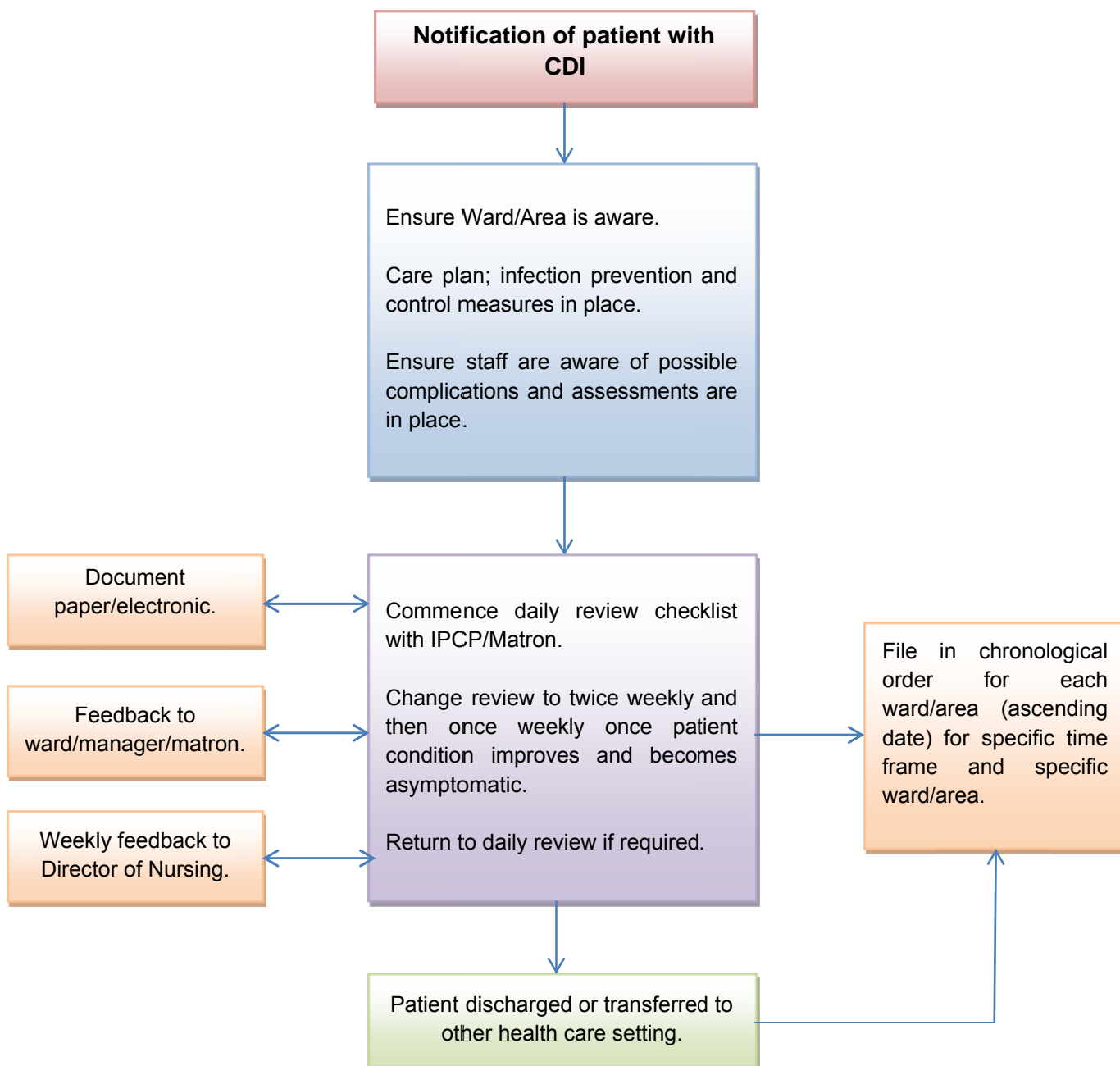
Figure 2.4: Flow chart to demonstrate the Daily Review Checklist.

10.2.2 Adaptation of the initial checklist

Feedback from Phase 1 and initial findings from the early interviews in Phase 2 helped to re-design the checklist form in an attempt to address some of the problems encountered in

analysing the findings from Phase 1 (see table 10.3 and appendix 1 for the revised checklist, version 2). Feedback from Phase 1 and initial findings from the early interviews in Phase 2 (IPCP and matron interviews) were used within the organisation to help re-design the checklist form in an attempt to address some of the problems encountered in analysing the findings from Phase 1. The revised form is shown in table 10.3

Clostridium *difficile* Daily check list

WARD   DATE   COMPLETED BY

Patient care	YES	NO	Comments/ Actions	
Check the following and include any actions:				
Abdomen – has the patient any abdo pain discomfort or distension				
Temperature – Is the patient pyrexial				
Nutritional status – Is this up to date; record MUST			MUST:	
Pressure ulcer risk assessment – is this up to date; record Waterlow			WATERLOW:	
Fluid balance – is this applicable and up to date				
Is the stool chart recorded and up to date Document type of stool and frequency			STOOL TYPE and FREQ:	
Is the patient on any CDI Medication Is the patient on any other significant medications (that may impact on CDI)				
Has daily bed bath/hygiene care been undertaken				
Has the patient had a daily bed linen change				
Care pathway/care plan	YES	NO	Comments/ Actions	
Is the care pathway/plan up to date				
Have all relevant elements been completed				
Isolation room	YES	No	Comments/Actions	
Patients with clostridium difficile are being nursed in the side room with the door closed and appropriate signage in place				
Side rooms are clean, free from dust/ spillages (check behind lockers, under beds and curtain rails) Side room is clutter free to facilitate cleaning				
Used linen has been removed from the room				
Twice daily Tristel clean in place and staff and domestics aware re HPV following discharge/transfer etc.				
Standard Precautions	YES	No	Not Observed	Comments/Actions
Staff are washing hands with soap and water after contact with patient with diarrhoea.				
Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals				
Staff are using PPE appropriately when in contact with a patient and/or patient environment				
Clean linen stored in the linen store area only (not bathrooms/sluice/bays/SR's)				
Infected linen is disposed of correctly and is not left in the side rooms or bays.				
Cleaning and general Environment	YES	NO	Comments/Action	
Tristel is being used at the correct dilution and is dated and timed (24 hour shelf life once made up)				
There are no single patient use items (check bathrooms cupboards/shelves for part used containers)				
The ward/unit area is generally clean and tidy and clutter free				
Dirty Utility	Yes	No	Comments/Action	
All bedpan bases are clean and in good condition				
All commodes are clean – check underside, frame and foot rest.				
Apron and gloves are available				
Discussed with Nurse in Charge/Caring for patient			Name:	

DRCP V 2

Table 10.3: Revised checklist version 2.

The patient observations items are now less ambiguous and elicit specific responses, for example asking if the stool chart is up to date as well as more detailed information about the type and frequency of stools (see table 10.4). This type of clinical information can be used along with other status data to judge the severity of CDI (DH, 2008, a). Relating back to the temperature example from earlier and the old chart, the new updated checklist provided more specific questions (see table 10.5). Ordering has been reversed and patient care items are at the beginning of the revised checklist followed by the standard precautions and environmental items. There is now an additional column so that any items that cannot be completed can be recorded as 'not observed' (see table 10.6). The revised checklist was introduced into the study Trust in April 2013.

Patient care	YES	NO	Comments / Actions
Is the stool chart recorded and up to date Document type of stool and frequency			STOOL TYPE and FREQ:

Table 10.4: Excerpt from revised checklist V 2: Patient care element (stool type and frequency).

Patient care	YES	NO	Comments / Actions
Temperature – Is the patient pyrexial			

Table 10.5: Excerpt from revised checklist V 2: Patient care element (temperature).

Standard Precautions	YES	NO	Not Observed	Comments / Actions
Staff are washing hands with soap and water after contact with patient with diarrhoea.				

Table 10.6: Excerpt from revised checklist V 2: Standard precautions element.

.

Adaptations incorporating the findings from Phase 1 of the study and the initial data produced from the interview transcripts from the key players in Phase 2 of the study emerged as in keeping with human factors approaches. Adopting a human factors approach helps to ensure that any process or system is evaluated and revisited with changes incorporating feedback from those involved in the process. A human factors approach focuses on promoting teamwork and improving communication in an attempt to reduce errors (Catchpole, 2013). Incorporating the findings from Phase 1 and combining these with

the evaluation from the IPCPs and matron with respect to the ambiguity and subjectivity of some of the elements of the checklist assisted in modifying the checklist. This ensured that the responses provided a more detailed and accurate picture relating to the patient with CDI in particular and assisted in promoting subsequent communication about the patient to the medical staff. This may have been the IPCP or matron discussing the patient with the medical staff or the microbiologist or the ward staff themselves undertaking this collaboration. Communicating and providing important information about the patient and or the environment can assist in maintaining patient safety (PHE, 2014, a; DH, 2008, a).

10.2.3 Phase 1 informing Phase 2

What became apparent from the findings of Phase 1 was that the checklist was an artifact used as part of a process and the actual intervention warranted further exploration. Phase 1 findings provided background contextual information and also key areas for elaboration in semi–structured interviews in Phase 2. This included exploration of how staff felt about undertaking and/or being subjected to the process and checklist completion. It also included staff perceptions of the influence that the DRCP may have had on the care and management of patients with CDI. What if any, changes should be incorporated to the checklist and the process in the future. Appendix 3 provides an example of the initial interview schedule and the open ended questions used. The interview schedules are numbered in versions from version 1 to version 9 in appendix 3 to demonstrate the evolving nature of the interview process. This is inherent in grounded theory due to the iterative nature of the process enabled by constant comparison. The researcher obtains information that is relevant to emerging concepts and themes (Charmaz, 2006).

10.3 Summary of findings of Phase 2

Early in the project it began to emerge that the checklist, although designed to audit compliance with infection control precautions, was, possibly inadvertently, operationalised as an interactive process. The different staff groups who participated commented on the educative nature of the DRCP and how the DRCP had resulted in the increased visibility of IPCPs and matrons on the ward and clinical areas. The helpfulness of key players (IPCPs and matrons) during the DRCP had in turn resulted in enhanced relationships between the key groups involved in the process (IPCPs, matrons and ward staff) and improved team working.

What began as an audit and surveillance checklist tool designed to help address a problem of increased incidence of CDI, developed into a process (DRCP) involving key players (IPCPs, matrons and ward staff). This process became influential in the care and management of patients with CDI. The DRCP became a catalyst for change as well as being part of the solution in the overall reduction of CDIs within the study Trust.

Fundamental to the DRCP was education, with the IPCPs seen as the experts and the exponents of learning and the ward staff and matrons as the recipients. Inherent was the contextual nature of the learning. The DRCP provided opportunities for staff to learn about CDI, the complications and recognition of disease severity. Staff found the contextual nature of the learning particularly helpful in increasing knowledge and awareness of patient related issues as well as infection prevention and control practices to help prevent transmission of CDI. Situated learning and informal practice based learning incorporate interactions between individuals and the environment that they find themselves in. The contextual nature of the learning that takes place at the time provides meaning and assists in understanding (Eraut, 2011; Lave and Wenger, 1991).

In relation to the DRCP matrons and ward staff developed an understanding of CDI, the disease profile and complications alongside the infection prevention and control practices required to prevent transmission. The DRCP incorporated individual patient assessment by the IPCP and matron in conjunction with the ward staff. Whilst checking the environmental aspects of the review process was important, the main focus of the DRCP was the patient. CDI began to be seen as an illness in its own right rather than just an infectious agent or merely a 'diarrhoeal illness'. CDI became embodied as an illness with a specific disease profile and the patient as the main focus of the DRCP.

The DRCP also provided an opportunity for increased visibility and a perceived helpfulness often involving practical hands on assistance by both IPCPs and matrons in the ward areas. This practical 'hands on assistance' could involve clinical patient assessment with the IPCP for example, escalating concerns in relation to CDI to the microbiologist. Alternatively practical assistance could involve cleaning the commode if it was found to be dirty in conjunction with informing the member of staff. The participants commented on this helpfulness as 'doing and telling' rather than just telling or informing.

The DRCP exposed different practitioner styles from the IPCPs and matrons, both in completion and delivery. Certain styles especially those of IPCPs, including being

approachable and helpful, were seen to assist in the process. Communication skills were seen as important in the delivery of key messages or information during the DRCP. The manner in which the IPCPs in particular spoke to them was seen as important by ward staff. An example is included below:

"Sometimes it is the way in which you are told to tidy up for example, and the way that you are spoken to as well; some people can be very rude". - **Ward staff participant no. 19.**

Approachability was seen as important in developing relationships particularly between ward staff and IPCPs. This led to staff being more willing to ask questions and discuss issues with respect to patient care and management or areas linked to infection prevention and control precautions and the prevention of transmission:

"..It is like in any job if people are approachable then more likely to ask questions and will come to you more". - **Ward staff participant no. 22.**

Relationship development was especially evident between the IPCPs and matrons since the introduction of the DRCP. The matrons commented particularly on the improvements in relationships between the IPCPs and matrons:

"It has (referring to the review process) built up a lot of rapport between the IPCPs and the matron". - **Matron participant no. 13.**

When it worked well, the DRCP was viewed as an educative, enabling and helpful process with a common goal to resolve problems, help staff and assist in the care and management of patients with CDI. Staff commented that it was still seen as having '*a policing role'* but this mainly related to the style and delivery of the key players (IPCP and matron) as opposed to the actual review process. The DRCP had become normalised and part of everyday practice, perceived to assist in the care and management of patients with CDI. Staff had seen the positive benefits (alongside other initiatives) of reduced rates and improved outcomes for the patient and themselves in relation to their understanding of the disease process. The DRCP became a process there to assist rather than '*tell staff off'* which subsequently resulted in staff endorsing and embracing the concept. Providing evidence of the benefits of the DRCP to staff and patients by assisting staff is also illustrative of incorporating a human factors approach. Providing a 'shared sense of mission' (Bosk et al, 2009, page 374) and reinforcing combined efforts to improve the patient experience is also reflective of human factors principles. Often when using a human factors approach,

processes and systems may not be embraced initially (Bosk et al, 2009). This had been the case with the DRCP with benefits emerging as the checklist process developed. The IPCP and matron were instrumental in providing a consistent approach day in day out. Whilst there may have been variations in approach which influenced some staff's perception of the process, overall the systematic approach assisted in delivering key messages in relation to CDI and infection prevention and control practices. Helping staff to resolve problems by incorporating improved communication and team work also aligns with a human factors approach (Catchpole, 2013). Enhanced communication and team working between the IPCP and matron and the ward staff were inherent in the DRCP and assisted in the care and management of patients.

A diagrammatic summary of the evolving nature of the DRCP is demonstrated in figure10.1.
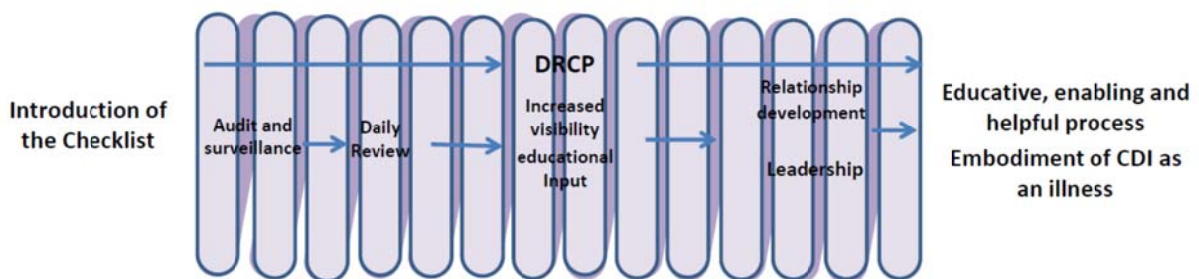
Figure 10.1: Diagrammatic representation of the evolving nature of the DRCP and the influence in the care and management of patients with CDI.

What can be seen from this diagrammatic representation is that a checklist was introduced by the IPCT in the study Trust. This checklist review was promoted by the organisation who advocated that it was owned jointly by IPCPs and Matrons (key players). The checklist was initially undertaken with a surveillance and institutional assurance aim. Whilst the checklist was unreliable in that it was differentially completed, indications from early data in the study suggested that the checklist provided an opportunity for real time monitoring and an opportunity for increased visibility and educational input. Undertaking the checklist review on a daily basis produced interaction between the IPCPs, matrons and ward staff enhancing communication and impacting on behaviour. This incorporated patient safety elements including patient assessment, observation that standard precautions were being undertaken by all staff at all times and inspection of the environment. Improved communication and behaviour change are all important aspects of a human factors approach (Russ et al, 2013).

In addition to assessment and observation, the IPCPs and matrons were involved in doing as well as observing, actively participating as part of the team, facilitating team between themselves and the ward staff. 'Policing' changed to assisting and also produced actions by the IPCPs and matrons, with the ward staff and for the patient. The checklist review began to emerge as a process hence the development of the DRCP. However there is no clear point as to when that process emerged, it was during the process of data analysis which helped to uncover the DRCP.

Alongside the evolving nature of the DRCP what began to emerge was that the DRCP also incorporated a human factors approach. It is important to point out that whilst the checklist process was not instigated as a human factors approach at the outset, it became synonymous with human factors. The DRCP developed as an innovative approach and was successful in assisting in the care and management of patients with CDI. Many of the attributes associated with its success for example improved communication and the educational benefits compare favourably with human factors theory. However in addition to a human factors approach which unwittingly was adopted, the transformation of CDI from contagion to illness experienced by patients with bona fide signs and symptoms added credibility to the DRCP and contributed to the process being perceived as important because it made a difference to patients.

Providing a framework such as the checklist albeit undertaken by the IPCP and matron provided the opportunity to promote quality and patient safety and identify problems early on and to action or prevent further complications occurring. When utilising a human factors approach, it is important that there is an understanding of what mitigates individuals not to implement evidence based aspects of care and management. Checklists may be left unused on occasions no matter how robust. Developing relationships can help to reinforce the contributions of each other in the process (Bosk et al, 2009). This was apparent in the DRCP with the IPCP and matron reinforcing good practice and assisting staff where necessary in the care and management of patients with CDI during the process.

Learning occurred throughout which was often embedded in the principles of situated learning. There was increased infection prevention and control knowledge generally and in relation to CDI. The patient became the focus of the review process and CDI was seen as a real illness with embodied signs, symptoms, specific treatment regime and an understanding of disease severity and prevention of transmission. Fundamental to this were three key areas or themes; 'Education and Learning'; 'Developing and Sustaining Relationships' and 'Leadership and Change Management'.

10.4 'Education and Learning'

'Education and Learning' were seen as one of the fundamental benefits of the DRCP and in particular situated practice based learning. Situated learning encompasses learning as a situated activity and central to this activity are the learners and the environment in which they find themselves (Lave and Wenger, 1991). Whilst Lave and Wenger (1991) relate their situated learning theory to an apprentice style model, the concept is relevant to the DRCP in this study. Contextualisation helps with understanding and subsequent development of knowledge and awareness (Lave and Wenger, 1991). Lave and Wenger (1991) maintain that learning is not just situated in practice but is linked to the lived experience and 'generative social practice' (page 35) which they refer to as 'legitimate peripheral participation' (Lave and Wenger, 1991, page 35).

In relation to the DRCP the value of the contextual learning was the engagement between the IPCP, matron and the ward staff in the context of the patient with CDI. This engagement assisted staff in understanding why certain aspects related to the patient or the environment were being assessed or checked. For example assessing if the patient had abdominal pain or distension which could indicate that the patient had developed or was developing pseudomembranous colitis, a complication of CDI (see chapter 2, section 2. 3 for a definition and further information on pseudomembranous colitis). An example is highlighted here:

"*Yes it (*referring to the DRCP*) has definitely improved our knowledge. We knew it was diarrhoea and C.diff but didn't realise that it could potentially be life threatening and the seriousness of it. Yes helped us to understand it more. Definitely improved knowledge". -* **Ward staff participant no. 21.**

Attaching meaning and significance to learning helps staff to internalise the knowledge and put it into practice (Lave and Wenger, 1991). Eraut (2011) maintains that this form of work place learning can assist with learning, rather than more formal or organised training (Eraut, 2011). This also ties in with a human factors approach. Human factors theory supports modification and designs of systems or processes to assist individuals (Russ et al, 2013). The DRCP was instrumental in developing an educational approach that assisted staff in the care and management of patients with CDI alongside staff's own benefits of increased knowledge and awareness. A human factors approach also adopts systems or processes that consider the benefits to patients and staff (Noble et al, 2012).

The clinical patient assessment aspect of the DRCP was provided by both IPCPs and matrons. In undertaking the clinical patient assessment, the IPCP and matron presented an image of a clinician engaged in the practices of a real illness encounter (CDI) rather than the review of a vague contagion. This had helped CDI to become embodied as an illness with a particular focus on the patient. Embodiment in this instance relates to a greater understanding of the whole situation allowing for recognition of when things are going wrong (Benner et al, 1989). Whilst patients may have presented with other illnesses and diagnoses, CDI was no longer seen as an 'add on' to these but also as an illness in its own right. This was perceived by the respondents as being as a result of the introduction of the DRCP. In the past infection prevention and control may have been seen to be solely concerned with infection prevention and control practices in the prevention and cross transmission of infectious agents. Whilst this remains important in the prevention and control of infections, it is also crucial that the infections themselves are seen as important as other illnesses and diagnoses in terms of patient safety and the prevention of HCAIs (Duerden, 2008).

The DRCP also resulted in the IPCP and matron working with, rather than just informing staff of any concerns or issues. This was perceived by participants, but principally the ward staff and senior managers, to be of particular benefit and subsequently assisted in changes in practice becoming embedded in practice. Participation in the learning event and learning with and from the IPCP and matron during the DRCP demonstrated a tacit approach to learning. Tacit knowledge is defined as knowledge that is gained through experience rather than from a book or more formal sessions (Cambridge Dictionaries on line, 2014). A more tacit approach can assist in promoting infection prevention and control practices providing that the tacit approach in itself promotes good infection prevention and control practices (Nichols and Badger, 2008).

IPCPs and matrons became the key exponents of learning with the matrons alongside ward staff being the main recipients of that learning. The matrons in particular commented on their increased knowledge and awareness which enabled them to feel more confident about CDI specific information alongside infection prevention and control practices. This increased knowledge and awareness was a mechanism for distributing knowledge. Knowledge became transferred to other settings through the matrons working with staff on the wards and clinical areas that they were accountable for. The DRCP although designed for use in cases of CDI was perceived to be a framework where education and learning could take place. This is illustrated here:

"I think we do things a lot differently; I think when you guys come up you are educating us all the time and we are learning while you are there; you are reinforcing things each time..". - **Ward staff participant no. 26.**

Whilst education and assisted learning are key elements of an IPCPs role (Perry, 2005), improved knowledge and awareness does not necessarily translate into improved infection prevention and control practices, compliance or a reduction in infection rates especially in the long term (Ward, 2011). During the DRCP, evaluation of learning could take place as well as the IPCPs and matrons ensuring that any previous learning had been understood and internalised. This was illustrated by a senior manager in the excerpt below when discussing education within the context of the DRCP:

" ….Practice is very different as oppose to the classroom. Staff learn and you can evaluate if learning has taken place in-particular you can observe that the learning has taken place in practice and that it has been acted upon as you are able to observe…………". - **Senior manager participant no. 24.**

Whilst the original checklist included patient care and assessment items, these were placed at the end of the actual checklist possibly sending a message that they were less of a priority than the environmental checks. Findings from Phase 1 and initial findings from Phase 2 of the study resulted in these aspects being included at the beginning of the checklist, indicative of prioritising and increased patient focus (see appendix 1 for the initial and revised checklist). The change to the checklist (April 2013) also coincided with a change to the information provided for ward staff. In the past in the study Trust, an advisory sheet with infection prevention and control practices around isolation of the patient, standard precautions and cleaning was provided. This changed to a care plan with the focus on the patient and the possible complications of CDI and information/prompts indicating what staff should observe and monitor (an excerpt from the care plan from the study Trust [maintaining anonymity] can be found in appendix 8). This care plan emphasised the change in focus and the embodied nature of CDI as oppose to being solely viewed as an infectious agent with the focus only on prevention of transmission. The care plan included patient care aspects with a focus on recognition of disease severity and complications (see appendix 8). It is important to mention that alongside the changing perceptions of key players in the study Trust (IPCPs, matrons, ward staff and senior managers), national guidance from the DH (2008, a) had also included patient focused elements around potential complications as well as treatment options for CDI. Ongoing evaluation and development of systems and processes incorporating organisational and national guidance as well as individual designs are important in human factors approaches (Russ et al, 2013). The principles of CDI and patient

focused care and management are evident in the DH guidance (DH, 2008, a). These whilst incorporated in the original checklist were not seen as the priority in terms of the assessment and checklist beginning with the environmental aspects. Data from the participants in this study prompted a re-design of the checklist with the patient focus as the focal point of the DRCP.

Key messages and important information in relation to CDI were delivered during the DRCP using constant reinforcement and reminders to staff. Eraut (2000) highlights the importance of 'routinisation' or learning by repetition in helping staff to embed key aspects of care and management into their day to day practice. The DRCP became 'routinised' for the IPCPs and matrons as well as the ward staff. The checklist provided a reminder of the different items to be checked in relation to the patient care aspects and the environmental and standard precaution checks. There is a danger that routines can become habitual and therefore problematic if they no longer have a purpose or an end product (Eraut, 2000). This again has some association with human factors. For checklists to remain current and useful they need to be re-evaluated and feedback from key participants needs to be incorporated into any changes (Bosk et al, 2009). Evaluation and ongoing review of the process as well as assessment and evaluation of the educational benefits can also assist in preventing some of the disadvantages of routinisation and the disadvantages of using checklists and human factors approaches. Evaluation of learning is important in order to understand what the individual and collective needs are of the staff on the ward areas (Rogers and Horrocks, 2010).

In terms of the DRCP, evaluation of the checklist review process was undertaken during this study using Phase 1 and Phase 2, which led to the changes to the actual checklist as already mentioned. Also whilst the actual checklist became the framework used to record the information it was the application of human factors, for example time spent on the ward interacting and engaging with staff that became the important element in the DRCP and that helped to develop relationships and improve team working and communication which is discussed further in section 10.5.

10.5 'Developing and sustaining relationships'

The approachability of the IPCPs and matrons was reported as fundamental for developing and sustaining relationships. Other essential traits, characteristics and behaviours included the use of facilitative communication skills and greater visibility in ward environments. These were all influential in the IPCPs and matrons ability to engage with ward staff during the

DRCP. As one senior manager highlighted in their interview, undertaking the DRCP required certain skills and they made reference to the abilities of key players (IPCPs and matrons) as to how they should engage with staff during the DRCP. The quote is highlighted below and discussed further in chapter 8, section 8.4:

"It's the skill in how you approach the review and winning hearts and minds. It's about letting people know that you are coming on to prevent patients getting CDI or improving the patients' situation for those that already have and it's not about coming on to beat you up with this". - **Senior Manager participant no. 16.**

Ward staff indicated that when the IPCPs and matrons were approachable and demonstrated good communication skills in delivering important messages around the care and management of patients with CDI, this led to a more responsive attitude amongst the ward staff. In these instances, the DRCP was not felt to be about apportioning blame or finding fault. Promoting a positive attitude to infection prevention and control alongside staff that are more responsive helps to sustain and reinforce key messages and improve infection prevention and control practices (Ward. 2012, a; Griffiths et al 2008; Vandenberghe, et al, 2002). This approach also aligns with human factors theory and a human factors approach. One of the key aspects in a human factors approach is to alter the way in which individuals manage and approach error. It is important to shift to a culture of safety rather than blame and encourage open and honest discussions in order to reinforce key messages and share knowledge and information (Ross, 2009). In relation to the DRCP and patients with CDI, helping staff to understand what was important in the care and management of patients with CDI rather than apportioning blame can lead to improvements in patient outcomes (Vonberg et al 2008).

The increased visibility provided by the DRCP which incorporated a significant and repeated presence on a ward area throughout the patients stay, provided opportunities for staff to get to know each other. This not only included IPCPs and matrons but also ward staff and IPCPs and matrons. Increased visibility and being seen as helpful are highlighted in studies as being an important factor in sustained infection prevention and control practices (Ward, 2012, a; Griffiths et al, 2009; Vandenberghe et al 2002). Relationships were not just about the IPCPs, matrons and ward staff but also incorporated relationship development between the IPCPs and matrons. This was often attributed to the increased exposure when undertaking the DRCP. Whilst there were issues in getting together, some IPCPs and matrons offered solutions to assist in overcoming some of these problems which included amongst others forward planning to try and ensure that the DRCP was undertaken at a

mutually agreed time. Establishing a joint initiative and a good working relationship between the key players (IPCPs, matrons and ward staff) during the DRCP had helped to highlight key messages in and around infection prevention and control practices. Relationship development within the context of the DRCP also had major benefits for joint working in general. Matrons and IPCPs commented on this within the context of this study and how they both felt more at ease in contacting each other and discussing issues or concerns not only around CDI but other infection prevention and control issues as well. Providing systems and processes that promote collaboration and co-operation also demonstrate a human factors approach (Bosk et al, 2009). The benefits impacting beyond the DRCP and patients with CDI.

Positive relationship development and the attributes that facilitated this were fundamental to effective delivery of infection prevention and control messages during the DRCP. This was demonstrated in Ward's study (2012, a) which examined student nurses and mentors attitudes towards IPCPs. IPCPs that were seen as more approachable, visible and offered solutions to problems were seen more positively by both student nurses and mentors and these attributes tended to result in positive collaborative relationship development. Engagement with staff is also seen as key to driving plans to improve infection prevention and control across organisations (Watterson, 2004). Griffiths et al (2008) in a review examining hospital management and organisational factors in infection prevention and control highlight the importance of positive relationships and increased morale to assist in patient outcomes in relation to infection prevention and control.

Relationship development is also a key component in effective team working. Effective teams tend to be more innovative and deliver higher quality patient care with individuals within those teams reporting less stress and feeling more supported (Borrill, et al 2000). In terms of human factors and patient safety, an important factor in the success of the team is listening to those with the most experience of what can go wrong (Firth-Cozen, 2001). The IPCP and matron provided this experience in terms of the DRCP and CDI and the potential complications or what could go 'wrong' with the ward staff having the patient specific knowledge. These key players formed the basis of the team in the context of the DRCP.

The DRCP had helped to facilitate the key players (IPCPs and matrons) being integrated into the ward team. However this was dependent on the key players (IPCPs and matrons) approach and involvement during the DRCP. Being part of the ward team may have also been transient and short lived for the period of the review. There was however,

acknowledgement of the importance of the continued effects of the team encounter in order to effect sustainable infection prevention and control which is illustrated below:

"Need to look at back and reflect on how we work as team; working together as team is as important as the components of the checklist itself. We need to work together to get that sustainable approach to infection control". - **Senior manager participant no. 24.**

Linked with team work was a perceived helpfulness. Ward staff believed that the IPCPs and matrons who were more approachable whilst undertaking the DRCP, tended to be more helpful. The IPCPs and matrons that assisted and informed ('doing and telling'), rather than just informing were perceived to be a team player as well as being seen as more helpful. This in turn helped in developing and sustaining relationships. Often in busy clinical environments with constant interruptions and a range of different staff vying for the individual ward nurses time it can be difficult to just stop and attend to the other health care professionals (the IPCP or matron in this case). Providing an opportunity to assist where practical if there were any issues and then inform where necessary of what those issues may have been, helped to provide a positive image and assisted with the care and management of patients with CDI. This was especially relevant when it involved specific patient actions or when there were any concerns or problems. Avoiding purely 'command and control' approaches where individuals are simply told what to do rather than working with staff and finding solutions is illustrative of a human factors approach (Bosk et al, 2009).

Human factors theory in relation to healthcare combines psychology and engineering to address issues of error, team work and communication (Catchpole, 2013). Teamwork and communication were inherent in the DRCP when it worked well. The IPCP and matron during the review assisted staff in the care and management of patients with CDI by educating, leading and being seen to be helpful. The latter, on occasions may have incorporated practical hands on assistance. Whilst the checklist was primarily used by the IPCP and matron and not the ward staff, its overall use as a prompt to ensure that patient care aspects, standard precautions and environmental checks were undertaken ensured that patient safety mechanisms were undertaken for patients with CDI. Ross (2009) highlights the importance of a checklist in preventing the omission of an important step in a process or system. The DRCP provided the reminder to ensure that key aspects of patient care and management and infection prevention and control practices were not missed.

Human factors theory and approaches are also about improving communication in order to promote a positive environment to learning and development and a culture where individuals

feel comfortable when asking questions or challenging practice (Gawande, 2009). In this study, the participants found the DRCP to be instrumental in developing communication channels and fostering a culture where the review process focused on the patient and helped staff to develop their knowledge and understanding of CDI and infection prevention and control practices. Within this staff perceived that they were able to ask questions on CDI but also other infection prevention and control issues. This in turn assisted in relationship development

What was evident from the DRCP was the relationship development between the staff groups as a direct result of improved communication and team working but also due to the increased visibility throughout the process. Staff became familiar with the IPCPs and matrons attending the ward every day. The checklist was important as a prompt but it was also the daily presence of the IPCP and matron during the DRCP which became an interactive, educative and helpful process that was perceived by the participants to have been influential in the care and management of patients with CDI.

10.6 'Leadership and change management'

Approachability, communication skills and increased visibility of the IPCP and matrons were seen as important in the key players (IPCPs and matrons) in the DRCP. A review of two studies undertaken six years apart using the same questionnaire but with different health care practitioners (nurses and paramedics) and different gender ratios, these attributes were seen to be important in clinical leaders and leadership by health professionals (Stanley, 2014).

Leadership is the 'ability to influence, motivate and enable' (Griffiths et al, 2008, page 8). It is not just about key people at the top of organisations but incorporates staff at all levels especially those involved in leading and developing care (Fletcher et al, 2004). The DRCP facilitated an interactive style of leadership with key players (IPCPs and matrons) assisting in the care and management of patients with CDI. Often this included providing guidance, encouragement and support, which may have been by instigating actions when required or encouraging ward staff to instigate actions. This may have helped to develop leadership potential amongst different groups of staff which in turn resulted in staff feeling valued and supported. Helping to create a culture where staff feel valued and supported links with patient centered leadership and improved patient outcomes (Kings Fund, 2013). A culture of

supportive leadership and valuing staff are also in keeping with human factors theory (Leonard et al, 2004).

In the case of the DRCP, improved patient outcomes included early recognition of complications and co-morbidities associated with CDI, helping to prevent transmission by effective infection prevention and control practices and assistance in the overall reduction of CDI rates within the study Trust. The patient became the focus of and central to the DRCP. Patient centeredness also usually incorporates working in partnership with the patient (Dwamena et al, 2012). Whilst the DRCP did not involve working in true partnership with the patient, the patient was involved in the assessment process and the clinical review. The next step following on from this study could be exploring true patient centeredness in relation to the DRCP and the care and management of patients with CDI. This is discussed further in chapter 11, conclusions and recommendations.

The nature of infection prevention and control practice may warrant a more directive approach when specific actions need to be undertaken, for example during outbreak management situations when patient safety and containment of the outbreak are the priority (PHE, 2014, b). A more transformational style however can assist in team development and communication (Thyer, 2003) and helps to improve relationships. At the heart of transformational leadership are approachability and communication, which as previously discussed, were fundamental in developing and sustaining relationships and inherent in the success of the DRCP.

The Healthcare Commission[40] (HCC) (2008), in a report which examined the key findings into a series of infection control outbreaks highlighted the negative effects of poor leadership and a lack of team work which resulted in staff feeling undervalued and unable to raise concerns around infection prevention and control practice. This was also found to be the case by the HCC in the outbreaks of CDI in both Stoke Mandeville hospital, Buckinghamshire hospitals NHS Trust (HCC, 2006) and Maidstone and Tunbridge Wells NHS Trust (HCC, 2007). These two CDI outbreaks (HCC, 2007: 2006) led to the current guidance on CDI from the DH (DH, 2008, a; PHE, 2013, a). The DRCP in this study provided a mechanism and opportunity for clinical leadership and for the IPCP and matron as well as ward staff to highlight concerns in relation to patient care and management and infection prevention and control practices. These could then be acted upon at the time of the review

---

[40] Healthcare Commission (HCC) preceded the Care Quality Commission (CQC) which was broadly an amalgamation of the HCC, Mental Health Act Commission and the Commission for Social Care Inspection. The CQC came into operation in April 2009 (HCC, 2009, downloaded 30/06/14).

with timely and sustained evaluation of any actions due to the daily review element of the DRCP.

Providing an opportunity to highlight concerns and action any issues or worries again illustrates the use of a human factors approach within the context of the DRCP. Human factors theory seeks to develop tools and systems to reduce the risk of errors and unsafe acts (Reason, 2000). Reason (2000) goes on to discuss the 'Swiss cheese model[41] of system accidents' (page 769). Within this model the holes in the cheese are due to 'active failures' and 'latent conditions' (page 769). 'Active failures' are classed as unsafe acts which are undertaken by individuals who have direct contact with patients (Reason, 2000). In relation to the DRCP unsafe acts may be related to the patient and a lack of recognition of complications of CDI, for example a distended abdomen and or altered temperature. Unsafe acts may also link to the environment for example not cleaning a commode after use. The DRCP undertaken by the IPCP and matron provided a mechanism whereby these issues could be highlighted and picked up sooner in order to prevent a series of omissions. Latent conditions are described as 'resident pathogens' within the system (Reason, 2000, page 769). These can result in 'error provoking conditions' for example time constraints and inexperience (Reason, 2000, page 769). In the case of the DRCP, the review assisted in preventing or minimising these issues. This may have been by providing education at the time of the DRCP improving staffs' knowledge and awareness of CDI. It may have also been linked to helping and the 'doing and telling' aspect of the DRCP whereby the IPCP and matron assisted with the action as a result of the DRCP.

Assistance with prevention or minimisation of issues during the DRCP was the concept of expertise and this was particularly relevant in terms of the DRCP in relation to the IPCPs. The IPCPs were seen as the experts in infection prevention and control practice and CDI. The Infection Prevention Society (IPS) portrays the role of the IPCP as that of an expert in infection prevention and control (Burnett, 2011). The benefits of expertise and leadership included examples where IPCPs or matrons assisted the ward staff to complete actions

---

[41] The Swiss cheese model describes the mechanisms by which defences, barriers and safeguards are positional in a system approach to error. Technological systems have many layers of defence incorporating engineered defences such as alarms and physical barriers, people defences, for example surgeons, pilots. Finally there are procedural and administrative defences. In ideal circumstances these defensive layers and approaches help to keep things safe. They are however more like Swiss cheese with holes in various positions. These holes are constantly changing and moving. Normally holes in one slice do not produce any bad outcomes but if these holes line up in a series of slices this can lead to a 'trajectory of accident opportunity' (page 769) which can lead to hazards and victims (Reason, 2000).

relating to patient care or environmental issues or the IPCP or matron undertook the actions themselves when appropriate.

The DRCP was also seen as a means of providing assurance around safety and standardising practice. Patient safety should be at the forefront of everyone's agenda in the UK NHS given the consecutive failings that have emerged over recent years (DH, 2013, a; Francis, 2013; Kings Fund, 2013; NHS, 2013). The DRCP provided an audit and surveillance function providing organisational assurance for patient and CDI as well as infection prevention and control practices. This allowed the IPCPs and matrons to monitor and address any issues or concerns. The findings as well as being fed back to staff at the time and the matron for the area were also fed back to senior management. This provided an opportunity to examine and explore patterns and areas for concern both at ward level but also at strategic level. Placing infection prevention and control at the heart of the organisations agenda and ensuring that there is a collective responsibility of all staff including senior managers and chief executives was highlighted in 'Our NHS, Our future' (DH, 2007) and 'Clean, safe care, reducing infections saving lives ' (DH, 2008, b).

Patient safety is also central to human factors theory. Providing a system that enables staff to highlight and express concerns is fundamental to patient safety (Leonard et al, 2004). The DRCP facilitated the IPCP and matron to communicate any concerns or problems. It also enabled wad staff to highlight concerns or problems related to the patient and CDI or any concerns regarding infection prevention and control practices.

The daily review element of the DRCP also provided an opportunity to standardise practice which in turn helped to maintain patient safety. It also led to the DRCP 'becoming the norm' and not being seen as a tool for criticism and negativity. The concept of normalisation is related to normalisation process theory (NPT) which explains how interventions become embedded into practice and practice becomes normalised (Murray et al, 2010). In the case of the DRCP the review process had become embedded into practice for patients with CDI with ward staff expecting an IPCP and a matron to visit the ward to review the patient. The dangers however are that staff can become over-reliant. They need to be empowered to understand the importance of the assessment and checks so that they are able to undertake themselves and not become over-reliant on the DRCP. The input of specialist nurses should not replace the ward nurses' decision making (Dimond, 2006).

The DRCP became both instrumental in the change in the way staff perceived the process and in the actual DRCP itself. Staff still perceived the DRCP to have an element of

surveillance but this was no longer perceived negatively. An example from the interview data is highlighted below:

" We don't think that you are coming on to check up on us and victimise us when reviewing C.diffs. The review is useful; opportunity to look at practice; highlight areas of good practice and mention areas where things need to be improved upon". - **Ward staff participant no. 22.**

The DRCP with its checklist and monitoring function was seen to assist and support staff in relation to patient safety rather than merely regulate staff behavior as when it was first introduced. The policing 'big brother' function was seen as aspect of the behavior portrayed by the key players, IPCPs and matrons, rather than a consequence of using the checklist, or their engagement with the review process itself. The key to this change was the approach adopted by the IPCPs and matrons. Positive, approachable, visible and supportive behaviours assisted with acceptability of the DRCP. These attributes all have been linked with postheroic leadership, which is described as a dynamic interactional process often undertaken collectively by different individuals and different team members (Fletcher, 2004). The idea of the DRCP as an interactional supportive process involving collaborative team work again links with human factors theory. Incorporating human factors science into any a system or process helps to support human performance (Russ et al, 2013). The DRCP assisted in promoting a culture where staff were able to discuss any errors or omissions resulting from findings during the DRCP. Understanding patient safety, error and human behaviour are at the heart of human factors theory. It is important that systems and processes are devised that consider why error occurs and assist those in preventing error (Ross, 2009).

10.7 The DRCP, checklists and human factors theory

The checklist, the starting point for this study, was introduced to standardise the approach in the care and management of in-patients with CDI and associated infection prevention and control practice (Denton et al, 2014). Checklists are not new in health care. They have been associated with human factors theory which has become integrated into patient safety in the UK NHS (Storr et al, 2013).

The study of human factors is also known as ergonomics (International Ergonomics Association [IEA], 2014). There are three specific domains related to human factors theory. The first is concerned with the physical strengths and limitations of humans (Gurses et al,

2011). One of the precursors for developing the initial checklist, the focus of this study was to ensure that it provided a means of ensuring that specific aspects of patient care and the environment were checked to ensure patient safety. The process that ensued provided staff with an opportunity to extend their knowledge and promoted an understanding of the standard of care and management required for patients with CDI. This understanding links to the second component in human factors and ergonomics, which is the cognitive domain. This focuses on the cognitive abilities of those involved in the process (Gurses et al, 2011).

The DRCP assisted in developing the cognitive abilities in relation to CDI whilst bringing to the fore the limitations of those involved especially during the initial stages of introduction of the checklist. The final domain, the 'macro' combines the overall work based system and examines how all the different component interlink (Gurses et al, 2011). This was particularly relevant in the case of the DRCP, it was the combination of the actual checklist and its subsequent redesign alongside the visibility, interactions and educative input that helped to identify and action patient safety issues.

In addition the reporting to senior managers made the checklist an interactive process visible and inclusive of an organisational integrated system. The DRCP had been influential individually in terms of patients, staff and ward areas as well the organisation as whole. Human factors approaches can range from the individual to the organisational level thus bringing contribution to healthcare generally (Russ et al, 2013).

In terms of the DRCP, the participants from the study perceived that behaviour had changed towards the checklist and the review process. What became evident was that the checklist as it evolved into the DRCP was seen to be less about 'checking up' and more about providing education, support and being helpful. The DRCP was also seen to have been instrumental in changing behaviour in relation to CDI and the care and management of patients with CDI. Staff became more aware of the importance of specific patient assessments and observations for CDI as well as the specific infection prevention and control precautions.

Findings from Phase 1 indicated that there was suboptimal practice at times in relation to the care and management of patients with CDI, which it could be argued indicated that certain aspects of infection prevention and control behaviour may not have always changed but this was not necessarily constant. What also became apparent from the findings from Phase 1 of this study was that there was not always a pattern to the suboptimal practices in terms of when, and if, they were found. For example the completed checklist may have documented

Day 1 that all the commodes were clean and in good working order and then the next day they were dirty and/or damaged.

This could be related to timing or staff on duty at the time but causality of poor compliance was not the focus of this study. The checklist and ultimately the DRCP assisted in highlighting these issues so that they could be actioned at the time and not left to develop with serious consequences for the patient or the environment and possible other patients.

10.8 Divergences from the overall findings of Phase 2

Whilst the overall data produced from the interview transcripts was positive, there were also some negative themes that arose. Open codes provided an early insight into any negative concepts linked to the DRCP. The participants responded to open style questions, for example being asked what their thoughts were on the checklist process (see appendix 3 for examples of the interview agendas). Interview data provided an insight into some of those initial responses with more focused coding and constant comparison providing the researcher opportunities to pursue key codes and concepts. Below provides a summary of some of these overall themes with individual staff groups perceptions also explored in more depth linked to negativity and the DRCP.

One of the main areas that generated negativity with respect to the DRCP included issues relating to the timing of the DRCP. This incorporated issues with the IPCPs and matrons meeting up to undertake the review and the timing of when the review took place on the ward. This latter issue was often around busyness on ward areas and staff on the wards not always having the time to either receive feedback from the review or action any immediate issues that may have been required at the time.

Lack of approachability and lack of helpfulness by the key players (IPCPs and matrons) were perceived as barriers to success of the DRCP. IPCPs and matrons who were less approachable and less helpful also tended to also be perceived as having a more authoritarian style and overall were viewed more negatively by all the participants. Senior managers commented in particular on the importance of approach and perceived helpfulness of IPCPs and matrons whilst undertaking the DRCP. IPCPs were less likely to comment on this aspect. This may have been because the IPCPs were the first group of respondents and as such the initial data had not at that point begun to develop any concepts

or themes in relation to approachability and helpfulness and therefore was not discussed in any detail.

IPCPS may have also not included comments about approachability and helpfulness because they may not have seen this as relevant in the context of the DRCP. Matrons were more likely to refer to approachability and helpfulness in relation to the IPCPs but not in relation to themselves. The matrons also implied that the IPCPs were the main driving force and protagonists in the DRCP therefore their approach (referring to the IPCPs) was seen to be more important when discussing approachability.

All of the ward staff commented on the importance of approach but as ward staff on the whole were the last group of interviewees, approachability was specifically included in the interview agenda as this had become one of the main themes that had emerged during Phase 2 (see appendix 3 for the different versions of the interview schedule).

10.7.1 Infection Prevention and Control Practitioners (IPCPs).

It is important to highlight that the IPCPs were the first group of interviewees. Their initial responses to the semi-structured questions provided an opportunity to adapt and alter subsequent questions for the remaining groups as different themes emerged in line with a grounded theory approach.

The IPCPs tended to focus on the checklist and the specifics of completing the actual form which could be said to be unsurprising as they were the architects of the checklist form. IPCPs believed that there was some ambiguity around the wording and structure of the checklist. Interview data included suggestions for possible alterations to assist in the process for the future and provide a less ambiguous checklist (see appendix 1 for an example of the revised checklist, version 2 currently in use in the study Trust).

Some IPCPs focused on the patient care items included in the checklist and felt that those areas were important for them to review during the DRCP, whereas the environmental aspects and infection prevention and control practice were the domain of the matron (three out of seven IPCPs commented on this aspect). This aligns with the Matrons Charter and the importance of the Modern Matron in infection prevention and control and cleanliness (DH, 2004). It also aligns with both the IPCP and matrons having clinical leadership roles. Edmonstone (2009) maintains that clinical leadership is about working with colleagues to review established practice and introduce different ways of working if required. This was very

much the case with the DRCP, with IPCPs and matrons working with the ward staff in order to achieve this with both providing a different focus.

One of the main issues for the IPCPs and the DRCP was around the logistics of meeting up with the matrons in order to undertake the DRCP. Whilst the interactive nature was important with IPCPs and matrons valuing the collaborative nature of the review, both groups recognised that often this was around practicalities and time constraints which has been discussed earlier

10.7.2 Matrons

The matrons also highlighted the problems in meeting up with the IPCPs to undertake the DRCP, again mentioning time constraints, the logistics of getting together and the fact that. It was an ongoing problem. Matrons and IPCPs commented on the value of undertaking the review together but acknowledged that often competing priorities could impact on that occurring. This could be an indication of routinisation and the DRCP losing its currency.

In the interviews with the matrons, the level of individual matrons' exposure' to the DRCP appeared to influence their perceptions. Only matrons who had been involved in the DRCP were included in the study, however the level of exposure was dependent on the number of patients with CDI in 'their' clinical areas. The matrons with the least exposure to the DRCP tended not to comment on their perceptions of the broader influence of the DRCP. Their interviews focused more on specificities, for example the educational benefits and their own increased knowledge and awareness in relation to *C.difficile* and CDI in particular (two out of the eight matrons).

The matrons with the most exposure to the DRCP tended to be the matrons that prioritised the DRCP for patients with CDI. This could be because they had undertaken the greater number of reviews and/or a higher incidence of patients with CDI. Linked to the last point, this could have resulted in less of a tendency for the DRCP to lose its currency, therefore still perceived as important. What was apparent was the exposure and familiarity to the DRCP rather than the actual nature of the patient group the matrons were responsible for (medical or surgical patients).

10.7.3 Ward staff

The main negative aspect provided by the ward staff was around the initial perceptions of the checklist and the perceived policing role. The ward staff however, did comment on the transitional nature of the DRCP. The initial perceptions included the checklist as a means 'to police' practice. This had transformed into the DRCP and being seen as a helpful process. A major factor in this was the approachability and helpfulness of the staff undertaking the review process (IPCPs and matrons).

Some of the participants had experienced negative attitudes displayed by the IPCPs and matrons and this had led to some to view the DRCP as only there to find fault. Ward staff participants fed back that staff in general (referring to their own ward areas) were more receptive to the DRCP if it was undertaken in an informative, helpful and supportive manner. This suggested a continuum; the more approachable and helpful the IPCPs and matrons, the more receptive the staff were to the DRCP, seeing it as a supportive process.

As discussed in chapter 3 there were a mix of different grades and roles of staff used in the ward participants. This ranged from staff nurses to link infection prevention and control practitioners as well as ward managers/sister/charge nurses. There was no variation in interview data, subsequent codes, concepts and themes as a result of the different roles or staff grades.

10.7.4 Senior managers

Senior managers in the main focused on their own views on the DRCP and what they perceived to be the important skills, knowledge and attributes of the key players (IPCPs and matrons) involved in the DRCP. The senior managers recognised education, approachability and relationship development as central to the success of the DRCP and highlighted key traits, characteristics and behaviours such as helpfulness as well as the educative and leadership roles as particularly valuable for the DRCP to be successful.

The assurance aspect of the DRCP and the importance of standardising practice were also identified as significant unsurprising given their corporate accountability. They expressed beliefs that the DRCP had been influential in conjunction with other drivers in assisting with the reduction in CDI rates seen by the organisation over the last few years; as well as providing a framework to assist in the care and management of patients with CDI. The reporting aspects of the DRCP included senior managers which helped to embed the

findings into the wider system providing senior management data on which to report more effectively (see chapter 2 section 2.13 and figure 2.4).

10.8 Conclusion

Overall the DRCP was perceived to have evolved into a process that was influential in the care and management of patients with CDI. Inherent in this evolutionary process was a human factors approach although this became embedded unconsciously rather than planned. These beneficial aspects of the DRCP noted by the senior managers and included in the discussions and summary highlighted throughout this chapter provide an insight into some of the overall perceptions of all the participants in relation to the influence that the DRCP had on the care and management of patients with CDI.

What became apparent was the transition of the checklist into a process. The checklist provided an opportunity to deliver a safe and supportive process which assisted staff in the care and management of patients with CDI. Human factors is about recognising that human interaction and support combined with checklists systems or processes can assist in maintaining patient safety (Fawcett and Rhymas, 2014).

The DRCP in promoting visibility, providing education, developing relationships and teamwork combined with leadership at ward level helped to assist in the care and management of patients with CDI. Conclusions and recommendations for education, practice and research alongside limitations of the study are considered in the final chapter (chapter 11).

Chapter 11
Conclusion and Recommendations

11.1 Introduction

This research study set out to explore the use of a daily review checklist introduced in an NHS Trust following a period of increased incidence of CDI. Checklists are not new in infection prevention and control, their use in this particular case, as a daily review undertaken by an IPCP and matron to assist in the care and management of patients with CDI was, unique. What emerged from this study was that the checklist was more than just a checklist; it embedded a complex intervention which I named 'daily review checklist process' (DRCP). What also emerged was that the DRCP incorporated principles of human factors or ergonomics. As this study unfolded, the full nature of what was occurring was unclear at the start hence it was important that the endeavour was exploratory in design. A grounded theory approach was used. This assisted me to remain creative, flexible and open to ideas in order to let meaning evolve from the data produced (Corbin and Straus, 2008).

The study consisted of two distinct phases. Phase 1 included a retrospective documentary analysis of a number of checklists (n=928) competed over a specific time period (July 2010 to December 2011). The aim of Phase 1 was to develop an understanding of the way in which the checklists were completed and to interrogate the content further in order to explore completion and compliance in relation to the items included in the checklist.

Phase 2 used qualitative semi- structured interviews recruited from different groups of staff involved, to explore their experience of the DRCP and any perceived benefits or constraints that the DRCP had on the care and management of patients and infection prevention and control practices associated with CDI. Phase 2 involved purposive sampling in order to ensure that participants recruited were familiar with the DRCP. This included IPCPs, matrons and ward staff. Theoretical sampling involved the inclusion of senior managers

The findings from Phase 1 provided insight into the use of the checklist during what became known as the DRCP. Phase 1 demonstrated that the checklist provided a means of real time monitoring of patient care in relation to CDI and the infection prevention and control practices being undertaken. Phase 1 confirmed the checklist as an audit and surveillance tool and also helped to inform Phase 2 both in the selection of participants, the nature of the subsequent enquiry (broad focus points for the initial semi-structured interview questions) and the overall research aims of the study. Phase 2 subsequently went on to provide insight into the meaning that the process had for those involved in the DRCP and what, if any influence this had had on the care and management of patients with CDI.

Research aims

The study's research aims were:

1. To explore the findings generated from a retrospective analysis of the daily review checklist.

2. To explore with infection prevention and control practitioners (IPCPs) matrons, ward staff and senior managers their perceptions of the checklist which became known as the daily review checklist process (DRCP) and what it means to them.

3. To explore with infection prevention and control practitioners (IPCPs) matrons, ward staff and senior managers their perceptions of the influence the DRCP has had on the care and management of patients with *C.difficile* infection (CDI).

This chapter will explore how these aims were met. A discussion and summary of the findings were presented in chapter 10. This concluding chapter will provide a synthesis of the findings in order to elaborate how they contribute an understanding of how what at the outset seemed to be an instrument of surveillance, overtime became recognised as an interactive process enabling improvements to care delivery of patients with CDI and associated infection control practices. The DRCP as it evolved into an interactive process incorporated human factors principles however unconsciously and this will also be explored in more depth and how the study contributes overall to human factors theory.

The chapter will also explore the implications of the findings of the study in terms of wider transferability. These largely relate to education and practice and are the basis for recommendations and identification of areas for future research. Finally limitations of the study are addressed.

11.2 Synthesis of findings in relation to the research aims

The first research aim was to explore the findings generated from a series of checklists completed over an eighteen month period between July 2010 and December 2011 (n = 928). Phase 1 demonstrated that the checklist provided real time monitoring of patients with CDI, providing timely individual patient assessment, observation and reminders of disease severity and complications of CDI. The daily review checklist also provided IPCPs matrons ward staff and senior managers with assurances that infection prevention and control practices were being undertaken and if not prompt action was taken to remediate non-compliance. Phase 1 highlighted that there were inconsistencies in checklist completion of the checklist due to the subjective interpretation of items included in the checklist. This retrospective analysis also assisted in reframing the design of Phase 2. This included the

development of the initial semi- structured questions for participants to encourage discussion about the checklist and explore what the review process meant to them (the second research aim). The data from Phase 1 also provided information to assist with purposeful sampling of participants for Phase 2.

The third research aim was to explore whether or not the DRCP had been influential in the care and management of patients with CDI. The overall feedback from all the participants was that what had started life as a checklist had changed into an interactive process, the DRCP. Themes surfaced during the study that offered an explanatory framework as to why the DRCP had changed. How CDI was understood also emerged and this was described as 'embodiment as an illness'. The DRCP had facilitated the inclusion of a patient focus as well as an understanding of transmission of CDI with clearer accountabilities for containment and prevention of spread. Three main themes emerged and these were 'Education and Learning', 'Relationship Development' and 'Leadership and Change Management'.

The theme 'Education and Learning' focused on the participants' increased clinical knowledge of *C.difficile* and CDI since the introduction of the DRCP. The participants involved in the study appeared to change and accommodate a view of CDI embodied as an illness with a specific disease profile (signs, symptoms and treatment) and placed the patient centre stage as the focal point. Increased clinical knowledge and awareness of CDI appeared to be accompanied by an increase in knowledge and awareness of prevention of spread of *C.difficile* using appropriate infection prevention and control precautions.

'Education and Learning' during the DRCP was predominantly delivered via situated practice based learning. It was the contextual nature of the delivery of the education and subsequent learning that took place during the DRCP that the participants recognised as particularly helpful. This demonstrates how the DRCP represented a human factors approach in relation to 'education and learning'. Human factors approaches can help to cultivate a learning environment and assist with patient safety (Russ et al, 2013). The DRCP was instrumental in developing a learning environment promoting a culture of patient safety in the context of the patient with CDI and infection prevention and control practice. CDI becoming embodied as an illness also demonstrated a change in attitude as the DRCP matured. The significance of CDI as a disease entity and/or illness experienced by the patient shifted CDI from a problem managed by infection prevention and control practice to one also requiring attention by nurses and nursing care or intervention.
.

Fundamental to the educative delivery, was the manner or approach in which the DRCP was undertaken by the IPCPs and Matrons. This approach influenced the receptivity of ward staff to the process. Visibility, approachability and helpfulness of the IPCPs and matrons were seen as important characteristics, or behaviours, by the ward staff and senior managers for delivery of key messages and communication of knowledge during the DRCP. The IPCPs and matrons that were more approachable and seen to assist as well as inform by 'doing and telling', were perceived as more helpful. Adopting these behaviours of approachability, assisting, and doing and telling were perceived as facilitating IPCPs and matrons in creating a permissive team culture enabling ward staff to discuss issues more readily. Team work and promoting a culture which encourages communication and discussion and avoiding attribution of blame are also integral to human factors approaches (Gurses et al, 2011).

Doing and telling and avoiding a 'command and control regime' (Bosk et al, 2009, page 445) was fundamental to the success of the DRCP when it worked well. The initial checklist was a local solution to a specific problem and whilst human factors theory may not have been intended at the outset in the design, it naturally became incorporated into the approach and subsequent process. The perceptions of the participants reinforced some of the attributes of a human factors approach, for example communication, patient safety, and behaviour change (Bosk et al, 2009; Catchpole, 2013; Ross, 2009; Russ et al, 2013). Additionally in this study, the approach of the key players (IPCPs and matrons) during the DRCP was seen to be a major factor in the success of the DRCP. If blame was apportioned or the IPCP and/or matron were not approachable the process was seen not to work as well. This extends human factors theory implying that it is specific attributes of the key players that was influential in the success.

This study also demonstrated the importance of the DRCP and situated learning. Human factors theory highlights the importance of modifying systems by learning from others as to what works and what may not work as well (Russ et al, 2013). The DRCP provided opportunities to evaluate and modify the checklist by learning from the participants during the study. What was also evident however, was the importance of situated learning in the context of the DRCP. The DRCP had enabled staff to become more knowledgeable about CDI and the complications of the disease, viewing CDI as an illness rather than merely a contagion. Awareness of the infection prevention and control precautions and the prevention of transmission had also increased as a consequence of the DRCP.

Human factors theory acknowledges the importance of education and training for individual practitioners to perform their role. Human factors theory purports that training alone however

232

may not be effective in relation to patient safety (Scanlon et al, 2010). In relation to infection prevention and control there is evidence to suggest that the long term benefits of education and training are limited and suggestions that knowledge gained is not necessarily transferred to practice (Ward, 2011). What was important in relation to the DRCP was the contextual nature of the learning by the IPCP and/or matron at the time of the actual review process. This develops on from human factors theory suggesting that it is the nature and delivery of the education that influences learning, which in the case of the DRCP was situated contextual learning.

These characteristics and behaviours of the IPCPs and matrons during the DRCP also assisted in developing and sustaining relationships. Again this was seen as an essential benefit of the DRCP. One of the significant relationships that developed was that forged between IPCPs and matrons. Improved relationships between IPCPs and matrons developed through involvement in the DRCP contributed to more general improvements in working relationship between IPCPs and matrons. Relationships were also developed between the IPCPs and ward based staff. This was particularly in relation to team work and collaborative working with the IPCP and matron assisting staff in safe and effective management of patients with CDI. A system or process that assists in a common goal demonstrates the influence of a human factors approach (Bosk et al, 2009).

Increased visibility, being recognisably helpful and supportive and advising on specific aspects of care delivery for patients with CDI were perceived as the main benefits of the DRCP and influential in improving care and management of patients with CDI. This connects with the third and final theme generated from the findings of Phase 2, 'Leadership and Change Management'. IPCPs and matrons were seen to be role modelling clinical leadership and management skills during the DRCP. Leadership was linked with the style and approach of the key players (IPCPs and matrons) with those demonstrating a more supportive and facilitative style seen more positively particularly by the ward based participants. Supportive leadership is seen as important in human factors theory (Leonard et al, 2004). What was influential in the DRCP was the daily review element of the process that assisted in reinforcing this supportive style.

The DRCP provided assurances that certain aspects of care management and infection prevention and control were being undertaken. This acted as a form of organisational security and linked closely with ensuring patient safety. Whilst there was appreciation of the educative function and improvements in relationship, all four groups of participants, but in particular the senior managers, acknowledged the value of the continued audit, surveillance

and monitoring functions of the DRCP in providing those assurances. Human factors theory is about organisational as well as individual benefits in promoting patient safety (Russ et al, 2013). Whilst patients and ward staff all were perceived to have benefited from the DRCP, the organisational benefits of assurance, reduced CDI rates (combined with other factors, see chapter 2, section 2.9), improved relationships and team working were all seen to have been as a result of the DRCP.

11.3 Implications and recommendations

These are divided into education and practice implications with recommendations and areas that warrant further investigation through research integrated throughout.

11.3.1 Education

The educational implications that emerged from this study focus on practice based and situated learning. Participants (ward staff and matrons) indicated that the practice based, context specific education assisted in developing awareness and understanding. This in turn contributed to the care and management of the patient with CDI. Increased knowledge also supported the practical application of infection prevention and control practices.

The DRCP also provided an opportunity for learning. All too often in busy clinical environments it is difficult to find time for learning. The contextual nature of the information provided alongside the perceived helpfulness of the information, assisted in the DRCP becoming a catalyst for learning. Eraut (2011) maintains that informal learning in the workplace can account for the majority of what we learn. Even if formal learning does take place it requires the addition of informal work based learning to assist in contextualisation (Eraut, 2007). Practice based educational approaches in relation to infection prevention and control awareness are often preferred by clinical staff as opposed to more formal infection prevention and control courses (Nichols and Badger, 2008).

Infection prevention and control education has become mandatory in many healthcare organisations as part of risk minimisation strategies. In order to ensure compliance, frequently education sessions adopt a didactic approach, often delivered to large and diverse groups of healthcare professionals. Recently electronic learning approaches are being adopted as these are perceived as less resource intensive (Ward, 2011). Studies have found that traditional infection prevention and control education may not have a long term shelf life or indeed merely increases awareness of infection prevention and control

measures, which may not necessarily be translated and demonstrated in practice (Ward 2011).

The contextual approach provided within the context DRCP develops on human factors ideology in that education and training alone without context may not be sufficient in addressing patient safety issues (Scanlon et al, 2010). It is important that education and learning approaches are combined with other processes and systems which in this case were the checklist and the DRCP, in order to promote and assist with patient safety (Karwowski, 2006).

It would be difficult to deliver all the infection prevention and control educational needs and organisational requirements solely using a practice based or situated learning approach. Nevertheless choice of learning approach has implications for sustainability and realising actual change in practice. The need for robust research evidence to evaluate the short and long term benefits of less formal, practice based educational delivery and impacts on change in practice have been reported elsewhere (Ward, 2011). This study has identified the value that interactive processes such as the DRCP can have on meeting education needs and/or knowledge and skill deficits of staff and ultimately improves patient outcomes. In everyday healthcare practice there are multiple activities associated with assessment of patient status but the education potential is not always capitalised particularly in nursing (Ker, 2008). Formalising the DRCP as "education" may be problematic. Nevertheless as a device for improving patient outcomes (length of stay, early recognition of deterioration and minimisation of transmission) and increasing knowledge and ensuring compliance with infection control and protection practice, the DRCP warrants further investigation.

Whilst there may always be a need to deliver infection prevention and control updates to large groups of staff in various organisations at various times and places, it is important that the methods and content are fit for purpose and behaviour change affected. Utilising a more interactive case study or patient focussed delivery approach may enable contextualisation and translation of information delivered. This could assist recipients to value the relevance of material and assist with increasing the legacy effect of education and effect changes to practice.

Opportunities for practice based contextual learning could also be explored for delivering key infection prevention and control messages or offering support and advice when visiting wards and areas for example when undertaking reviews similar to the DRCP or undertaking ward or department based audits or indeed activities such as 'Intentional Rounding'

(National Nursing Research Unit, 2012). Finding opportunities for interactive 'just in time' delivery for example providing educational input alongside working with staff on a clinical need or problem as illuminated in this study may help with longer term sustainability.

Combining an interactive style of educational delivery with a human factors approach when developing systems that incorporate patient safety elements, may be an area to explore further. This will require a variety of methods including longitudinal studies to compare different educational interventions and how they impact on different systems and approaches used.

11.3.2 Practice

Practice implications and recommendations are sub-divided and linked with the specific findings that emerged from the study. The revisions made to the checklist over the timeline of the study were discussed in chapter 10 section 10.2.2. The revised checklist has been in use since April 2013 in the study Trust and anecdotal feedback is that it is easier to use, less ambiguous and more sensitive and specific. This has resulted in more detailed information being captured through the DRCP. The checklist will be subjected to regular review in line with the study Trust's policy for all tools used for assessment, also a feature of human factors approaches (Bosk et al, 2009).

Providing formal and informal feedback from the DRCP
The IPCPs summarised the content of the checklist and entered it into an electronic template as part of the Infection Prevention and Control Team data base. This information was also sent to the Chief Nurse on a weekly basis. There was no formal feedback mechanism to the matron or ward manager. One of the recommendations from this study would be to explore the benefits, if any, of providing formal feedback to the ward manager through weekly or monthly summaries. This could be useful in assisting ward mangers and other staff monitoring practice and any deviations or non-compliance.

Phase 1 results derived from the original checklist template indicated that overall compliance was not necessarily influenced by the frequency or period that the DRCP was undertaken. Compliance could vary from day to day. Trends might have been observed over longer time intervals. The current data collection methods using the revised checklist as part of the DRCP may provide more reliable data in the long term and could be monitored more

formally to assist in monitoring patients with CDI and overall infection prevention and control compliance.

When utilising a human factors approach it is important to evaluate and review any systems or processes used (Catchpole, 2013). The feedback from the DRCP as well as highlighting areas of good practice and areas for review and detecting any trends could also be used to feedback on the checklist and the review process itself.   Chapter 10, section 10.2.2 illustrated the adaptations to the original checklist which were undertaken from initial data generated from the IPCPs and matrons. This resulted in changes to the checklist and a revised checklist (see appendix 1 version 2). Further evaluation and adaptations could be further enhanced by incorporating feedback from ward staff as well as the IPCPs and matrons in order to enhance the checklist and the review process as well as providing timely information on the data generated. It is important to incorporate all parties involved in the process in the evaluation of checklists and human factors approaches (Russ et al, 2013).

Increased visibility, approachability and other key traits and characteristics of the IPCPs

The DRCP had also been influential in providing an opportunity for increased contact and visibility of IPCPs and matrons for ward teams. This was a consequence of the daily or frequent reviewing that was incorporated in the DRCP and the collaborative working that ensued. This reportedly resulted in improved working relationships between IPCPs and matrons and also between IPCPs, matrons and ward staff. The development of these relationships, in particularly between the IPCPs and ward staff were often shaped by the approach taken and possible personal characteristics or affect, of the key players (IPCPs and matrons). This was particularly evident in the accounts of the relationship between IPCPs and ward based staff. The more "approachable" and "helpful" the IPCPs appeared, the more responsive the staff. Communication and dialogue can help with systems and processes to ensure that they are understood and acted upon. Providing rationale and an understanding of what and why certain things are undertaken also demonstrates human factors approach. Human factors theory outlines the importance of combining checklists with attitudinal change and removing barriers that prevent individuals from changing behaviours (Bosk et al, 2009). The DRCP with its interactive style and approachability of key players providing support and education helped to develop this attitudinal and behavioural change.

The implications for the study Trust include facilitating the continued development of those positive relationships and exploring how those relationships and subsequent attitudinal and

behavioural changes could be developed in other areas. This may include different ward areas where the DRCP had not been used or not used as extensively. It may also include employing similar strategies to help prevent and control, resolve and contain other infection related issues for example catheter related urinary tract infections (CAUTI). Utilising checklists and human factors approaches, for example patient focussed and team based collaborative working (Catchpole, 2013; Russ et al, 2013) as was used in this study may assist in these areas as well. This could also be explored beyond the study Trust to see if similar strategies and processes are beneficial elsewhere in relation to HCAIs.

Other recommendations that could be implemented on a wider scale include observing how different approaches may influence infection prevention and control practices and if a visible, approachable and helpful style can impact on actual practice and infection rates. There is evidence to support the positive effects of IPCPs as part of the team (Vandenberghe et al, 2002). In the study by Vandenberghe et al (2002), an IPCP was based on an intensive care unit (ICU) and worked with staff, predominantly focusing on surveillance and education.

The study found a significant reduction in 'device related hospital infection rates '(page 56) over a three and five year period. It may not be feasible or necessarily required to recommend having a specific IPCP in post on every ward and area. However there may be some benefit in allocating wards or units to specific IPCPs, perhaps encouraging sub-specialisation. In that way the role of the IPCP may become more proactive rather than the tendency to respond reactively to problems. This may assist the further development of collaborative relationships between wards and IPCTs.

Research could assist in evaluating if these approaches were beneficial, particularly if indicators such as ventilated associated pneumonia (VAP), CAUTI and central line associated blood stream infections (CLABSI) were used to quantify value added benefits as these can be benchmarked nationally and internationally. Likewise these indicators could be used as identifiers for clinical areas that particularly require attention for inculcating human factors approaches e.g. exploring quality of team work, maximising opportunities for educating in context and giving attention to processes in context to identify systematic weaknesses

The role of the IPCP as a clinical leader in infection prevention and control practice emerged in this study similar to other evidence (Ward 2012, a). The participants in this study voiced the importance of a particular style of leadership, one that promoted collaborative working. This had many of the features associated with postheroic and transformational styles of

leadership and these characterised those accounts that illuminated successful enactment of the DRCP. Postheroic leadership promoting a shared leadership role is also inherent in human factors approaches. An example is demonstrated in the WHO (2009) Safer Surgery approach. Human factors incorporated in the surgical checklist emphasises the importance of shared leadership in order that all staff are able to challenge and report any concerns without fear of recrimination (Gawande, 2009). Whilst it was the IPCP and matron who predominantly demonstrated leadership qualities in the DRCP their approachability and helpfulness assisted staff in also being able to challenge and discuss issues around patient safety and infection prevention and control which in turn helped to develop ward staff leadership capabilities.

These personal qualities and or expression of values that accommodated a transformational way of working may be considerations for recruitment and incorporated into ongoing continuing professional development for IPCPs in healthcare organisations. IPCPs that can lead and develop practice, contribute to teams and assist in others in their leadership roles around practice and patient safety in relation to CDI and infection prevention and control would help to influence behaviour change and enhance a human factor approach.

Joint collaborative approach by IPCPs and matrons in undertaking the DRCP

The DRCP was found to have been instrumental in developing and sustaining relationships, in particular between IPCPs and matrons. The participants in the study suggested that a joint approach by the IPCP and matron in undertaking the DRCP had been of benefit in terms of a collaborative approach with consistent messages. What was evident from the data obtained in the study was that the review was not always undertaken jointly by the IPCP and matron. Reasons for this were mainly around time constraints and resource issues.

Solutions suggested by participants (IPCPs and matrons) during the study included having pre-designated times to meet up to undertake the DRCP or undertaking the review separately and discussing findings at a later stage. Other potential solutions may include the matron undertaking the review on a less frequent basis. For example, if the patient required the DRCP on a daily basis then the IPCP could undertake alone with a joint review with the matron two or three times per week depending on risk assessment. Similarly once the review was required less frequently, the matron may only be involved once per week. Other alternatives could be that the review be undertaken with the ward manager or sister/charge nurse. However, one of the issues in undertaking the DRCP with the ward manager or sister/charge nurse is that there may also be restrictions with time and resources.

Patient centred approach

The findings of the study both in terms of 'Education and Learning' and 'Leadership' highlighted the importance of a patient centred approach. However what was also discussed is that whilst the DRCP may have been instrumental in the patient becoming the focus of the process and incorporating patient assessments, the DRCP did not incorporate true patient centeredness. Involving the patient in the DRCP in discussions and any decision making could be an area that is explored in more depth in future research. This could involve exploring patient's views of CDI and their perceptions of how the illness impacts on them. Focusing on the person and not just the disease can assist with patient centeredness (Dwamena, et al, 2013) and further explore the concept of embodiment and CDI and/or other HCAIs.

11.4 DRCP and human factors approach

For the organisation what started as an audit activity conducted by two authority figures changed through interaction into the DRCP. This evolution was recognised as a shift from merely policing or a strategy for checking up on staff to one of an educative, helpful and supportive process that assisted staff in the care and management of patients with CDI. CDI had become recognised as an illness, become embodied, and staff were more aware of what CDI might mean for patients and were able to recognise deterioration or improvements. Although patient safety was still inherent in the DRCP, the development of relationships and a team culture enabled by behaviours and the approach adopted by key players (IPCPs and matrons) resulted in the evolvement of a patient-focused process.

The checklist provided the key players with an artefact or tool to undertake the DRCP but it was the evolution of the DRCP that demonstrated and also facilitated the development of a human factors approach. The DRCP may have been undertaken by an IPCP and matron and not by the ward staff themselves caring directly for the patient with CDI. Nonetheless it was the wider benefits of communication, relationship development, teamwork, leadership and contextual nature of the learning during the DRCP that helped bring about changes to perceptions of the checklist and review process, CDI and infection prevention and control practices. Communication, leadership, team work and relationship development are all

important in human factors approaches (Bosk et al, 2009; Gawande, 2009; Russ et al, 2013).

Storr et al (2013) have suggested that those working in infection prevention and control should draw on the expertise of human factors experts in order to help with the ongoing infection challenges facing healthcare. Indeed that infection preventionists need to work with human factors experts to re-design, implement and evaluate specific approaches and interventions to help address ongoing infection prevention and control issues and ensure that infection prevention and control takes the 'irreducible minimum to as low as it can be' (Storr, et al 2013, page 4). They go onto maintain that human factors approaches could help in developing interventions that will ensure behaviour change becomes inherent and embedded in every day practice (Storr et al, 2013).

What this study has demonstrated is that where human factors principles are incorporated into systems and processes, even unconsciously alongside the development of staff with the skills and attributes to underpin and enhance those strategies can contribute to behaviour change and sustainability. In this study this has brought other staff (IPCP and matron) through their involvement in the review process to work alongside ward staff to confront challenges. Assisting with decision making and improving performance both directly and indirectly were clearly helpful behaviours and represented team cohesion with the team also including the IPCP and matron. The helpfulness and approachability of the key players in the DRCP, the IPCP and matron has enhanced the process and assisted in communication, learning and team working; key principles inherent in human factors approaches.

Given the perceived value of the DRCP in this study it would be helpful to compare other review methods for HCAIs including CDI used in similar health care settings. Although checklists and human factors approaches are not new to the field of infection prevention and control (Storr, et al, 2013; Aldeyab et al, 2011; Abbett et al, 2009; Salgado et al, 2009; Weiss et al, 2009), no evidence was found that collaborative team based review processes incorporating a checklist and human factors principles as with the DRCP in this study are in use elsewhere. A systematic analysis of review methods and/or routine infection prevention and control interventions for patients with CDI and other HCAIs in terms of patient care outcomes is required. This would allow measures that can be used to determine benefits could be identified facilitating better research design and also refine the plurality of interventions for CDI control locally, nationally and internationally.

11.5 Limitations of the study

A number of limitations emerged with this two phased design which deserve to be considered alongside the findings, implications and recommendations that arose from the study. Some of the limitations relating to Phase1 are reported in the findings and discussion chapters (chapter 4 and 5 respectively). These centred on the design and reliability of the checklist and the difficulties these presented for data collection and analysis. The recognition of these limitations proved useful for the design and development of Phase 2. They identified the necessity to use strategies that allowed further exploration with the participants of areas such as noncompliance. It also assisted in the adaptation and development of the revised checklist (see appendix 1).

Phase 2 of the study only included participants from one UK NHS Trust which make the findings less generalizable. The DRCP was unique to the setting in terms of its development and subsequent use, which made designing a study that compared and contrasted the DRCP with other healthcare facilities almost impossible. This study has defined and mapped the operationalization of a process involving a checklist and identified the human factors features incorporated. This approach may have value in the evaluation of other interventions associated with CDI and, or processes used with other HCAIs.

Comparable with other qualitative studies nevertheless, the number of participants (n=27) recruited to Phase 2 could be described as a limitation. A combination of purposeful and theoretical sampling was used in line with a grounded theory approach where participants are chosen for their ability to inform the research process (Corbin and Strauss, 2008). Recruitment ceased when theoretical saturation was reached. This approach inevitably has some drawbacks and the findings cannot be claimed to represent all those exposed to the DRCP only those that purposively represent the phenomena

One aspect that also warrants discussion as a possible limitation of the study was my role as a practitioner research and member of the ICPT that developed and implemented the initial checklist and involved in the subsequent DRCP. Data from this study informed the review of the checklist. As a practitioner researcher with vested interests this inevitably questions the veracity of the interpretations, potentially resulting in imposition of my ideas and a failure to represent the views of those involved in the study (Cutcliffe, 2000). Identification and appreciation of potential biases, constant comparison method applied to data and acknowledging other published literature when discussing the findings and conclusions helped to overcome some of these challenges (McGhee, 2007). In contrast there is a view

that prior knowledge and involvement can assist with data collection and data analysis. The practitioner researcher may be able to facilitate participants when exploring issues further because of their understanding of the topic area under review (Stern, 1994). This may have been the case having been actively involved in the DRCP. The potential for researcher bias and methods used to overcome these were discussed in more detail in chapter 3, section 3.11.

11.5 Conclusion

This study set out to explore the use of a daily review checklist in the care and management of patients with CDI but became much broader in focus once the interactive process that incorporated the use of the checklist became apparent. The study sought to give voice to the views of those involved (IPCPs, matrons, ward staff and senior managers) in order to capture its influence on the care and management of patients with CDI. What became apparent when undertaking the study is what began life as a checklist, designed with mainly an audit and surveillance function, evolved into a DRCP that incorporated unknowingly human factor principles. The DRCP had an interactive, educative, helpful and supportive function, which became influential in the care and management of patients with CDI. CDI became understood as an illness with definable embodiment and importantly the patient became the focal point.

Approachability, visibility and helpfulness of IPCPs and matrons were fundamental to delivery of the DRCP. The operationalization of the DRCP brought benefits to participants such as believing that they had an enhanced knowledge and understanding of *C.difficile,* CDI and the clinical implications of CDI. This was accompanied with an increased awareness of the infection prevention and control practices important in the prevention of the spread of the disease. Other benefits included the development of relationships between IPCPs and matrons and IPCPs, matrons and ward staff. This provided opportunities for greater collaboration, perceived enhanced team working and an opportunity to discuss issues and concerns related to infection prevention and control. Ward staff over time saw the benefits of the DRCP as opposed to imposition of (another) a 'big brother' surveillance approach. The DRCP was seen as providing organisational assurance that certain practices were being undertaken especially in relation to the patient safety by senior managers. The DRCP became a platform for IPCPs and matrons to demonstrate clinical leadership skills and expertise when assisting ward staff to focus on the needs and safe care of patients with CDI.

Embedded in the development of the DRCP was a human factors approach. This was not consciously the original intention when the checklist, was designed. What subsequently emerged, as the DRCP evolved, were opportunities for learning, improved communication, team working and clinical leadership. These in turn shifted the perception that checklist process was intended as a surveillance strategy for monitoring CDI and infection prevention and control practices to a patient focussed process. Human factors theory offers a framework to assist in promoting patient safety and improving healthcare delivery (Russ et al, 2013). The DRCP extended some aspects of human factors theory in relation to situated learning and the specific approach and attributes of the IPCP and matron during the DRCP. The DRCP was perceived to have influenced the care and management of patients with CDI. This was achieved by increased awareness and understanding of the disease process as it is experienced by the patient and refocusing the infection prevention and control precautions on preventing spread of a disease with all the concomitant consequences for others. This shift cannot fail to contribute to patient safety and healthcare delivery.

References

Abbett, S.K., Yokoe, D.S., Lipsitz, S.R., Bader, A.M., Berry, W.R., Tamplin, E.M., Gawande, A.A. (2009). Proposed Checklist of Hospital Interventions to Decrease the Incidence of Healthcare-Associated *Clostridium difficile* Infection. *Infection Control and Hospital Epidemiology,* **30,** 11, pp1062-1069.

Aldeyab, M.A., Devine, M.J., Flanagan, P., Mannion, M., Craig, A., Scott, M.G., Harbarth, S., Vernaz, N.,…….. Kearney, M. (2011). Multihospital Outbreak of *Clostridium difficile* Ribotype 027 Infection: Epidemiology and Analysis of Control Measures. *Infection Control and Hospital Epidemiology,* **32,** 3, pp 210-219.

Ali, S., Moore, G., Wilson, A.P.R. (2011). Spread and persistence of *Clostridium difficile* spores during and after cleaning with sporicidal disinfectants. *Journal of Hospital Infection,* **79,** pp 97-98.

Anderson, J., Gosbee, L.L., Bessesen, M., Williams, L. (2010). Using human factors engineering to improve the effectiveness of infection prevention and control. *Critical Care Medicine,* **38,** pp S269-S281.

Ayliffe, G. (2008). The emergence of the ICNA and progression to the IPS. *British Journal of Infection Control.* **9,** pp 6-9.

Baier, T. Nuewirth, E. (2007). Excel:: Com:: R. *Computational Statistics,* **22,** pp 91-108.

Bailey, J. (2008). First steps in qualitative data analysis: transcribing, *Family Practice,* **25,** pp 127-131.

Bauchamp, T.L., Childress, J.F. (2013). *Principles of Biomedical Ethics.* Oxford University press. Oxford.

Beach, M., Inui, T. (2006). Relationship-centred care. A constructive reframing. *Journal of Internal medicine,* **21,** ppS3-S8.

Bender, D.A. (2005). *A Dictionary of Food and Nutrition* Downloaded Aug 2014 from: http://www.encyclopedia.com/doc/1O39-ribotyping.html.

Benner, P.(1983). *From Novice to Expert: Excellence and Power in Clinical Nursing.* Addison Wesley. California.

Benner, P., Wrubel, J. (1989). *The Primacy of Caring: Stress and Coping in health and Illness.* Addison-Wesley. California*.*

Berger, P.L., Kellner, H. (1981). *Sociology reinterpreted.* Anchor Press/Doubleday. New York.

Berwick, D. (2013). *A promise to learn- a commitment to act: Improving the safety of patients in England.* DH. London.

Best, E.L., Fawley, W.N., Parnell, P., Wilcox, M. (2010). The potential for airborne dispersal of *Clostridium difficile* from symptomatic patients. *Clinical Infectious Diseases,* **50,** pp 1450-1457.

Blocher, J.C., Busta, F.F. (1985). Inhibition of germinant binding by bacterial spores in acidic environments. *Applied Environmental Microbiology,* **50,** pp 274-279.

Bignardi, G.E. (1998). Risk Factors for *Clostridium difficile* infection. *Journal of Hospital Infection,* **40,** pp1-15.

Borg, M.A. (2014). Cultural determinants of infection control behaviour: understanding drivers for implementing effective change. *Journal of Hospital Infection,* **86,** pp 161-168.

Borrill, C.S., Carletta, J., Carter, A.J., Dawson, J.F., Garrod, S., Rees, A., Richards, A., Shapiro, D., West, M.A. (2000). *The Effectiveness of Healthcare teams in the National Health Service.* Aston University, University of Glasgow, University of Leeds. Downloaded July 2014 from: *http://www.ctrtraining.co.uk/documents/TheEffectivenessofHealthCareTeamsintheNHS_003.pdf.*

Bosk, C.L., Dixon-Woods, L.M., Goeschel, C.A., Pronovost, P.J. (2009). The art of medicine: Reality check for checklists. *The Lancet,* **374,** pp 444-445.

Boyce, J.M., Pittet, D.(2002). Guideline for hand hygiene in health-care settings: recommendations of the Healthcare Infection Control Practices Advisory Committee and the HICPAC/SHEA/APIC/IDSA Hand Hygiene Task Force. *Infection Control and Hospital Epidemiology,* **23,** pp S3−S40.

Brinkmann, S. (2013). *Qualitative Interviewing.* Oxford University Press. Oxford.

British Association for Parental and Enteral Nutrition (BAPEN). (2011). *The 'MUST' Explanatory Booklet.* BAPEN. London. Downloaded Sept 2012 from: http://www.bapen.org.uk/pdfs/must/must_explan.pdf.

BBC. (2008). *No Charges over C diff outbreak. Downloaded* Sept 2012 from: http://news.bbc.co.uk/1/hi/health/7532654.stm.

Bryant, A., Charmaz, K. (Eds). (2007). *The SAGE Handbook of Grounded Theory.* Sage. London.

Burdette, S. D., Bernstein, J.M. (2007). Does the nose Know? The Odiferous diagnosis of *Clostridium difficile* associated diarrhoea, *Clinical Infectious diseases,* **44,** pp 1142.

Burnett, E. (2011). Outcome Competences for Practitioners in Infection Prevention and Control. *Journal of Infection Prevention,* Published online 11th Feb 2011. Downloaded Feb 2014 from: http://bji.sagepub.com/content/early/2011/02/07/1757177410395797.full.pdf+html.

Cambridge Dictionaries on line (2014). Downloaded Sept 2014 from: http://dictionary.cambridge.org/dictionary/business-english/tacit-knowledge.

Campbell, K.A., Phillips, M.S., Stachel, A., Bosco, J.A., Mehta, S.A. (2013). Incidence and risk factors for hospital-acquired *Clostridium difficile* infection among inpatients in an orthopaedic tertiary care hospital. *Journal of Hospital Infection,* **83,** pp 146 – 149.

Care Quality Commission (CQC) (2012). *About us: What we do and how we do it.* CQC. Newcastle Upon Tyne. Downloaded June 2014 from: http://www.cqc.org.uk/sites/default/files/documents/201202-cqc-about_us.pdf.

Catchpole, K. (2013). Spreading human factors expertise in healthcare: untangling the knots in people and systems. *Quality and Safety in Health Care,* **0,** pp1-5.

Cartmill, T.D.I., Panigrahi, H., Worsley, M.A., McCann, D.C., Nice, C.N., Keith, E. (1994). Management and control of a large outbreak of diarrhoea due to *Clostridium difficile. Journal of Hospital Infection,* **27,** pp1-15.

Charmaz, C. (2006). *Constructing grounded theory: A practical guide through qualitative analysis.* Sage. London.
Chen, H-Y., Boore, J.R.P. (2009). Using a synthesised technique for grounded theory in nursing research, *Journal of Clinical Nursing,* **18,** pp 2251-2260.

Chiovitti, R.F., Piran, N. (2003). Rigour and grounded theory research, *Journal of Advanced Nursing,* **44,** pp 427- 435.

Clarke, A. (2006). Qualitative interviewing: encountering ethical issues and challenges. *Nurse Researcher,* **13,** pp 19-29.

Climo, M.W., Israel, D.S., Wong, E.S., et al, (1998). Hospital wide restriction of Clindamycin: effect on the incidence of *Clostridium difficile-*associated diarrhoea and cost. *Annals of Internal Medicine,* **128,** pp 989-995.

Clynes , M,. P., Raftery, S. E. C. (2008). Feedback: An essential element of student learning in clinical practice. *Nurse Education in Practice.* **8**, pp 405-411.

Cohen, S.H., Gerding, D.N., Johnson, S., Kelly, C.P., Loo, V.G., McDonald, C., Pepin, J., Wilcox, M. (2010). Clinical practice Guidelines for *Clostridium difficile* Infection in Adults: 2010 update by the Society for Healthcare Epidemiology of America (SHEA) and the Infectious Diseases Society of America (IDSA). *Infection Control and Hospital Epidemiology,* **31,** pp T1 –T28.

Cole. M.(2011). Patient safety and health care associated infection. *British Journal of Nursing,* **20,** pp 1122-1126.

Cooney, A. (2010). Choosing between Glaser and Strauss: an example. *Nurse Researcher,* **17**, pp18-28.

Cooper, J. (2007). *Cognitive Dissonance: Fifty years of a classic theory.* Sage. London.

Corbin, J., Strauss, A. (2008). *Basics of Qualitative Research,* 3rd Ed. Sage. London.

Creswell, J.W. (2014). *Research Design: Qualitative, quantitative and mixed methods approaches.* 4th Ed. Sage. London.

Cutcliffe, J.R. (2005). Adapt or adopt: Developing and transgressing the methodological boundaries of grounded theory. *Journal of Advanced Nursing,* **51,** pp 421- 428.

Cutcliffe, J.R. (2000). Methodological issues in grounded theory. *Journal of Advanced Nursing,* **31,** pp 1476- 1484.

David, M., Sutton, D. (2004). *Social Research: The Basics,* Sage. London.

Dawson, S.J. (2003). The role of the Infection Control Link Nurse. *Journal of Hospital Infection,* **54,** pp 251- 257.

Dealey, C., Moss, H., Marshall, J., Elcoat, C. (2007). Auditing the impact of implementing the Modern Matron in an acute teaching trust. *Journal of Nursing Management,* **15,** pp 22-33.

Degani, A., Weiner, E.L. (1990). *Human Factor of Flight Deck Checklists: The Normal Checklist.* NASA. California.

Denton, A., Topping, A., Humphreys, P. (2014). Managing *Clostridium difficile* infection in hospitalised patients. *Nursing Standard,* **28,** pp 37-43.

Department of Health (DH) (2014). *NHS Standard Contract 2014/15. Final Technical Guidance.* DH. London.

DH. (2013):
    a). *The Operating Framework for the NHS in England 2014.2015.* The Stationary Office. London. Downloaded Aug 2014.from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/256456/NHS_outcomes.pdf.
    b) *The Education Outcomes framework*. DH. London

DH. (2012). *Compassion in Practice: Nursing midwifery and care staff. Our vision and strategy.* DH. London. Downloaded March 2014 from: http://www.england.nhs.uk/wp-content/uploads/2012/12/compassion-in-practice.pdf.

DH 2011. *Technical Guidance for the Operating Framework 2012/13.* DH. London. Downloaded July 2012 from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216413/dh_132045.pdf.

DH. (2010):
    a) *High Impact Intervention No 7 Care bundle to reduce the risk from Clostridium difficile.* DH. London. Downloaded October 2011 from: http://nhschoicestraining.spinningclock.com/Documents/HII_-_Clostridium_difficile_infection.pdf.
    b) *C. difficile Objective Methodology.* The Stationery Office, London. Downloaded October 2010 from: http://webarchive.nationalarchives.gov.uk/+/www.dh.gov.uk/en/Publichealth/Healthprotection/Healthcareassociatedinfection/Nationalupdates/DH_114862.
    c) *Equity and excellence: Liberating the NHS.* DH. London.
    d) *The Health and Social Care Act 2008: Code of Practice on the prevention and control of infections and related guidance.* DH. London.

DH (2009). *The Operating Framework for the NHS in England 2010/11.* The Stationery Office, London. Downloaded Nov 2011 from: http://systems.hscic.gov.uk/infogov/links/operatingframework2010-2011.pdf.

DH. (2008):
    a) *Clostridium difficile infection: How to deal with the problem*. DH. London
    b) *Reducing healthcare associated infections: from trust board to ward: A summary of best practice*. DH. London. Downloaded Sept 2014 from: http://mrsaactionuk.net/pdfs/BoardToWard.pdf.

DH. (2007). *Saving Lives.* DH. London.

DH. (2006). *The Health Act 2006: Code of practice for the prevention and control of Health Care Associated Infections.* DH. London.

DH. (2005).*Research Governance Framework for Health and Social Care.* DH. London.

DH. (2004). *A Matron's Charter: An Action Plan for Cleaner Hospitals.* DH. London.

DH.(2002). *Winning Ways.* DH. London.

DH. (2000). *The NHS Plan: a plan for investment, a plan for reform.* DH. London. DH/Public Health Laboratory Service [PHLS]. (1994). *Clostridium difficile infection Prevention and Management: A Report by a Department of Health/Public Health laboratory Service Joint Working group.* DH/PHLS. London.

Devuni, D., Rossi, L.M., Wu, G.Y., Ko, C.Y. (2014). *Toxic Megacolon.* Downloaded Aug 2014.from: http://emedicine.medscape.com/article/181054-overview#showall.

Dial, S., Alrasadi, K., Manoukian, C., Huang, A., Menzies, D. (2004). Risk of *Clostridium difficile* diarrhoea among hospital inpatients prescribed proton pump inhibitors: cohort and case controlled studies. *Canadian Medical Association Journal,* **171,** pp 33-38.

DiCicco-Bloom, B. Crabtree, B.F. (2006). The qualitative research interview, *Medical Education,* **40,** pp 314-321.

Dimond, B. (2006). Generalist and specialist nurses: caring for a patient with a stoma. *British Journal of Nursing,* **15**, pp 769-770.

Drekonja, D.M., Butler, M., Macdonald, R., Bliss, D., Filice, J.A., Rector, T.S., Wilt, T.J. (2011). Comparative effectiveness of *Clostridium difficile* infections: a systematic review. *Annals of Internal Medicine,* **155,** pp 839 – 847.

Dreyfus, S.E., Dreyfus, H.L. (1980). *A five stage model of the mental activities in directed skill acquisition.* Unpublished report supported by the Air Force Office of Scientific Research (AFSC) (Contract) F49620-79-C-0063. University of California at Berkeley. Cited in: Benner, P.(1983). *From Novice to Expert: Excellence and Power in Clinical Nursing.* Addison Wesley. California.

Dubberke, E., Gerding, N., Classen, D., Arias, K.M., Podgorny, K., Anderson, D.J………Yokoe, D.S. (2008). Strategies to prevent *Clostridium difficile* infections in acute care hospitals. *Journal of Infection Control and Hospital Epidemiology,* **29,** pp S81-S92.

Duerden, B.I. (2009). Responsibility for managing healthcare – associated infections: where does the buck stop? *Journal of Hospital Infection,* **73,** pp 414 -417.

Duke, K. (2002) Getting beyond the "official line": reflections on dilemmas of access, knowledge and power in researching policy networks. *Journal of Social Policy*, **31,** pp 39–60. Cited in: Edwards, R., Holland, J. (2013). *What is Qualitative interviewing?* Bloomsbury Publishing. London.

Dwamena F, Holmes-Rovner M, Gaulden CM, Jorgenson S, Sadigh G, Sikorskii A, …….. Beasley M. (2012). *Interventions for providers to promote a patient-centred approach in clinical consultations (Review).* Cochrane Library. Downloaded Sept 2014 from: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD003267.pub2/pdf.

Edmonstone, J. (2009). Clinical Leadership: the Elephant in the room. *International Journal of Health Planning and Management,* **24,** pp 290-305.

Edwards, R., Holland, J. (2013). *What is Qualitative interviewing?* Bloomsbury Publishing. London.

Edwards, R., Sevdalis, N., Vincent, C., Holmes. (2012). Communication strategies in acute health care: evaluation within the context of infection prevention and control. *Journal of Hospital Infection,* **82,** pp 25-29.

Eraut.M. (2011). Informal learning in the workplace: evidence on the real value of work-based learning (WBL). *Development and learning in organisations,* **25,** pp 8-12.

Eraut, M. (2007).Learning from other people in the workplace. *Oxford Review of Education,* **33,** pp 403-422.

Eraut. M. (2004).Informal learning in the workplace. *Studies in Continuing Education,* **26,** pp 247-273.

Eraut. M. (2000).Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology,* **70,** pp 113-136.

Farrugia, C., Borg, M.A. (2012). Delivering the infection control message: a communication challenge. *Journal of Hospital Infection,* **80,** pp 224-228.

Fawcett, T.(J).N; Rhynas, S.J.(2014). Re-finding the 'human side' of human factors in nursing: Helping student nurses to combine person centred care with the rigours of patient safety. *Nurse Education Today,* **34,** pp 1238-1241

Fawley, W.N., Wilcox, M.H.(2001). Molecular epidemiology of endemic *Clostridium difficile* infection*. Epidemiology and Infection,***126,** pp 343-350.

Firth-Cozen, J. (2001). Cultures from improving patient safety through learning: the role of teamwork. *Quality in Health Care,* **10** (Suppl II), pp ii26 – ii31.

Flanagan, M. (1998). Factors influencing tissue viability nurse specialists in the UK: 2. *British Journal of Nursing,* **7,** pp 690-692.

Fletcher, J.K. (2004). The paradox of postheroic leadership: an essay on gender power and transformational change. *The Leadership Quarterly,* **15,** pp 647-661.

Fors, V., Backstrom, A., Pink, S. (2013). Multisensory emplaced learning: Resituating situated learning in a moving world. *Mind Culture and Activity.* **20, 2,** pp 170-183.

Foulke, G.E., Silva, J, Jr. (1989). *Clostridium difficile* in the intensive care unit: management problems and prevention issues. *Critical Care Medicine,***17,** pp 822-826.

Francis (2013). *Report of the Mid-Staffordshire NHS Foundation Trust Public Inquiry: Executive Summary.* Stationary Office. London.

Freeman, J., Bauer, M.P., Baines, S.D., Corver, J., Fawley, W.N., Goorhuis, B., Kuijper, E.J., Wilcox, M.H. (2010). The Changing Epidemiology of *Clostridium difficile* Infections. *Clinical Microbiology Reviews,* **23,** 3, pp 529-549.

Garcia, R., Barnard, B., Kennedy, V. (2000).The fifth evolutionary era in infection control: Interventional epidemiology. *American Journal of Infection Control,* **28,** pp 30-43.

Gawande, A. (2009). *The Checklist Manifesto: How to get things right.* Profile. London.

Gerding, D.N., Muto, C.A., Owens, R.C. (2008). Measures to Control and Prevent *Clostridium difficile* Infection. *Clinical Infectious Diseases, 46,* pp S43-S49.

Gilca, R., Hubert, B., Fortin, E., Gaulin, C., Dionne, M. (2010).Epidemiological Patterns and Hospital Characteristics Associated with Increased Incidence of *Clostridium difficile* Infection in Quebec, Canada1998-2006.*Infection Control and Hospital Epidemiology.***31,** pp 939-947.

Glaser, B., Strauss, A. (1967). *The Discovery of grounded Theory: Strategies for Qualitative Research.* Aldine Publishing Co. Chicago.

Glass (1976). Primary, secondary and meta-analysis of research. *Educational Researcher,* **5,** pp. 3-8. Downloaded August 2014 from: http://www.dataschemata.com/uploads/7/4/8/7/7487334/glass_1976_primarysecondary metaanalysis.pdf.

Goering, R.V., Dockrell, H.M., Zuckerman, M., Wakelin, D., Hoitt, I.M., Mims, C., Chiodini, P.L. (2008). *Mims' MedicalMicrobiology.* 4th Ed. Elsevier. Philadelphia.

Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report,* **8,** 4, pp 597-607.

Goldwater, E. (2007). Using Excel for Statistical Data Analysis. Downloaded October 2013 from: http://people.umass.edu/evagold/excel.html.
Gopee, N., Galloway, J. (2009). *Leadership and Management in Healthcare.* Sage. London.

Gould, D. (2008). The matron's role in acute National Health Service trusts. *Journal of Nursing Management,* **16,** pp 804-812.

Goulding, C. (2005). Grounded theory, ethnography and phenomenology: A comparative analysis of three qualitative strategies for marketing research. *European Journal of Marketing,* **39**, pp 294-308.

Gouliouris, T., N.M. Brown, S. H. Aliyu.(2010). Prevention and treatment of *Clostridium difficile* Infection. *Clinical Medicine,* **11,** 1,pp 75-79. Downloaded October 2011 from: http://rcpjournal.org/content/11/1/75.full.pdf+html.

Graneheim, U.H., Lundman, B. (2004). Qualitative content analysis in nursing research: concepts, procedures and measures to achieve trustworthiness. *Nurse Education Today,* 25, pp 105-112.

Gravel, D., Gardam, M., Taylor, G., Miller, M., Simor, A., McGeer, ……….and the Canadian Nosocomial Infection Surveillance Program. (2008). Infection control practices related to *Clostridium difficile* infection in acute care hospitals in Canada. *American Journal of Infection Control* **37,** pp9-14

Greenhalgh, T., Peacock, R. (2005). Effectiveness and efficiency of search methods in systematic reviews of complex evidence: audit of primary sources, *British Medical Journal [BMJ].* **331,** pp1064-1065

Griffiths, P., Renz, A., Rafferty, AM. (2008). *The impact of organisation and management factors in infection control: A scoping review.* Kings College London/RCN. London

Guba, E.G., Lincoln, Y.S. (1994). Competing Paradigms in Qualitative Research In: S. Lincoln (Eds). *Handbook of qualitative research,* (pp105-117). Sage. Thousand Oaks, California.

Gurses, A.P., Ozok, A.A., Provonost, P. (2011). Time to accelerate integration of human factors theory and ergonomics in patient safety. *BMJ Quality Safety.* **21,** pp347-351

Hales. B., Terblanche, M., Fowler, R., Sibbald, W. (2008). Development of medical checklists for improved quality of patient care. *International Journal for Quality in healthcare,* **20,** pp 22-30.

Hall, P. (2005). Inter-professional teamwork: Professional cultures as barriers. *Journal of Inter-professional Care,* **19,** pp 186-196.

Hall, I.C, O'Toole, E. (1935). Intestinal flora in new born infants. *American Journal of Diseases Child.* **49,** pp 390-402. Cited in: Lyerly, D.M., Krivan, H.C., Wilkins, T. D. (1988). *Clostridium difficile:* its disease and toxins. *Clinical Microbiology Reviews,* **1,** pp 1-18.

Harbarth, S., Samore, M. (2012). *Clostridium:* transmission *difficile*? *PLoS Medicine,* **9,** e100117. Downloaded April 2014 from: http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001171.

Hardy, K.J., Gossain, S., Thomlinson, D., Pillay, D.G., Hawkey, P.M. (2010). Reducing *Clostridium difficile* through early identification of clusters and the use of a standardised set of interventions. *Journal of Hospital Infection,* **75,** pp277-281.

Hart, C. (1998). *Doing a Literature review.* Sage. London.

Hawker, J., Begg, N., Blair, I.,Reintjes, R., Weinberg, J. (2005). *Communicable Disease Control Handbook.* 2nd Ed. Blackwell. Oxford.

Haynes, A.B., Weiser, T.G., Berry, W.R., Lipsitz, S.R., Breizat, A-H.A., Dellinger, E.D., ………… Gawande, A.A.(for the Safe Surgery Saves Lives Study Group). A Surgical Safety Checklist to reduce morbidity and mortality in a global population. *New England Journal of Medicine,* **360,** pp 491-499.

Health and Social Care Act 2012.

Health and Social Care Act 2008.

Health Act 2006.

Healthcare Commission (HCC). (2009). *The Healthcare Commission 2004-2009.* HCC. London. Downloaded June 2014 from: http://www.nhshistory.net/Healthcare_Commission_legacy_report.pdf.

HCC. (2008). *Learning from Investigations.* HCC. London.

HCC. (2007). *Investigation into outbreaks of Clostridium difficile infection at Maidstone and Tunbridge Wells NHS Trust.* HCC. London.

HCC. (2006). *Investigation into outbreaks of Clostridium difficile infection at Stoke Mandeville Hospital, Buckinghamshire NHS Trust.* HCC. London.

Health and Safety Executive (HSE). (2006). *HSE Investigation into outbreaks of Clostridium difficile infection at Stoke Mandeville Hospital, Buckinghamshire NHS Trust.* HSE. London.

Health Protection Agency [HPA]. (2012).*Results from the mandatory surveillance of Clostridium difficile.* Downloaded March 2012 from: http://www.hpa.org.uk/web/HPAweb&HPAwebStandard/HPAweb_C/1254510678961.

Howerton, A., Ramirez, N., Abel-Santos, E. (2011). Mapping interactions between germinants and *Clostridium difficile* spores. *Journal of Bacteriology,* **193**, pp 274-282.

HPA. (2011):
   a) *Clostridium difficile.* Downloaded October 2011 from: http://www.hpa.org.uk/Topics/InfectiousDiseases/InfectionsAZ/ClostridiumDifficile/.
   b) *Quarterly Epidemiological Commentary: Mandatory MRSA & MSSA bacteraemia, and Clostridium difficile infection data (up to July – Sept 2011).* Downloaded January 2012 from: http://www.hpa.org.uk/webc/HPAwebFile/HPAweb_C/1284473407318.

HPA (2009).*Report for the national Audit office: Trends in rates of Healthcare Associated Infection in England 2004 to 2008.* HPA. London. Downloaded Aug 2014 from: *http://www.nao.org.uk/wp-content/uploads/2009/06/0809560_MDA_Trends.pdf.*

HPA (2006). *Clostridium difficile: Findings and recommendations from a review of the epidemiology and a survey pf Directors of Infection Prevention and Control in England.*

HPA. London. Cited in: DH (2008).*Clostridium difficile infection: How to deal with the problem.* DH. London.

Health Protection Scotland (HPS). (2014):
   a) *National Infection prevention and Control Manual.* HPS. Downloaded June 2014 from: Edinburghhttp://www.documents.hps.scot.nhs.uk/hai/infection-control/ic-manual/ipcm-p-v2-3.pdf.
   b) *Care Bundle.* Downloaded Sept 2014 from: http://www.hps.scot.nhs.uk/haiic/ic/bundles.aspx.

Hoare, K.J., Mills, J., Francis, K. (2012). Dancing with data: an example of acquiring theoretical sensitivity in a grounded theory study. *International Journal of Nursing Practice,* 18, pp 240-245.

Hornstein,G. (1998). Excerpt from private conversation cited in: Timmermans, S., Bowker, G.C., Leigh Star. S. (1998). Visibility, control and comparability in building nursing interventions classification. In: Berg. M., Mol, AM (Eds). *Differences in medicine: unravelling practices, techniques and bodies.* Duke University Press. New York.

Hutchinson, S.A. (1993). Grounded theory: the method. In P.L., Munhall, Boyd, C.A. (Eds). *A Qualitative Perspective,* 2nd Ed. National League for Nursing press. New York. Institute for Healthcare Improvement. (2014). *Care bundles.* Downloaded Aug 2014 from http://www.ihi.org/topics/bundles/Pages/default.aspx.

International Ergonomics Association (IEA). (2014). *Definition and domains of ergonomics.* IEA. Downloaded December 2014 from: http://www.iea.cc/whats/index.html

Jelphs, K., Dickinson, H. 92008). *Working in teams.* Policy Press. Bristol.

Joppe. (2000). *The research process.* Downloaded June 2013 from: http://www.academia.edu/930161/The_research_process. Cited in Golafshani, N. (2003). Understanding reliability and validity in qualitative research. *The Qualitative Report,* **8,** 4, pp 597-607

Karl, R. (2010). Briefing, Checklists, Geese and Surgical Safety. *Annals of Surgical Oncology,* **17,** pp 8-11.

Karwowski, W. (2012). The discipline of ergonomics and human factors. In G. Salvendy (Ed). *Handbook of human factors and ergonomics.* (4th Ed) pp 3-37 John Wiley and Sons. New Jersey

Kavanagh, S., Cowan, J. (2004). Reducing risk in health care teams: an overview. *Clinical Governance: An International Journal,* **9,** pp 200-204.

Kennedy, I. (2001). *The report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary 1984 to 1995: learning from Bristol.* DH. London.

Keogh, B. (2013). *Review into the quality of care and treatment provided by 14 hospital trusts in England: overview report.* NHS. London

Ker, J. (2008). Teaching on a ward round. *BMJ,* **337,** Downloaded August 2014 from: http://www.bmj.com/content/337/bmj.a1930.

Kings Fund (2013). *Patient –centred leadership.* The Kings Fund. London.

Kolb, D.A. (1984). *Experiential learning. Experience as the source of learning and development.* Prentice Hall. New Jersey.

Koteyko, N., Nerlich, B. (2008). Modern matrons and infection control practices: aspirations and realities. *British Journal of Infection Control,* **9,** pp 18-22.

Kval, S., Brinkmann, S. (2009).*Interviews: learning the craft of qualitative research interviewing.*2nd Ed. Sage. London.

Laurance, J. (2009). Peter Pronovost: champion of checklists in critical care. *Lancet,* **374,** pp 443.

Lave, J. Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge University Press. New York.

Lawley, T.D., Clare, S., Walker, A.W., Goulding, D., Stabler, R.A., Croucher, N., ……………Dougan, G. (2009). Antibiotic Treatment of *Clostridium difficile* Carrier Mice Triggers a Supershedder State, Spore-Medicated Transmission and Severe Disease in Immuno-compromised Hosts. *Infection and Immunity,* **77,** pp 2661-3669.

Leonard, V. W. (1994). A Heideggerian phenomenological perspective on the concept of the person. In: *Interpretive Phenomenology: Embodiment, caring and ethics in health and illness.* Benner, P. (Eds). Sage. London.

Leonard, J., Marshall, J.K., Monayyedi, P. (2007). Systematic Review of the risk of enteric infection in patients taking gastric acid suppression. *American Journal of Gastroenterology,* **102,** pp 2047-2056.

Leonard, M., Graham, S., Bonacum, D. (2004). The human factor: the importance of effective communication and team, work in providing safe care. *Quality Safe health Care,* **13,** (suppl 1), pp i85-i90.

Lewis. S.J., Heaton. K.W. (1997). Stool Form Scale as a useful Guide to Intestinal Transit Time. *Scandinavian Journal of Gastroenterology*, **32***, pp 920-924.

Leischner S, Johnson S, Sambol J et al. (2005). *Effect of alcohol hand gels and chlorhexidine hand wash in removing spores of Clostridium difficile (CD) from hands.* 45th Interscience Conference on Antimicrobial Agents and Chemotherapy, Washington DC.

Lincoln, Y.S., Guba, E.G. (1985). *Naturalistic Inquiry.* Sage. California.

Lloyd Jones, M. (2003). Role development and effective practice in specialist and advanced practice roles in acute hospital settings: a systematic review and meta-synthesis. *Journal of Advanced Nursing,* **49,** pp191-209.

Loveday, H.P, Wilson, J.A., Pratt, R.J., Golsorkhi, M., Tingle, A., Baka, A., Brownea,J., Prietob,J., Wilcox.M. (2014). epic3: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England. *Journal of Hospital Infection,* **86,** pp S1 – S70*.

Lyerly, D.M., Krivan, H.C., Wilkins, T. D. (1988). *Clostridium difficile:* its disease and toxins. *Clinical Microbiology Reviews,* **1,** pp 1-18.

Mackenzie,N., Knipe, S. (2006). Research dilemmas: paradigms, methods and methodology, *Issues in Educational Research.* **16,** pp 1-11.

MacLachlan, M. (2004). *Embodiment: Clinical critical and cultural perspectives on health and illness.* Open University Press. Berkshire.

Madeo, M., Owen, E., Baruah, J. (2008). The management of *Clostridium difficile* infection: using small-scale audit to indicate the knowledge of nursing and medical staff in an acute hospital setting. *British Journal of Infection Control,* **9,** pp12-17.

Manian, F.A., Meyer, L., Jenne, J. (1996). *Clostridium difficile* contamination of blood pressure cuffs: a call for a closer look at gloving practices in the era of universal precautions. *Infection Control and Hospital Epidemiology,* **17,** pp180-182.

Marsden, J. (2000). Expert nurse decision making: telephone triage in as a method of patient prioritisation in an ophthalmic Accident and Emergency Department. *Nursing Times Research,* **4,** pp 44 -54.

May, C.R., Mair, F., Finch, T., MacFarlane, A., Dowrick, C., Treweek, S.,………….. Montori, V.M. (2009). Development of a theory of implementation and integration: Normalisation Process Theory. *Implementation Science,* **4,** 29. Downloaded March 2014 from: http://www.implemntationscience.com/content/4/1/29.

Mayfield, J., Leet, T., Miller, J., Mundy, L.M.(2000). Environmental control to reduce transmission of *Clostridium difficile.   Clinical Infectious Diseases,* **31,** pp 995-1000.

McCallin, A.M. (2003). Designing a grounded theory study: some practicalities. *Nursing in Critical Care,* **8,** pp 203-208.

McEvoy, P. (2001). Interviewing colleagues: Addressing the issues of perspective, inquiry and representation. *Nurse Researcher,* **9,** pp 49-59.

McFarland, L.V., Beneda, H.W., Clarridge, J.E., Raugi, G.J. (2007). Implications of the changing face of *Clostridium difficile* disease for health care practitioners. *American Journal of Infection Control*, **35,** pp 237-253.

McFarland, L.V., Mulligan, M.E., Kwok, R.Y., Stamm, W.E. (1989). Nosocomial acquisition of *Clostridium difficile* infection. *New England Journal of Medicine,* **320,** pp 204-210.

McGhee, G., Marland, G.R., Atkinson, J. (2007). Grounded theory research: literature reviewing and reflexivity. *Journal of Advanced Nursing.* **60,** pp 334-342.

McNeil, J., Nolan, A. (2011). Midwifery research by midwifery researchers: challenges and considerations. *Evidence based Midwifery,* **9,** pp 61-65.

McNellis, B. (2010). *Are you using checklists? Check!* Downloaded March 2012 from: http://www.jaapa.com/are-you-using-checklists-check/article/173489/.
McNulty, C., Logan, M., Donald, I.P., et al, (1997). Successful control of *Clostridium difficile* infection in an elderly care unit through the use of restrictive antibiotic policy. *Journal of Antimicrobial Chemotherapy* **40,** pp707-711.
Medical Dictionary for Health Professionals and Nursing (2014). Definition of Bioburden. Downloaded Aug 2014 from: http://medical-dictionary.thefreedictionary.com/bioburden.

Melia, K.M. (1996). Rediscovering Glaser. *Qualitative Health Research,* **6,** pp 368-378.

Merriam, S.B. (2001). Andragogy and self- directed learning: Pillars of adult learning theory. *New Direction for Adult and Continuing Education.***89,** pp 3-13.

Mills, J., Bonner, A., Francis, K. (2006). The development of constructivist grounded theory. *International Journal of Qualitative Methods,* **5,** pp 1-10.

Mohman, S.A., Cohen, S.G., Mohrman, A.M., (1995). *Designing Team-Based Organizations.* Jossey-Bass. San Francisco.
Morse, J.M., Field, P.A. (1995). *Qualitative Research Methods for Health professionals.* 2nd Ed. Sage. London Cited in: Cutcliffe, J. (2000). Methodological issues in grounded theory. *Journal of Advanced Nursing,* **31,** pp 1476- 1484.

Murphy, D.M., Hanchett, M., Olmstead, R.M., Farber, M.R., Lee, T.B., Haas, J.P., Streed, S.A.(2012). Competency to infection prevention: A conceptual approach to guide current and future practice. *American Journal of Infection Control,***40,** pp 296-303.

Murray, E., Treweek, S., Pope, C., MacFarlane, A., Ballini, L., Dowrick, C., …………. May, C. (2010). Normalisation process theory: a framework for developing, evaluating and implementing complex interventions. *BMC Medicine,* 8, 63. Downloaded March 2014 from: http://www.biomedcentral.com/1741-7015/8/63

Muto, C.A., Pokrwya, M., Shutt, K., et al, (2005). A large outbreak of *Clostridium difficile*-associated disease with an unexpected proportion of deaths and colectomies at a teaching hospital flowing increased fluoroquinolone use. *Infection Control and Hospital Epidemiology,* **26,** pp 273-280.

National Advisory Group on the Safety of Patients in England. (2013). *A promise to learn – a commitment to act Improving the Safety of Patients in England.* DH. London. National *Clostridium difficile* Standards Group. (2003). *Report to the Department of Health.* DH. London.

National Health Service (NHS) Choices (2014). Complications of Ulcerative Colitis. Downloaded Aug 2014 from: http://www.nhs.uk/Conditions/Ulcerative-colitis/Pages/Complications.aspx.

NHS Commissioning Board. (2013) *Everyone Counts: Planning for patients 2013/14*

NHS Commissioning Board. London.

NHS England. (2014):
   a) *Clostridium difficile infection objectives for NHS organisations in 2014/15 and guidance on sanction implementation.* NHS England. London.
   b) *Patient-led assessments of the care environment (PLACE).* Downloaded Sept 2014 from: http://www.england.nhs.uk/ourwork/qual-clin-lead/place.

NHS England (2013). *Patient led assessments of the care environment. The ward assessment – acute and community hospitals, hospices and treatment centres.* NHS England. London. Downloaded Sept 2014 from: http://www.england.nhs.uk/wp-content/uploads/2014/01/place-ward-acute-1.pdf.

National Nursing Research Unit (2012). Intentional Rounding: What is the Evidence? Downloaded June 2012 from: http://www.kcl.ac.uk/nursing/research/nnru/Policy/Currentissue/Policy-Plus-Issue35.pdf.

National Institute for Health and Care Excellence (NICE).(2013). *Interventional procedure overview of faecal microbiota transplant for recurrent Clostridium difficile infection.* NICE. London.

Neil, S. (2006). Grounded theory sampling. *Journal of Research in Nursing,* **11,** pp 253-260.

Nichols, A., Badger, B. (2008). An investigation of the division between espoused and actual practice in infection control and of the knowledge sources that may underpin this division. *British Journal of Infection Control,* **6,** pp11-15.

National Institute for Health and care Excellence (NICE). (2011). *Prevention and Control of health-care associated infections: Quality Improvement Guide.* Downloaded October 2011 from: http://www.nice.org.uk/media/842/61/HCAIQualityImprovementGuide.pdf.

Northouse, P.G (2009). *Leadership theory and practice* 3rd Ed Sage. London.

Nursing and Midwifery Council (NMC). (2013). Post Education and Practice Standards (prep). Downloaded Dec 2013from: http://www.nmc-uk.org/Employers-and-managers/Your-responsibilities/CPD-and-practice/.

Paton, R.A., McCalman, J. (2008). *Change management: a guide to effective implementation.* 3rd Ed. Sage. London.

Patton, M.C. (2002).*Qualitative Research and Evaluation Methods.* 3rd Edition. Sage. London.

Perry, C. (2005). The infection control nurse in England – past present and future. *British Journal of Infection Control,***6,** pp 18-21.

Pittet, D., Allegranzi, B., Boyce, J. (2009). The World Health Organization guidelines on hand hygiene in health care and their consensus recommendations. *Infection Control and Hospital.Epidemiology,***30,** pp611–622.

Planche, T.D., Davies, K.A., Coen, P.G., Finney, J.M., Monahan, I.M., Morris, K.A., ….Wilcox, M.H. (2013). Differences in outcome according to *Clostridium difficile* testing method: a prospective multicentre diagnostic validation study of *C.difficile* infection. *Lancet,* **13,** pp 936-945.

Pratt, R.J., Pellowe, C.M., Wilson, J.A., Loveday, H.P., Harper, P.J., Jones, S.R.L.J., …… Wilcox, M.H. (2007). Epic 2: National evidence based guidelines for preventing healthcare-associated infections in NHS hospitals in England. *Journal of Hospital Infection,* **65,** ppS1-S64.

Price, M.F., Dao-Tran, T., Garey, K.W., Graham,G., Gentry, L.O., Dhungana , L., DuPont. H.L.(2007).Epidemiology and incidence of Clostridium difficile-associated diarrhoea diagnosed upon admission to a university hospital. *Journal of Hospital Infection,* **65,** pp 42-46.
Proctor, R.W., Van Zandt, T. (2008). *Human Factors in simple and complex systems.* 2nd Ed. CRC Press. New York

Pronovost. P., Nedham, D., Berenholtz, S., Sinopoli, D., Chu, H., Cosgrove, S., …… Goeschel, C. (2009). An intervention to decrease catheter-related bloodstream infections. *New England Journal of Medicine,* **355,** 26, pp 2725-32.

Public Health England (PHE). (2014):
   a) *Clostridium difficile Ribotyping Network (CDRN) for England and Northern Ireland.* PHE. London.
   b) *Communicable Disease Outbreak Management: Operational guidance.* PHE. London.

PHE. (2013):
   a) *Updated guidance on the management and treatment of Clostridium difficile infection.* PHE. London.
   b) *Summary Points on Clostridium difficile infection.* PHE. London.

Quinn, F.M., Hughes, S. J. (2007). *Quinn's Principles and Practice of Nurse Education.*5th Ed. Cengage Learning EMEA. Hampshire.

Randle, J., Adams, G., Vaughan, N. (2008). How knowledgeable el are nurses' about *C.difficile. Nursing Times,* **103,** pp 42-43.

Reason, J. (2000).Human error: models and management. *BMJ,* **320,** pp 768-770.

Rennie, D.L. (2000). Grounded theory methodology as methodical hermeneutics. *Theory Psychology,* **10,** pp 481-502.

Riggs, M.M., Sethi, A.K., Zabarsky, T.F., Eckstein, E.C., Jump, R.L.P., Donskey, C.J. (2007). Asymptomatic carriers are a potential source for transmission of epidemic and non-epidemic *Clostridium difficile*strains among long-term care facility residents. *Clinical Infectious Diseases, 45,* pp 992-998.

Robson, C. (2011). *Real World Research.*3ed Ed. John Wiley &Sons. Chichester.

Rogers, A., Horrocks, N. (2010). *Teaching Adults.*4th Ed. Open University Press. Maidenhead.

Ross, K. (2001) Political elites and the pragmatic paradigm: notes from a feminist researcher – in the field and out to lunch, *International Journal of Social Research Methodology*, 4. pp155–166. Cited in: Edwards, R., Holland, J. (2013). *What is Qualitative interviewing?* Bloomsbury Publishing. London.

Ross, J. (2009). Considering the Human Factors in Patient Safety. *Journal of PeriAnesthesia Nursing, 24,* pp 55-562.

Royal College of Nursing (RCN).(2012). *Wipe it out: Once chance to get it right.* RCN. London. Downloaded June 2014from: http://www.rcn.org.uk/__data/assets/pdf_file/0008/427832/004166.pdf.

Rubin H.J., Rubin, S. (2012). *Qualitative Interviewing: The art of hearing data.* 3rd Ed. Sage. London.

Russ, A.L., Fairbanks, R.J., Karsh, B-T., Militello, L.G., Saleem, J.J., Wears, R.L. (2013). The science of human factors: separating fact from fiction. *BMJ Quality Safety, 22,* pp 802-808.

Salgado, C. D., Mauldin, P.D., Fogle, P.J., Bosso, J.A.(2009). Analysis of an outbreak of *Clostridium difficile* infection controlled with enhanced infection control measures. *American Journal of Infection Control, 37,* pp 458-464.

Samore, M.H., Venkataraman, L, DeGirolami, P.C., Arbeit, R.D., Karchmer, A.W., (1996). Clinical Molecular Epidemiology of Sporadic and Clustered Cases of Nosocomial *Clostridium difficile* Diarrhoea. *The American Journal of Medicine,*100, pp 32-40.

Scanlon, M.C., Karsh, B.T., (2010). Value of human factors in medication and patient safety in the intensive care unit. *Critical care Medicine, 38,* (suppl), ppS90 – S96

Seale, C. (2001). Qualitative methods: validity and reliability. *European Journal of Cancer care.* 10, pp 131-136.

Senge, P. (2006). *The fifth discipline: The art and practice of the learning organisation.* Revised Ed. Random House. London.

Sevdalis, N., Forrest, D., Undrre, S., darzi, A., Vincent, C.A. (2007).Annoyances, disruptions and interruptions in surgery.The Disruptions in Surgery Index (DiSI).*World Journal of Surgery,*32, pp1643-1650. Cited in: Edwards, R., Sevdalis, N., Vincent, C., Holmes. (2012). Communication strategies in acute health care: evaluation within the context of infection prevention and control. *Journal of Hospital Infection, 82,* pp 25-29.

Shaughnessy, M.K., Micielli, R., DePestel, D.D., Arndt, J., Stachan, C., Welch, K., Chenoweth, C.E. (2011). Evaluation of Hospital Room Assignment and Acquisition of

Clostridium difficile infection. *Infection Control and Hospital Epidemiology,***32,** 3, pp 201-206.

Silverman, D. (2010). *Doing qualitative research.* 3rd Ed. Sage. London.

Stanley, D. (2014). Clinical leadership characteristics confirmed. *Journal of Research in Nursing,* **19,** pp118-128.

Stern, P.N. (1994). Eroding grounded theory. In J.M. Morse. (Eds). *Qualitative Research Methods.* Sage. London.

Storr, J., Wigglesworth, N., Kilpatrick, C. (2013). *Integrating human factors with infection prevention and control.* Thought Paper. The health Foundation. London. Downloaded April 2014 from:
http://www.health.org.uk/public/cms/75/76/313/4248/Integrating%20human%20factors%20with%20infection%20prevention%20and%20control.pdf?realName=XKev27.pdf.

Strauss, A., Corbin, J. (1998). *Basics of Qualitative Research: Techniques and procedures for developing Grounded Theory.* 2nd Ed. Sage. London.
Strauss, A. Corbin, J. (1990). *Basics of Qualitative Research: Grounded Theory Procedures and Techniques.* Sage. London.

Sundquist Beauman, S. (2006). Leadership and the clinical nurse specialist: from traditional to contemporary. *New-born and Infant Nursing Reviews,* **6,** pp 22 -24.

Tanner, J., Khan, D., Anthony, D., Paton, J. (2009). Waterlow score to predict patients at risk of developing *Clostridium difficile -a*ssociated disease. *Journal of Hospital Infection,* **71,** pp 239-244.

The Health Foundation (2014). *A Framework for measuring and monitoring safety.* The Health Foundation. London.

The Institute of Ergonomic and Human Factors (UK). (2014). *What is human factors.* Downloaded August 2014 from: http://chfg.org/what-is-human-factors.

Timmermans, S., Bowker, G.C., Leigh Star. S. (1998). Visibility, control and comparability in building nursing interventions classification. In: Berg. M., Mol, AM (Eds). *Differences in medicine: unravelling practices, techniques and bodies.* Duke University Press. New York.

Thorne, S. (2000). Data analysis in qualitative research. *Evidence-based Nursing,* **3,** pp 68-70.

Thyer, G.L. (2003). Dare to be different: transformational leadership may hold the key to reducing nursing shortages. *Journal of Nursing Management,* **11**, 73-79

Tristel® (2014). Tristel ®Factsheet. Downloaded August 2014 from:
http://www.tristel.com/wp-content/uploads/2012/05/Tristel-Fuse-Surfaces-Factsheet-Export-ENG-Issue-3.pdf.

Turnbull James K. (2011). *Leadership in context: lessons from new leadership theory and current leadership development practice.* Kings Fund. London.

Turner, B. (1981). Some practical aspects of qualitative data analysis: one way of organising the cognitive processes associated with the generation of grounded theory. *Quality and Control,* **15,** pp 225-245. Cited in Cutcliffe, J. (2000). Methodological issues in grounded theory. *Journal of Advanced Nursing,* **31,** pp 1476- 1484.

Tye, C.C., Ross, F.M. (2000). Blurring Boundaries: professional perspectives of the Emergency Nurse Practitioner role in a major Accident and Emergency Department. *Journal of Advanced Nursing,* **31,** pp1089-1096.

Vandenberghe, A., laterre, P.-F., Goenen, M., Reynaert, M., Wittebole, X., Simon, A., Haxhe, J.J. (2002). Surveillance of infection control infection in an intensive care department – the benefit of the full time presence of an infection control nurse. *Journal of Hospital Infection,* **52,** pp 56-59.

Vaughan, N., Randle, J., Adams, G. (2006). Infection control link professional's knowledge of *Clostridium difficile. British Journal of Infection Control,* **7,** pp25-29.

Vincent. C. (2010). *Patient Safety.* 2nd Edition Wiley Blackwell. Oxford.

Vincent. C. (2006). *Patient Safety.* Elsevier. Edinburgh; cited in Vincent. C.(2010). *Patient Safety.* 2nd Edition Wiley Blackwell. Oxford.

Vonberg, R.P., Kuijper, E.J., Wilcox, M.H., Barbut, F., Tull, P., Gastmeier, on behalf of the European C. difficile-Infection Control Group and the European Centre for Disease Prevention and Control (ECDC), van den Brook, P.J., Colville, A., Coignard, B., Daha, T., Deabst, S., Duerden, B.I., ……………… Wiuff, C. (2008). Infection control measures to limit the spread of *Clostridium difficile. Journal Compilation European Society of Clinical Microbiology and Infectious Diseases, CMI,* **14,** (suppl 5), pp 2-20.

Walker, A.S., Eyre, D.W., Wyllie, D.H., Dingle, K.E., Harding, R.M., O'Connor, L., … Peto, T.E.A., on behalf of the Infections in Oxfordshire data base. (2012).Characterisations of *Clostridium difficile* hospital ward-based transmission using extensive epidemiological data and molecular typing. *PLoS Medicine,* **9,** e1001172. Downloaded April 2014 from:
http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1001172#pmed-1001172-g005.

Walker, W. (2007). Ethical considerations in phenomenological research. *Nurse Researcher,* **14,** pp 36-45.

Walker, D., Myrick, F. (2006). Grounded Theory: An exploration of process and procedure. *Qualitative Health Research,* **16,** pp 547-559.

Walls, P., Parahoo, K., Fleming, P. (2010). The role and place of knowledge and literature in grounded theory. *Nurse Researcher,* **17,** pp 8-17.

Ward. D. (2012)
- a) Attitudes towards the Infection Prevention and Control Nurse: an interview study. *Journal of Nursing Management,* **20,** pp 648-658.
- b) Attitudes towards infection prevention and control: an interview study with nursing students and mentors, *BMJ,* **21,** pp 301-306.

Ward, D. (2011). The role of education in the prevention and control of infection: a review of the literature. *Nurse Education Today,* **31,** pp 9-17.

Waterlow, J. (1985). A risk assessment card. *Nursing Times,* **81,** pp 24-27.

Waterlow, J. (2014). Waterlow score card. Downloaded June 2014 from: http://www.judy-waterlow.co.uk/the-waterlow-score-card.htm.

Watson, J. (2012). Raised inflammatory markers. *BMJ,* **304,** e454. Downloaded June 2012 from: http://www.bmj.com/content/344/bmj.e454.

Watterson, L. 92004). Using indicator development to revise infection control activities in an acute NHS trust. *Journal of Nursing Management,* **12,** pp 403-410.

Weber, D.J., Rutala, W.A. (2011). The Role of the Environment in the Transmission of *Clostridium difficile* Infection in Healthcare Facilities. *Infection Control and Hospital Epidemiology,* **32,** pp207-209.

Weiss, K., Boisvert, A., Chagnon, M., Duchesne, C., Habash, S., Lepage, Y., …. Savoie, M. (2009). Multipronged Intervention Strategy to Control an Outbreak of *Clostridium difficile* Infection (CDI) and its impact on Rates of CDI from 2002 to 2007. *Infection Control and Hospital Epidemiology,* **30,** pp 1-13.

Westbrook, J., Woods, A., Rob, M., Dunsmuir, W., Day, R. (2010).Association of interruptions with an increased risk and severity of medication administration errors. *Archives of Internal medicine,* **170,** pp 683-690. Cited in: Edwards, R., Sevdalis, N., Vincent, C., Holmes. (2012). Communication strategies in acute health care: evaluation within the context of infection prevention and control. *Journal of Hospital Infection,* **82,** pp 25-29.

Whiting, L.S. (2008). Semi-structured interviews: guidance for novice researchers. *Nursing Standard,* **22,** pp35-40.

Wilcox, M.H., Shetty, N., Fawley, W.N., Shemko, M., Coen. P., Birtles, A., ….. Wren, M.W.D. (2012). Changing epidemiology of *Clostridium difficile* infection following the introduction of a national ribotyping based surveillance system. *Clinical Infectious Diseases,* **55,** pp 1056-1063.

Wilcox, M.H., Fraise, A.P., Bradley, C.R., Walker, J. Finch, R.G. (2011). Sporicides for *Clostridium difficile:* the devil is in the detail. *Journal of Hospital Infection,* **77,** pp 187-188.

Wilcox, M.H., Fawley, W.N., Wigglesworth, N., Parnell, P., Verity, P., Freeman, J. (2003). Comparison of the effect of detergent versus hypochlorite cleaning on environmental contamination and incidence of *Clostridium difficile* infection. *Journal of Hospital Infection* **54,** pp 109-114.

Williams, B., Entwistle, V., Haddow, G., Wells, M. (2008). Promoting Research participation. Why not advertise altruism? *Social Science and Medicine,* **66,** pp1451-1456.

World Health Organisation (WHO). (2014). *Clean care is safer care: The burden of healthcare associated infection worldwide.* WHO. Geneva. Downloaded Aug 2014 from: http://www.who.int/gpsc/country_work/burden_hcai/en/.

WHO. (2009).*WHO Guidelines for Safe Surgery 2009.* WHO. Geneva.

WHO.(2005). *WHO Guidelines on Hand Hygiene in Healthcare.* Downloaded May 2012 from:
http://www.who.int/patientsafety/information_centre/ghhad_download_link/en/index.html.

Worrall, M (2008). Chocks away: Time for a Surgical Checklist. *Bulletin of the Royal College of Surgeons of England,***90,** pp 304-305.

Worsley, M.A. (1988). The role of the Infection Control Nurse. *Journal of Hospital Infection,***11,** (suppl. A)**,** pp 400-405**.**

Appendices

Appendix 1. – Versions 1 and 2 of checklist.

Clostridium *difficile* Daily check list.

This checklist should be completed by the Matron & IPCN on a daily basis.

WARD DATE	COMPLETED BY		
SLUICE	YES	NO	Comments or Actions taken
All bedpan bases are clean and in good condition			
All commodes are clean – check underside, frame and foot rest.			
Apron and gloves are available			
Slipper pans are maceratable and not reusable			
Cleansing foam is single patient use (check cupboards/shelves for part used containers)			
STANDARD PRECAUTIONS			
Staff are washing hands with soap and water after contact with patient with diarrhoea.			
Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals			
Staff are wearing single use aprons and gloves when in contact with a patient and/or patient environment			
Staff decontaminate their hands prior to putting on PPE and with soap and water after removing PPE.			
All staff decontaminate their hands before and after any patient contact or different patient bed spaces.			
Clean linen stored in the linen store area only (not bathrooms/sluice/bays)			
Infected linen is disposed of correctly and is not left in the side rooms or bays.			
MANUAL HANDLING EQUIPMENT			
All manual handling equipment is single-patient use.			
CLEANING			
Tristel is being used at the correct dilution and is dated and timed (8 hour shelf life once made up)			
Side rooms are clean, free from dust/ spillages (check behind lockers, under beds and curtain rails)			
ISOLATION			
Patients with clostridium difficile are being nursed in the side room with the door closed and appropriate signage in place			
Used linen has been removed from the room			
PATIENT CARE			
Care plan and patient information leaflet provided			
Discuss with Nurse in Charge re. patients condition to include:			
Abdomen			
Temperature			
Nutritional status			
Pressure ulcer risk assessment			
Fluid balance			
Daily bed bath/hygiene care			
Daily bed linen change			
Stool chart – document type of stool			
Medication			

DRCP V 1

Clostridium *difficile* Daily check list

WARD   DATE   COMPLETED BY

Patient care	YES	NO	Comments/ Actions	
Check the following and include any actions:				
Abdomen – has the patient any abdo pain discomfort or distension				
Temperature – Is the patient pyrexial				
Nutritional status – Is this up to date; record MUST			MUST:	
Pressure ulcer risk assessment – is this up to date; record Waterlow			WATERLOW:	
Fluid balance – is this applicable and up to date				
Is the stool chart recorded and up to date Document type of stool and frequency			STOOL TYPE and FREQ:	
Is the patient on any CDI Medication Is the patient on any other significant medications (that may impact on CDI)				
Has daily bed bath/hygiene care been undertaken				
Has the patient had a daily bed linen change				
Care pathway/care plan	**YES**	**NO**	**Comments/ Actions**	
Is the care pathway/plan up to date				
Have all relevant elements been completed				
Isolation room	**YES**	**No**	**Comments/Actions**	
Patients with clostridium difficile are being nursed in the side room with the door closed and appropriate signage in place				
Side rooms are clean, free from dust/ spillages (check behind lockers, under beds and curtain rails) Side room is clutter free to facilitate cleaning				
Used linen has been removed from the room				
Twice daily Tristel clean in place and staff and domestics aware re HPV following discharge/transfer etc.				
Standard Precautions	**YES**	**No**	**Not Observed**	**Comments/Actions**
Staff are washing hands with soap and water after contact with patient with diarrhoea.				
Patients are offered hand washing facilities or hand wipes after using toilet facilities or before meals				
Staff are using PPE appropriately when in contact with a patient and/or patient environment				
Clean linen stored in the linen store area only (not bathrooms/sluice/bays/SR's)				
Infected linen is disposed of correctly and is not left in the side rooms or bays.				
Cleaning and general Environment	**YES**	**NO**	**Comments/Action**	
Tristel is being used at the correct dilution and is dated and timed (24 hour shelf life once made up)				
There are no single patient use items (check bathrooms cupboards/shelves for part used containers)				
The ward/unit area is generally clean and tidy and clutter free				
Dirty Utility	**Yes**	**No**	**Comments/Action**	
All bedpan bases are clean and in good condition				
All commodes are clean – check underside, frame and foot rest.				
Apron and gloves are available				
Discussed with Nurse in Charge/Caring for patient			Name:	

DRCP V 2

268

Appendix 2. – Trust governance and ethical approval form.

30 November 2012

Ms Andrea Denton

1

Huddersfield

Dear Ms Denton

ID: 1048   A study to examine the impact of a daily review checklist process on patients with Clostridium difficile infection (CDI)

The Research and Development department has considered the following documents in support of the application for approval to undertake the study on the premises of

Document	Version	dated
Proposal: A study to examine the impact of		
PIS final AD 9303420		June 2012
Initial email to participants AD 9303420		
Interview Agenda AD u9303420		
SREP Consent form adapted for AD 9303420		
SREP application u9303420 AD Oct 2012		
Risk Managment form AD u9303420		
NhsSsiForm[1] Oct 2012 u9303420		
FW Approval		
FW2 IRAS forms pdf		
FullDatasetTrialForm[2] Oct 2012 u9303420		

Your study now has R&D approval on the understanding and provision that you will adhere to the following conditions:

That the research should:

- Comply with the requirements of The Research Governance Framework for Health and Social Care (2nd DH 2005);
- Comply with regulatory requirements and legislation relating to: Clinical Trials, Data Protection, Health and Safety, Trust Caldicott Guidelines, and the use of Human Tissue for research purposes;

- Be conducted in accordance with ICH Good Clinical Practice and/or the MRC guidelines for good clinical practice (as appropriate);
- Not commence until it has received written approval from a UKECA recognised Research Ethics Committee (REC) and that any REC imposed conditions of that approval are implemented;

You must also:

- Request written approval for any change to the approved protocol/study documents that you or the Chief Investigator wish to implement;

- Ensure that all study personnel, not employed by
  Trust, hold either an honorary contract with the Trust or a letter of access issued by the Trust, before they have access to any facilities, patients, staff, their data, tissue or organs;

- Complete the Research Governance interim and final reports as requested;
- Submit monthly recruitment and screening data to R&D (if applicable).
- Comply with our audit and monitoring procedures as required.

Please note:

- The use of medicines not in the hospital formulary for the purpose of research is restricted to trust approved trial protocols only. Continued use of them outside or at the end of a clinical trial will require a formal application to and approval from the Medicines Management Committee. Trial participants should be made aware of this situation.

This approval letter constitutes a favourable Site Specific Assessment (SSA) for this site

Please be aware that the R&D department has a database containing study related information, and personal information about individual investigators e.g. name address, contact details etc. This information will be managed according to the principles established in The Data Protection Act.

Yours sincerely

Director of Research and Development

271

THE UNIVERSITY OF HUDDERSFIELD
School of Human and Health Sciences – School Research Ethics Panel

OUTLINE OF PROPOSAL
Please complete and return via email to:
Kirsty Thomson SREP Administrator: hhs_srep@hud.ac.uk

Name of applicant: E Andrea Denton

Title of study: A grounded theory study to examine the impact of a daily review checklist process on patients with *Clostridium difficile* infection (CDI)

Department: School of Human and Health Sciences; Health and Social Care Research
Date sent: July/Aug 2012

Researcher(s) details	Andrea Denton PhD student. Student number 9303420039
Supervisor details	Annie Topping and Paul Humphreys
Aim / objectives	The main aim of the study is to examine the impact of a daily review checklist had on the care and management of patients with *Clostridium difficile* infection (CDI). The objectives are: 1. To explore three different staff groups perceptions of the daily review process; this includes infection prevention and control practitioners (IPCPs) matrons and ward staff. 2. To explore the different staff groups' perceptions of the impact that the daily review checklist process has had on the care and management of patients with CDI. 3. To explore the different staff members opinions are on what impact the review process has on them. 4. To investigate if in the opinion of these staff members there should be any changes to the process itself and what these changes may be.
Brief overview of research methodology	The study has been divided into 2 phases; phase 1 evaluated retrospective data from the daily review checklists used in the care and management of patients with CDI completed between July 2010 and December 2011. Permission to undertake the audit was provided by the study Trust R&D department where AD is a member of staff. Permission to access the checklist data was given by both the Director of R&D/Consultant Microbiologist/Infection Control Doctor and the Lead Infection Prevention and Control Nurse. Data from phase 1 and a background literature review has informed (theoretical sensitivity) phase 2 both in methodological approach (Grounded Theory) and proposed approach for sampling. A grounded theory approach will be utilised in order to explore the perceptions of different staff groups on the impact of a daily review checklist process on the care and management of patients with CDI. Whilst checklists within the context of infection prevention and control are not a new phenomenon, the collaborative interactive style involving matrons and ward teams with the checklist is unique. The study will enable the participants to provide insight into their own experience of the review process as well as any benefits or constraints both to them and to patient care and management with respect to CDI. Initially purposive sampling will be used. The three staff groups targeted include the Infection Prevention and Control Practitioners, matrons and ward based staff. All of these groups have been involved or been subjected to the daily review checklist process. Matrons and ward staff will be recruited form areas of 'high incidence' where the checklist process has been used, but following data analysis theoretical sampling may drive further data collection.
Study Start & End Date	Start Date: October 2011 End Date: October 2014
Permissions for study	Permissions include NHS permissions, the local trust research and development office and the researchers' line manager.

Confidentiality	Data will be stored on sound files and transcripts will be stored on the University computer. Only anonymous transcripts will be stored on a home computer. Any written notes will be stored in a locked drawer in a locked room on university premises.
Anonymity	All data will be anonymised. All data used in the final report will be identified only by staff group; IPCP, matron or ward nurse and within a group number. Any list of participants linking identifier will be kept securely on a University password protected computer and separately from anonymised data files. Work computers will not be used
Psychological support for participants	Psychological support may be required for staff participants if any areas of poor practice are identified. This would be managed by ensuring that the interviews are conducted in a professional and non-judgemental manner and ensuring that staff are aware that the information is for research purposes and will be handled sensitively. Professional issues and potential disclosure have also been included in the information guide and will be reinforced throughout the process.
Researcher safety / support (attach complete University Risk Analysis and Management form)	See attached form
Identify any potential conflicts of interest	The main potential conflict is due to the study incorporating direct and indirect work colleagues

Please supply copies of all relevant supporting documentation electronically. If this is not available electronically, please provide explanation and supply hard copy

Information sheet	See attached
Consent form	See attached
Letters	Email to participants – see attached
Questionnaire	Not applicable
Interview guide	See attached
Dissemination of results	Data will be presented in thesis and also peer reviewed journals/publications along with conference presentations.
Other issues	No other issues
Where application is to be made to NHS Research Ethics Committee / External Agencies	IRAS application completed
All documentation has been read by supervisor (where applicable)	Yes

All documentation must be submitted to the SREP administrator. All proposals will be reviewed by two members of SREP.
If you have any queries relating to the completion of this form or any other queries relating to SREP's consideration of this proposal, please contact the SREP administrator (Kirsty Thomson) in the first instance – hhs_srep@hud.ac.uk

I

University of
HUDDERSFIELD
Inspiring tomorrow's professionals

CONSENT FORM

Title of Research Project:

It is important that you read, understand and sign the consent form. Your contribution to this research is entirely voluntary and you are not obliged in any way to participate, if you require any further details please contact your researcher.

I have been fully informed of the nature and aims of this research	☐
I consent to taking part in it	☐
I understand that I have the right to withdraw from the research at any time without giving any reason	☐
I give permission for my words to be quoted (by use of pseudonym)	☐
I understand that the information collected will be kept in secure conditions for a period of five years at the University of Huddersfield	☐
I understand that no person other than the researcher/s and facilitator/s will have access to the information provided.	☐
I understand that my identity will be protected by the use of pseudonym in the report and that no written information that could lead to my being identified will be included in any report.	☐

If you are satisfied that you understand the information and are happy to take part in this project please put a tick in the box aligned to each sentence and print and sign below.

Signature of Participant:	Signature of Researcher:
Print:	Print:
Date:	Date:

(one copy to be retained by Participant / one copy to be retained by Researcher)

THE UNIVERSITY OF HUDDERSFIELD
School of Human and Health Sciences – School Research Ethics Panel

AMENDMENT(S) TO PREVIOUSLY APPROVED APPLICATION

(Attach separate sheets as necessary)

Applicant Name: E Andrea Denton

Title of previously approved study: A grounded theory study to explore the impact of a daily review checklist process on patients with *Clostridium difficile* infection (CDI)

Date approved: Nov 2012

(please also give details here if the title is to be revised):

Issue	Please clearly identify below revisions made to previously approved SREP application.
Researcher(s) details	Andrea Denton PhD student; student number 9303420039
Supervisor details	Annie Topping/Paul Humphries
Aim / objectives	As previous except will be exploring 'different' staff groups perceptions including Infection prevention and control practitioners IPCPs matrons, ward staff and senior nurses
Methodology	As previous plus: Having commenced interviewing with two groups of staff i.e. the Infection Prevention and Control Nurses and the matrons, the interviews have highlighted that the daily review checklist process may have broader implications within the organisation and therefore it would be useful to gain senior managers views on the checklist process in relation to the care and management of patients *with Clostridium* difficile Infection (CDI).
Permissions for study	Line manager aware of an additional staff group
Access to participants	
Confidentiality	This will be the same as for the other members of staff being interviewed.
Anonymity	All data will be anonymised. All data used in the final report will be identified only by staff group; IPCP, matron, ward nurse or senior nurse and within a group number. The actual trust will be kept anonymous and referred to initially as a 'local NHS Acute Trust' and then throughout as 'the study Trust'. Any list of participants linking identifier will be kept securely on a University password protected computer and separately from anonymised data files.

	Work computers will not be used.
Psychological support for participants	As previous
Researcher safety / support (attach complete University Risk Analysis and Management form)	As previous
Information sheet	As previous
Consent form	Consent will be obtained as for the other groups of staff and the senior nurses will have a write to withdraw at any time which is included in the consent form and the participant information sheet (previously sent)
Letters	As previous
Questionnaire	As previous
Interview schedule	As previous
Dissemination of results	As previous. Trust will be kept anonymised and referred to as a 'Northern trust'
Other issues	Nil
Where application is to be made to NHS Research Ethics Committee	Previous
All documentation has been read by supervisor (where applicable)	Previous and aware re this addendum

Signed: _____EADenton_____
        (SREP Applicant – electronic signature acceptable)

Date: ____27/02/12_____

Participant Information Leaflet

**The Impact of the daily review checklist process on the care and management
of patients with *Clostridium difficile* infection (CDI)**

Invitation to take part in research

I would like to invite you to take part in a research study as part of my PhD which I am undertaking at the University of Huddersfield.

Before you decide to take part it is important that you understand what the research is about, why it is important and what will be involved. With this in mind the information below is divided into 3 sections; section 1 explains why the study is being undertaken and provides some background information; section 2 explains what will be involved and what to expect and section 3 summarises any potential risks and benefits and what happens next.

Please take time to decide if you want to participate in the research and feel free to contact me at any time if there is anything that is unclear or if you require any further information. My contact details are provided at the end of this information sheet

Section 1

Aim of the study and background information

The study aims to explore the impact of the daily review checklist process currently used in the trust on the care and management of a patient with *Clostridium difficile* infection (CDI). Most of you will be familiar with the checklist that the infection prevention and control nurse alongside the matrons use to review patients with CDI. The study aims to examine your perceptions of this checklist, the review process and your opinion of the impact this review process has on the care and management of patients with CDI.

Clostridium difficile is a Gram positive spore producing bacteria and is the leading cause of hospital related diarrhoea. It is one of the main health care associated infections (HCAIs) the government continue to monitor and devise prevention strategies and objectives in an effort to reduce the burden. In 2010 in addition to the national strategies including the High Impact Intervention (HII) (DH, 2010) to reduce the risk of *Clostridium difficile,* the Trust introduced a daily review checklist approach undertaken by IPCN's and Matrons in the care and management of patients with CDI.

The study has been divided into two phases and Phase 1 of the study has already been completed. This looked at previous checklists and examined the data from completed checklists between June 2010 and Dec 2011. All of the data from the checklists has been analysed to explore trends and examine the use of the checklist itself. The findings have helped to inform this current part of the study, Phase 2 that hopefully you will participate in. Phase 2 involves interviewing staff.

Section 2

Why have you been invited?

Different groups of staff will be involved in the study which includes infection prevention control nurses, matrons and ward or unit staff as well as senior nurses. Individuals who have had direct or indirect involvement in the daily review checklist process are in a good position to help inform the study.

Do you have to take part?

There will be no obligation to be involved and you may decide you no longer want to take part in the research at any time without providing a reason (a written consent will also be obtained prior to the study commencing and will emphasise this).

What happens if you decide to take part?

If after reading this information you decide that you are interested, please confirm by contacting me on any of the details at the end of this information sheet. There will be further opportunity to describe the study in more detail and go through the information sheet again and ask any questions. At this stage I will ask if you are happy to participate I will ask you to complete a consent form and sign to say that you are happy to participate and I will give you a copy of the form. You will then be invited to take part in an interview at a time convenient to us both.

The interviews will be held on hospital premises in an area of your choice. The interviews will last approximately 20-30 minutes. You will be asked open ended questions aimed at generating discussion that focuses on your opinions. The information will be taped using a digital recorder. The data will be transcribed and anonymised. Should you disclose anything that may impact on patient safety, this will be discussed in the interview but may need to involve others which would also be discussed.

U9303420 Information Sheet Daily Review checklist Process and CDI 2012 v 2

What happens to the information?

All information generated will be kept on files stored only on the University computer for security purposes. Only anonymised transcripts will be saved on a home computer. No information will be stored on work computers. The final report will include excerpts from transcripts but these will be anonymised and you will have an opportunity to have access to transcripts and read the report once the PhD has been completed.

Section 3

Potential Risks and burdens

The potential risks and burdens are minimal. The main risk is that the interview may result in areas of practice being discussed which may have professional implications for you as a participant. Any disclosure of sensitive information with legal or professional implications may have to be addressed but this will be discussed during the interview. The main burden is the inconvenience of undertaking the interview. This will be minimised by offering you a choice of venue and a time convenient to you.

What if there is a problem taking part?

If there is a problem at any stage of the study you can speak to either of my Supervisors at the University of Huddersfield These are:

Professor Annie Topping 01484 473974/ Dr Paul Humphreys 01484 472771

Or the Chair of the University School Research Ethics Panel (SREP):

Dr Nigel King 01484 472812

Or the Research and Development officer of the local Trust

What happens next?

If you are interested in taking part please contact me via any of the methods below and I will arrange for the interview to be held at a convenient time and venue and get back in touch:

Work office: 01422 222376 (Ext 2376) or 01484 355259 (Ext 5259) Work mobile: 07747 461559

Andrea.Denton@......................... (work email) U9303420@hud.ac.uk (University email)

<div align="center">

Thank you for your help and co-operation

Andrea Denton (IPCP); PhD Student

U9303420 Information Sheet Daily Review checklist Process and CDI 2012 v 2

</div>

Appendix 3. – Interview Agendas.

Interview Agenda 1

<u>**Interview Guide**</u>

As the study is utilising a grounded theory approach other questions/prompts may evolve throughout for all staff groups or specific staff groups.

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal chat. Information about the study should be revisited and a reminder of the information sheet and consent form. Allow the interviewee time to ask any further questions. Inform them about the nature of the interview, tape recordings and any other issues that they require clarification on. Remind the interviewee that they can withdraw at any time.

Questions:

1.   Talk me through the process of the daily review checklist from your perspective
Prompts/areas to include - background as to why the process came about in their opinion; why use the checklist; benefits and concerns; overall thoughts on the form and process (have a copy of the form for interview). IPCN's and Matrons specifically need to cover completion of the form/layout design of questions without leading the interviewee.

2.   What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI?
Prompts/areas to include - knowledge base, practice, patient, environment

3.   Do you do anything differently since the checklist process was brought in?
May have a different response for each staff group

4.   What are your thoughts on the process and the form (may have covered in first question during general discussions)?
Prompts may differ for different staff groups. IPCNs and Matrons may be resource/time issues; ward staff positive/informative or opposite.

5.   Is there anything we could do differently in terms of the checklist or process?
Prompts/areas to include – how do you see the process/form progressing; would they change anything? For ward staff this may have to have a slightly different emphasis; need to cover if they would want to undertake the review and IPCN's/Matrons audit the process. How does it link with the HII/Saving Lives audit?

IG Version 1 Oct 2012

6.   Is there anything else you want to discuss?

Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

Thank the participant and ensure no concerns/worries after completion of interview with guide on what happens next – refer them to the Information Guide.

IG Version 1 Oct 2012

Interview Agenda 2

<u>**Interview Guide IPCP**</u>

As the study is utilizing a grounded theory approach other questions/prompts may evolve throughout.

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1. Talk me through the process of the daily review checklist from your perspective Prompts/areas to include – Try to ascertain their opinion as to why the checklist process came about, benefits/constraints/concerns and overall thoughts on the form and process. IPCP's and Matrons specifically need to cover completion of the form/layout design of questions without leading the interviewee. Discuss Phase 1 and different completion and if any changes to format etc

2. What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI? Prompts/areas to include - knowledge base, practice, patient, environment; educational benefits if any , relationship benefits or constraints

3. Do you do anything differently since the checklist process was brought in? May have a different response for each staff group

4. What are your thoughts on the process and the form (may have covered in first question during general discussions)? Prompts may differ for different staff groups. IPCPs and Matrons may be resource/time issues; ward staff positive/informative or opposite.

5. Is there anything we could do differently in terms of the checklist or process? Prompts/areas to include – how do you see the process/form progressing; would they change anything? For ward staff this may have to have a slightly different emphasis; need to cover if they would want to undertake the review and IPCP's/Matrons audit the process. How does it/does it link with the HII/Saving Lives audit?

6. Is there anything else you want to discuss? Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

IG Issue 2 Jan 2013

End of Interview

Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide.

IG Issue 2 Jan 2013

Interview Agenda 3

<u>**Interview Guide M**</u>

As the study is utilizing a grounded theory approach other questions/prompts may evolve throughout.

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1.   Talk me through the process of the daily review checklist from your perspective Prompts/areas to include – Try to ascertain their opinion as to why the checklist process came about, benefits/constraints/concerns and overall thoughts on the form and process. IPCP's and Matrons specifically need to cover completion of the form/layout design of questions without leading the interviewee. Discuss Phase 1 and different completion and if any changes to format etc

2.   What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI? Prompts/areas to include - knowledge base, practice, patient, environment; educational benefits if any , relationship benefits or constraints

3.   Do you do anything differently since the checklist process was brought in? Has it changed the way you review patients and wards. Does it help with RACs/Does it duplicate enhance RACs   May have a different response for each staff group

4.   What are your thoughts on the process and the form (may have covered in first question during general discussions)? Ask about educational benefits Prompts may differ for different staff groups. IPCPs and Matrons may be resource/time issues; ward staff positive/informative or opposite.

5.   Is there anything we could do differently in terms of the checklist or process? Ask re if others should do the review/copies for areas etc. Prompts/areas to include – how do you see the process/form progressing; would they change anything? For ward staff this may have to have a slightly different emphasis; need to cover if they would want to undertake the review and IPCP's/Matrons audit the process. How does it/does it link with the HII/Saving Lives audit?

IG Issue 3 Jan 2013

6.   Discussion re relationships both between IPCP and matrons ward staff and IPCP and IPCP and matrons going up together. Mention that some have said initially seen as 'Big Brother' but some have said that that has changed now and often due to time and staff observing that there to help and support. What do they think of that?

7.   Is there anything else you want to discuss? Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

End of Interview

Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide.

IG Issue 3 Jan 2013

Interview Guide WS

As the study is utilizing a grounded theory approach other questions/prompts may evolve throughout.

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1.   Talk me through the process of the daily review checklist from your perspective Prompts/areas to include – Try to ascertain their opinion as to why they think the checklist process came about, benefits/constraints/concerns and overall thoughts on the form and process. Ward staff may need to discuss the process more than the form itself as may be variability in individuals who have seen the actual form used.

2.   What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI? Prompts/areas to include - knowledge base, practice, patient, environment; educational benefits if any , relationship benefits or constraints.

3.   Do you (or your staff if ward sister/manager) do anything differently since the checklist process was brought in? May have a different response for each staff group – ward staff has it altered anything, may link with last question. Try and obtain any negative and add as progress with what other ward staff have said. Do they action things more or see us as the ones to action – what would they action and what would they expect us to action. Mention that matrons see as an opportunity to help action things around care management and environmental things if dept. issues for example.

4.   What are your thoughts on the process and the form (may have covered in first question during general discussions)? Prompts may include positive/informative or opposite. Impact on relationships between staff and IPCP and staff and matrons and matrons and IPCP. Is it big brother, has anything changed or is it still big brother. Utilise feedback from matrons and IPCP. Ask re completion of the patient care elements – how fill in (or staff complete since if ward manager/sister) etc. Do they (ward staff) get any feedback from the checklist review either on shift or generally at ward meetings etc.

5. **Is there anything we could do differently in terms of the checklist or process? Do you find it useful? How could we make it more useful? Would you be willing to or do you already or have you undertaken the review with the IPCP or could you suggest anyone else?** Prompts/areas to include – how do you see the process/form progressing; would they change anything? For ward staff this may have to have a slightly different emphasis; need to cover if they would want to undertake the review and IPCP's/Matrons audit the process. How does it/does it link with the HII/Saving Lives audit?

6. **Is there anything else you want to discuss?** Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

End of Interview

Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide.

IG Issue 4 Jan 2013

Interview Guide SM

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1.   Talk me through the process of the daily review checklist from your perspective Prompts/areas to include – Try to ascertain their opinion as to why the checklist process came about, their thought on what and who it incorporates who undertakes and why, show them a copy of the checklist; benefits/constraints/concerns and overall thoughts on the form and process.

2.   What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI? Prompts/areas to include - knowledge base, practice, patient, environment;

3.   What has been the impact in a broader sense on the ward, division organization if any? May link with Do you think things are undertaken differently since the checklist process was brought in? Ask about RAC here. What are the organizational impact ask re resources, money etc.

4.   General discussion re the following themes that have arisen during previous interviews with different staff groups:
Review around 'process' as much as the checklist;

Patient safety

Priorities around infection prevention and control

Perceptions of staff around 'Big Brother' but some have said that that has changed now and often due to time and staff observing that there to help and support. What do they think of that?

Relationships – ask their thoughts on impact on relationships

Educational/resource/visibility

IG Issue 5 Jan 2013

5.   What are your thoughts on the process and the form (may have covered in first question during general discussions)? What happens to the form/information (IPCP/matron etc DN)?

6.   Is there anything we could do differently in terms of the checklist or process? Prompts/areas to include – how do you see the process/form progressing; would they change anything? Mention feedback from Phase 1 and so far in Phase 2. Thoughts on others undertaking the review e.g. ward managers/sister charge nurses and staff nurses. Copies for areas – are they necessary. How do they see things once care pathway commences?   and the care pathway

7.   Is there anything else you want to discuss? Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

End of Interview

Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide.

IG Issue 5 Jan 2013

Interview Guide SM

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1.   Talk me through the process of the daily review checklist from your perspective Prompts/areas to include – Try to ascertain their opinion as to why the checklist process came about, their thought on what and who it incorporates who undertakes and why, show them a copy of the checklist; benefits/constraints/concerns and overall thoughts on the form and process.

2.   What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI? Prompts/areas to include - knowledge base, practice, patient, environment;

3.   What has been the impact in a broader sense on the ward, division organization if any? May link with Do you think things are undertaken differently since the checklist process was brought in? Ask about RAC here. What are the organizational impact ask re resources, money etc.

4.   General discussion re the following themes that have arisen during previous interviews with different staff groups:

> a. **Patient safety/assurance**
> b. **Priorities around infection prevention and control**
> c. **Perceptions of staff around 'Big Brother'** but some have said that that has changed now and often due to time and staff observing that there to help and support. What is their view?
> d. **Linked to above - Skill in undertaking the review**
> e. **Relationships – ask their thoughts on impact on relationships both ward and matrons**
> f. **Educational/resource/visibility**
> g. **Leadership role when on the ward**

5.   What happens to the form/information/what would you like to happen to the information?

IG Issue 6 Jan 2013

6.   Is there anything we could do differently in terms of the checklist or process? Prompts/areas to include – how do you see the process/form progressing; would they change anything? Mention feedback from Phase 1 and so far in Phase 2. Thoughts on others undertaking the review e.g. ward managers/sister charge nurses and staff nurses. Copies for areas – are they necessary. How do they see things once care pathway commences?   and the care pathway

7.   Is there anything else you want to discuss? Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

End of Interview

Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide.

IG Issue 6 Jan 2013

Interview Guide for WS

As the study is utilizing a grounded theory approach other questions/prompts may evolve throughout.

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1.   **Talk me through caring for a patient with Cdiff –** use this first broad based question and question 2 if more appropriate rather than asking about the checklist and the daily review process: **Talk me through the process of the daily review checklist from your perspective**

2.   **Can you tell me anything about the daily review checklist from your perspective** Prompts/areas to include – Try to ascertain their opinion as to why they think the checklist process came about, benefits/constraints/concerns and overall thoughts on the form and process. Ward staff may need to discuss the process more than the form itself as may be variability in individuals who have seen the actual form used.

3.   **What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI?** Prompts/areas to include - knowledge base, practice, patient, environment; educational benefits if any, relationship benefits or constraints.

4.   **Do you (or your staff if ward sister/manager) do anything differently since the checklist process was brought in?** – has it altered anything, may link with last question. Try and obtain any negative and add as progress with what other ward staff have said.

5.   **What is their expectation of the matron and the IPCPs in the review process?** Do they action things more or see us as the ones to action – what would they action and what would they expect us to action. Mention that matrons see as an opportunity to help action things around care management and environmental things if dept. issues for example CDI concerns, link to role of the nurse/specialist role – how do they see that.

6.   **What are your thoughts on the process and the form and the way in which it is delivered?** Prompts may include positive/informative or opposite; supportive or opposite.

IG Issue 7 Jan 2013

Impact on relationships between staff and IPCP and staff and matrons and matrons and IPCP. Is it big brother, has anything changed or is it still big brother. Utilise feedback from matrons and IPCP. **How do they see the role of the specialist nurse in particular the IPCP?** This last question linked with feedback from senior managers at perhaps ward staff perceived that specialist roles see themselves as elitist; first and foremost a nurse **Is there anything we could do differently in terms of the checklist or process? Do you find it useful? How could we make it more useful?** Prompts/areas to include – how do you see the process/form progressing; would they change anything? For ward staff this may have to have a slightly different emphasis. Do they get feedback on the process from matron/ward manager?

7.   Would you be willing to/ do you already or have you undertaken the review with the IPCP or could you suggest anyone else? Need to cover if they would want to undertake the review and IPCP's/Matrons audit the process. How does it/does it link with the HII/Saving Lives audit?

8.   Is there anything else you want to discuss? Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

End of Interview

Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide.

IG Issue 7 Jan 2013

Interview Guide SM

Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1.   Talk me through the process of the daily review checklist from your perspective Prompts/areas to include – Try to ascertain their opinion as to why the checklist process came about, their thought on what it incorporates, show them a copy of the checklist; benefits/constraints/concerns and overall thoughts on the form and process.

2.   What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI? Prompts/areas to include - knowledge base, practice, patient, environment; educational benefits if any , relationship benefits or constraints if any

3.   What has been the broader impact on the ward, divisions and organization (if any) May link with next question as well

4.   Do you think things are undertaken differently since the checklist process was brought in? Ask about RAC here. What are the organizational impact ask re resources, money etc.

5.   What are your thoughts on the process and the form (may have covered in first question during general discussions)? What happens to the DN info?

6.   General discussion re following issues/themes that have arisen during other interviews with other groups and their thoughts:
- **Process as much as checklist**
- **Patient safety**
- **Priorities around infection control**
- **Perceptions of staff around 'Big brother'.** A lot of feedback from matrons and IPCPs saying that this has changed now due to visibility and seen as there to help and support/educational. Include what ward staff are sating
- **Relationships in general**

IG Issue 8 May 2013

7. Is there anything we could do differently in terms of the checklist or process? Prompts/areas to include – how do you see the process/form progressing; would they change anything? Mention feedback from Phase 1 and so far in Phase 2. Thoughts on others undertaking the review e.g. ward managers/sister charge nurses and staff nurses. copies for areas – are they necessary. How do they see things once care pathway commences?   and the care pathway

8. Is there anything else you want to discuss? Prompts/areas to include - open ended to include areas that the participant feels are important that they have not mentioned. This may also evolve as the study progresses.

End of Interview

Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide. Reaffirm anonymity aspects and how that will be maintained.

IG Issue 8 May 2013

Interview Guide for WS

 Prior to the interview commencing, ensure that the interviewee is set at ease with general introductions and informal conversation. Information about the study should be revisited and a reminder of the information sheet and consent form provided. Inform the participant about the nature and content of the interview. Allow the interviewee time to ask any questions or clarify any other issues. Remind the interviewee that they can withdraw at any time.

Questions:

1.   **Talk me through caring for a patient with Cdiff –** use this first broad based question and question 2 if more appropriate rather than asking about the checklist and the daily review process

2.   **Can you tell me anything about the daily review checklist from your perspective** Prompts/areas to include:

   a. Try to ascertain their opinion as to why they think the checklist process came about

   b. Benefits/constraints/concerns and overall thoughts on the form and process.

   c. For Ward staff may need to discuss the process more than the form itself as may be variability in individuals who have seen the actual form used.

3.   **What has been the impact of the process/checklist in your opinion on the care and management of patients with CDI?** Prompts/areas to include:

   a. Knowledge base,

   b. Practice,

   c. Patient,

   d. Environment;

   e. Educational benefits if any,

   f. Relationship benefits or constraints.

   g. Do you find the checklist and or the process useful? If so how and why?

4.   **Do you (or your staff if ward sister/manager) do anything differently since the checklist process was brought in?** Prompts areas to include**:**

   a. May link with last question.

IG Issue 9 Jan 2013

b. Check if now know coming to review, if that impacts on the care and management/ paperwork/ ensuring everything as it should be because of the review. Try to ascertain if this would happen as a consequence of knowing importance or just because of the review.

5. **What is their expectation of the matron and the IPCPs?** Prompts to include:

   a. Do they action things more or see us as the ones to action

   b. Thoughts on the matron/IPCP hands on if come across things

   c. Role of the nurse/specialist role – how do they see

6. **What are your thoughts on the process and the form and the way in which it is delivered?** Prompts may include:

   a. Positive/informative or opposite;

   b. Timing of review – does 'busyness' impact and if so how

   c. Supportive or opposite.

   d. Impact on relationships between staff and IPCP and staff and matrons and matrons and IPCP.

   e. Is it big brother, has anything changed or is it still big brother.

   f. How is feedback given; is positive as well as negative feedback delivered.

   g. Level of authority – is it seen as this and how does this impact

7. **Is there anything we could do differently in terms of the checklist or process?** Prompts/areas to include:

   a. Should we and if so how could we make it more useful?

   b. Ask re using as learning tool more than a checklist?

   c. How do you see the process/form progressing; would they change anything?

   d. Would you be willing to or do you already or have you undertaken the review with the IPCP or could you suggest anyone else?

8. **Is there anything else you want to discuss?**

End of Interview Thank the participant and ensure there are no concerns/worries after completion of interview and inform them what happens next – refer them to the Information Guide.

IG Issue 9 Jan 2013

Appendix 4. – Initial email and email to senior manager.

Initial email to participants

Dear

I am writing to invite you to take part in a research study that I am undertaking as part of my PhD at the University of Huddersfield. I enclose a Participant Information leaflet which explains about the study in more detail.

I am examining the daily review checklist process that we currently use within the trust for patients with *Clostridium difficile* infection (CDI). I want to explore the impact that this has had on the care and management of patients with CDI and your thoughts on the checklist and process itself.

With this in mind I am hoping to interview staff who have been involved in the process. There is no obligation to take part and you can withdraw at any time without any reason. There will be a consent form to sign of which you will be given a copy to keep.

The interviews should last approximately 20-30 minutes and will be recorded using a digital recorder. All of the information will be anonymised and remain confidential with only myself and my supervisors at the University having access to the data. Risks and burdens of the study are minimal but are highlighted in the information leaflet attached.

Please can you get back to me if you are happy to take part and I will then be in touch to arrange a time and a venue convenient to yourself and send out a consent form for you to sign?

Please don't hesitate to contact me if you require any further information.

Thanking you in anticipation

Kind Regards

Andrea

Andrea Denton IPCN; PhD student

Email Issue 1 Dec 2012

Email to Senior Manager Participants

Dear

I am writing to invite you to take part in a research study that I am undertaking as part of my PhD at the University of Huddersfield. I enclose a Participant Information leaflet which explains about the study in more detail.

I am examining the daily review checklist process that we currently use within the trust for patients with *Clostridium difficile* infection (CDI). I want to explore the impact that this has had on the care and management of patients with CDI and your thoughts on the checklist and review process itself.

With this in mind I am hoping to interview senior staff within the organisation to seek their thoughts on broader organisational impact. There is no obligation to take part and you can withdraw at any time without any reason. There will be a consent form to sign of which you will be given a copy to keep.

The interviews should last approximately 20-30 minutes and will be recorded using a digital recorder. All of the information will be anonymised and remain confidential with only myself and my supervisors at the University having access to the data. Risks and burdens of the study are minimal but are highlighted in the information leaflet attached.

I have provided contact details and further information on what to do next on the information leaflet. Please do not hesitate to contact me if you require any further information.

Thanking you in anticipation

Kind Regards

Andrea

Andrea Denton IPCN; PhD student

Email Issue 2 Dec Feb 2013

Appendix 5. – Examples of open codes.

Initial Codes and sub-codes after open coding (alphabetical)

Acceptance
Accessibility
Actions
  Instigating
  Doctors to action
  Feedback
  IPCPs actions:
    Feedback
    Help staff to recognise who to speak to/ chain of command
    Highlighting things
    Monitor more closely
    Spotting potential problems
  Matron's action
  Micro
  Staff to action
  Ward managers to action
Aide memoire
Approachability
Authority:
  Challenging practice
  Expert
Background to DRP:
  All patients treated the same
  C.diff numbers
  Collaborative approach
  Common themes
  Environment
  Evidence base
  Incident
  Instrumental in combined review between IPC and matron
  IPCP involved with patient
  Moving things along
  Not taking much notice
  Outbreak
  Ownership at clinical level
  Picking up issues
  Standardising as background to the DRP
  Structure
  The 'ideal'
  Wanted something different
Busy
Cleaning
Collaboration
Communication
Complacency
Completion of checklist
  Difference in completion
Documentation
Education
  Learning
  Contextual
  Improved awareness
  Changes to knowledge
  Changes to practice

Evidence based
Future of DRP:
  Areas to add to checklist/changes to checklist

Alternative what do on the review between matron and IPCP
Copy left on ward
Do on other areas
Holding people to account
More collaboration
More formal feedback
Other MDT members involved
Others complete
Use as educational tool
Utilise other matrons
Feedback as to what happens to the information at senior management level?
Getting involved
Highlighting positives
Hospital sites
Impact on actual patients
Impact on knowledge
Impact on patient care
Importance
Improvements
Judgement
Lack of ownership
Leadership
Change
Improved awareness
Authority
Expert
Standardising practice
Matrons:
Difficulties getting together
Increased knowledge
More approachable
Priorities
Proactive
Relationships
Resistance
Think they know
Tick box exercise
More than just C.diff checklist

Patient care elements:
Abdomen
Anomalies or discrepancies
General
Medication
Pressure ulcer risk assessment
Stool chart
Temperature

Perceptions of staff /others towards the process
Positive:
IPCPs:
Relationships
Matrons:
Feel supported
Highlights my practice
Learn from IPCPs
Thought on ward staffs perceptions of the process
Towards IPCNs
Towards ward staff
Senior management

Ward staff:
> Education
> Support
> Visibility
> Approachability

Negative:
> IPCPs:
>> Ward staff can be negative
>> Difficulties in getting hold of a matron

> Matrons:
>> Ward staff can be negative sometimes at beginning
>> Ward staff can be negative to IPCPs and matrons
>> Difficulties in getting together

> Ward staff:
>> Attitude of IPCPs at times

Perceptions of the process
> Positive:
>> Aide memoire
>> Assurance
>> Bigger picture
>> Broader Impact
>> Combined environment and patient care aspects
>> Doing something specific
>> Ease of completion
>> Educational
>> Embedded
>> Enjoy
>> Ensures actions are undertaken
>> Feedback
>> General use not just for wards with CDI patients
>> Getting to know
>> Good support
>> Helpful
>> Highlighting issues
>> Highlights where more support needed
>> Holistic management
>> Improved documentation completion
>> Joint team working
>> Keeps focused
>> Look at everything
>> More observant
>> More robust
>> More than just a tick box
>> Not about blame
>> Its about patients
>> Picking up other things
>> Positive
>> Process
>> Prompt
>> Purpose
>> Recording
>> Recurring themes
>> Re-education in C.diff
>> Resource
>> Safety
>> Standardising practice
>> Structure
>> Tick box

Used out of hours by matrons

Negative:

General comments:

After Horse has bolted
Policing
Big brother
Can be critical
Difficulties getting together due to commitments
Don't always see everything
Ensuring flexibility
Familiarity breeds contempt
Focus on the negatives
Lack of feedback
Lack of knowledge of what looking for
More ownership
Not just for CDI patients
Repetition
Some bits not applicable
Staff behaviour
Subjective
Tick Box exercise
Timeliness of instigating process
Too lengthy
Unfair

Power and influence
Prevent complications
RAC audits
Root cause analysis
Relationships:

Doing it together
Strengthened
Developed

Risk
Role appreciation
Shared responsibility
Standardising practice
Team work
Time
Visibility:

Accessibility
Asking Questions
Informative
Resource
Talking to staff

Working with staff

Appendix 6. – Examples of focused codes.

Codes and sub codes after focused coding

Background to DRP:
  C.diff numbers had been high
  Collaborative approach required
  Assurance that things were being done correctly
  Evidence base
  Picking up issues while on the area
  Standardising practice as reason for introduction of the DRCP
  Providing structure
  Wanted something different
Busy:
  Not always seen as a priority
  Time constraints in meeting up
  Ward priorities
Communication:
  Approachability of the IPCP and matron
  Conversations
  Enabling staff to do things
  Feedback provided
  Ignored
  Positive
Completion of checklist
Education:
  Educational approach
  Contextual nature makes it relevant
  Helps others to educate staff e.g. LIPCP
  Impact on knowledge:
    Improved awareness
    Improved clinical judgement
    Up to date knowledge
    Thinking more about what you are doing
    Know more about *C.difficile* now, complications
Future of DRP:
  Becomes embedded in practice
  Care pathway becomes integral
  Use for other things as well as CDI
  Feedback:
    Communication
    Copy left on ward
    Delivery
    Feedback to Senior managers
    More formal feedback
    What happens to info at senior management level
    Holding people to account
    Medical team involved more
    Use as an educational tool
    Wording of checklist needs changing
Impact on patient care:
  Accountability for actions
  Actions instigated or undertaken
  Documentation
  Environmental elements checked
  Organisational benefits
  Patient care elements
  Patients like seeing the IPCP and matron
Leadership:
  Authority combined with expertise
  Changes to practice
  Expert in IPC

Power and influence
Highlighting issues
Checking things have been done
Highlights where more support needed
Heightened awareness due to visit by IPCP and matron
Look at everything
Picking up other things whilst there on the ward
Becoming the norm
Standardising practice
Assurance

Perceptions of the process
After Horse has bolted
Policing
Big brother
Can be critical at times
Difficulties getting together due to commitments
Focus on the negatives sometimes
Lack of feedback
Repetition
Subjective and a tick box exercise

Relationships
Getting to know staff whilst undertaking the review
Good support when out there on the ward areas
Helpful when on the ward
Highlighting issues
Joint team working
Act as a resource
Doing it together
Strengthened relationships
Developed relationships
Team work

Visibility
Accessibility of the IPCPs and matrons
Asking Questions
Informative
Resource
Talking to staff

Appendix 7. – Example of Bristol Stool chart used in the study trust.

Bristol Stool Chart – Stool Assessment
Bristol Stool Chart (Heaton, 1999)

Type 1 Separate hard lumps – like nuts (hard to pass)	**Type 4** Like a sausage or snake, smooth and soft
Type 2 Sausage-shaped but lumpy	**Type 5** Soft blobs with clear cut edges (passed easily)
Type 3 Like a sausage but with cracks on its surface	**Type 6** Fluffy pieces with ragged edges, a mushy stool

Type 7
Watery, no solid pieces – ENTIRELY LIQUID

- Please note that types **5, 6 & 7** are classed as diarrhoea (DH 2012; 2009).
- When obtaining a sample, the stool should take on the shape of the container, if the stool has come into contact with urine, this can still be sent for typing.
- If a patient has diarrhoea, **not clearly** attributable to an underlying condition e.g. colitis or overflow or therapy e.g. laxatives or enteral feed then a **sample should be obtained** to determine if due to an infective cause.
- Advice should be sought from the patient's Consultant if there is any doubt.

N.B. All patients with diarrhoea should be isolated until a non- infective cause has been established (discuss with Infection Prevention and Control if required).

Patient's usual bowel pattern on admission: **Type:**   **Frequency:**

Does the patient take regular laxatives?   **Yes / No**

Date	Ward/Bed space	Time	Type	Colour	Amount	Comments – Blood, mucous, Reason specimen sent	Initials

Appendix 8. – Example of snapshot taken from care plan for CDI used in study trust.

Snapshot of study Trust '*Clostridium difficile'* care plan

Patients condition
   a. Monitor patients stool frequency and type; record BNO as well if applicable each shift
   b. Monitor abdomen and observe for signs and symptoms of colitis, ileus and toxic mega colon which includes abdominal pain/distension/discomfort).
   c. Monitor temperature and Early Warning Scores (NEWS); monitor abnormal patterns and report/escalate.
   d. Bloods - Ensure CRP, FBC, U & E's, Albumin repeated as required.

Treatment
   a. Medical team to follow CDAD clinical guidelines for CHT and /or have discussed with microbiologist.
   b. Medical team to review current antibiotics and to document rationale for continuation of non *C. difficile* antibiotics.
   c. Medical team to review PPI's, laxatives; document reason for prescription, stop if appropriate.

Nutritional and Hydration status
   a. Weigh patient and calculate BMI
   b. **Record baseline MUST score…………………………………………………..**
   c. Monitor MUST nutritional status
   d. Refer to dietician as per protocol.
   e. Optimise nutritional status and offer assistance/supplements (as directed where required)

Skin Integrity
   a. Assess skin integrity and ensure up to date Waterlow pressure risk assessment is completed
   b. **Record base line score……………………………………………………………**

Therapy and rehab
   a. Daily update on ability to tolerate rehab/therapy in line with clinical need. Where possible any interventions to take place after non infected patients have been seen (clinical need will dictate).
   b. PPE, hand hygiene and cleaning as per previous guidelines