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**Exploring the Use of Protocols and Guidelines in
the Management of Healthcare-Associated
Infection: A Case Study**

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A thesis submitted in partial fulfilment of the requirements
for the degree of Doctor of Philosophy in Health and Social
Studies

School of Health and Social Studies

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Contents

List Of Tables.....	xii
List Of Figures.....	xiii
Dedication.....	xiv
Acknowledgements.....	xv
Declaration.....	xviii
Abstract.....	xix
Introduction.....	1
Motivational Influences For This Study.....	2
About The Study.....	5
Study Aim.....	6
Research Questions.....	6
Thesis Outline.....	7
Chapter One: Setting/Background	10
Introduction.....	11
Meaning Of The Term Healthcare-Associated Infection.....	12
Epidemiology Of Healthcare-Associated Infections.....	13
What Is <i>Clostridium Difficile</i> Infection And Where Is It Found?.....	21
How Do Patients Become Infected?.....	22
What Are The Risk Factors For <i>Clostridium Difficile</i> Infection?.....	23
What Are The Symptoms Of <i>Clostridium Difficile</i> Infection?.....	24
How Is <i>Clostridium Difficile</i> Infection Diagnosed?.....	25
How Is <i>Clostridium Difficile</i> Infection Treated?.....	27
How Is <i>Clostridium Difficile</i> Infection Prevented?.....	30

World Health Organization Global Challenge.....	32
The National Patient Safety Agency.....	36
Legislative Framework.....	39
Enforcement Of Regulations And Standards.....	40
The Importance Of Systems To Manage Risk.....	41
Learning From Past Industrial Disasters.....	42
Lessons Learned Within Healthcare.....	43
Amplification Of Risk Following Adverse Events.....	45
The Person Approach Versus The Systems Approach.....	46
The ‘Swiss Cheese’ Model Of Accident Causation.....	47
Strengths And Weaknesses Of Accident Models.....	49
Hazard Analysis Critical Control Point.....	51
Defeating The Defences.....	52
Conclusion.....	53
Chapter Two: Literature Review.....	55
Introduction.....	56
Guidelines For Preventing Healthcare-Associated Infection	56
The Purpose Of Protocols And Guidelines.....	59
Terms Used In Relation To Protocol And Guideline Use.....	61
How Are Protocols And Guidelines Are Being Used?.....	62
Importance Of Context.....	64
Organisational Learning.....	68
Summary.....	73

Factors Influencing The Use Of Protocols And Guidelines.....	74
Importance Of Using Theoretical Models.....	77
What Are Behavioural Theories?.....	79
Behavioural Theories Used With Health Behaviours.....	80
Studies Using Behavioural Theory With Infection Control.....	81
Theory Of Reasoned Action And Theory Of Planned Behaviour....	85
Strengths Of The Theory Of Planned Behaviour.....	87
Weaknesses of The Theory of Planned Behaviour.....	88
The Development Of An Integrated Framework.....	91
Conclusion And Research Contribution.....	95
Research Questions.....	98
Chapter Three: Methodology And Methods.....	99
Introduction.....	100
Research Methodology.....	100
Chosen Paradigm.....	101
Interpretivism.....	102
Constructivism.....	103
Research Design: The Case Study.....	105
Potential Limitations Of The Case Study.....	110
Increasing The ‘Trustworthiness’ Of The Study.....	111
Credibility.....	112
Negative Case Analysis.....	113
Triangulation.....	113
Member Checks.....	115
Transferability Of The Study Findings.....	116
Dependability.....	117
Confirmability.....	117

Research Methods	119
Introduction.....	119
Rationale For The Chosen Methods.....	119
Non-Participant Observation.....	119
Document Review.....	123
Face-To-Face Semi Structured Interviews.....	124
Use Of A Vignette And Discussion Group.....	125
Development Of The Topic Guide.....	126
Site Of The Case Study.....	127
Negotiating Access.....	128
Piloting The Consent Forms And Consent Process.....	131
Ethical Approval.....	134
The Field Work	135
Introduction.....	135
Summary Of Data Collected.....	135
Description Of The Ward Setting.....	139
Participant Sampling Procedure	141
Raising Awareness Of The Study.....	142
Sampling Design.....	142
Sample Size.....	144
Participant Selection, Recruitment And Withdrawal.....	144
Obtaining Informed Consent.....	145
Documenting Non-Participation And Withdrawal.....	147

Obtaining Informed Consent	147
Identifying Healthcare Staff And Obtaining Consent.....	147
Identifying Patients And Obtaining Consent.....	150
Identifying Visitors And Obtaining Consent.....	152
The Data Collection Process	153
Non-Participant Observation.....	154
Recording Observations.....	156
Document Review.....	158
Semi-Structured Interviews.....	159
Post-Interview Process.....	164
Data Transcription and Analysis	166
Data Transcription.....	166
Preparation For Data Analysis.....	168
Conducting Data Analysis.....	168
Coding The Data.....	169
Development Of Categories And Themes.....	171
Reflexivity And Positionality	173
Researcher Role.....	174
Access, Building Trust And Managing Relationships.....	177
Maintaining Ethical Practice.....	181
Positionality.....	182
‘Outsider’ Perspective.....	182
Researcher Identity.....	184
Professional Background, Education And Experience.....	185
Conclusion.....	187

Chapter Four: Study Findings	189
Introduction.....	189
Research Question 1	189
Awareness And Perceptions Of Protocols And Guidelines	189
‘Knowing’ About Protocols And Guidelines.....	190
Explicit Versus Tacit And Experiential Knowledge.....	196
Protocols And Guidelines: A Benefit Or A Hindrance?.....	212
Summary.....	219
Research Question 2	220
Ambiguity	220
Introduction.....	220
Diagnosis Ambiguity.....	221
Assessment Ambiguity.....	224
Barrier Nursing Ambiguity.....	227
Isolation Ambiguity.....	229
Communication Ambiguity.....	231
Summary.....	235
Theme: Organisational Issues	236
Introduction.....	236
Spatial And Structural Constraints.....	236
Equipment And Resource Constraints.....	240
Role Models, Social Norms And ‘Fitting In’	244
Control Of Standards.....	250
Summary.....	256

Theme: Perceptions of Contamination	257
Introduction.....	257
Fear Or Infection.....	257
Normalisation Of Infection.....	263
‘‘Looking Or Feeling Dirty’’	270
Getting Rid Of ‘‘It’’	279
Summary.....	282
Theme: Professional Frustrations	283
Introduction.....	283
Struggling To Meet Obligations.....	283
‘‘Nurses Are Not Cleaners’’	288
Feeling Overwhelmed.....	294
Summary.....	298
Research Question 3	299
Theme: Dealing With Difficulties	299
Staying Silent.....	300
Protecting Yourself From Blame.....	309
‘‘Nothing Gets Done!’’.....	315
Summary.....	318

Chapter Five: Discussion and Conclusions.....	319
Introduction.....	320
Research Question 1.....	321
Detachment, Lack Of Ownership And Lack Of Accountability.....	321
Organisational And Socio-Cultural Influences To ‘Knowing’	324
Reliance On Tacit And Experiential Knowledge.....	326
Familiarity.....	327
Confidence.....	329
Ways Of ‘Knowing’	330
Reflection On Explicit, Tacit And Experiential Knowledge.....	332
Mental Short-Cuts.....	334
‘Seeing Things Work’	335
Different Perspectives Of Protocols And Guideline Use.....	336
Nurse Managers’ Perspective: Keeping Behaviour On Track.....	336
Nurses’ Perspective: Protocols Provide Protection From Blame.....	338
Doctors’ Perspective: Protocols Stifle Autonomy.....	339
Summary.....	340
Research Question 2.....	342
Ambiguity.....	342
Importance Of Cooperation, Patient History And Communication..	344
Making Sense Of Explicit Knowledge From Protocols.....	345
Blending Different Forms Of Knowledge.....	347
Summary.....	349

Organisational Issues	351
Privacy And Dignity Versus Infection Control.....	351
Modelling Behaviour And Commitment To Infection Control.....	355
Regulation Of Infection Control Practice.....	359
Monitoring Behaviour At Boundaries.....	361
Summary.....	364
Perceptions Of Contamination	365
Fear Of Infection.....	365
Self-Control.....	366
‘Working Around’ Protocols As A Means Of Reducing Fear.....	366
Normalising Infection.....	367
Under-Estimating The Risk Of <i>C.difficile</i> Infection.....	368
The Influence Of Physical And Emotional Cues.....	372
Prioritising The ‘Dirtiness’ Of A Task.....	375
Inherent Versus Elective Tasks.....	379
Summary.....	381
Professional Frustrations	382
The Influence Of Negative Emotional States.....	382
Ways Of Coping.....	383
Balancing Ward Cleaning Duties With Patient Care.....	385
Responsibilities, Nurse Identity And Conflict.....	387
Fragmented Infection Control Practice.....	389
Summary.....	391

Research Question 3	393
Dealing with Difficulties	393
Toleration Of Difficulties.....	393
Learning From Common Workflow Problems.....	395
Voicing Concerns, Suggestions And Incident Reporting.....	396
Summary.....	399
Conclusions	400
Study Limitations.....	407
Original Conceptual Contribution To Knowledge.....	408
Original Empirical Contributions To Knowledge.....	409
Recommendations.....	412
Concluding Remarks.....	420
References	421
Appendices	467

List of Tables

Table 1: Proportion Of <i>Staphylococcus aureus</i> Blood Isolates Resistant To Methicillin (MRSA).....	19
Table 2: Michie <i>et al.</i> (2005) Behavioural Change Framework.....	93
Table 3: Criteria To Critically Appraise Qualitative Research.....	112
Table 4: Groups Of People Involved With Piloting The Consent Forms.....	132
Table 5: Summary Of Observations Completed.....	136
Table 6: Number Of Nurse Interviews Completed.....	137
Table 7: Number Of Doctor Interviews Completed.....	137
Table 8: Number Of Ancillary Staff Interviews Completed.....	138
Table 9: Number Of Patient Interviews Completed.....	138
Table 10: Summary Of Written Consent Forms Obtained.....	146

List of Figures

Figure 1: Theory Of Planned Behaviour.....	87
Figure 2: Theme: Awareness And Perceptions Of Protocol And Guidelines.....	189
Figure 3: Theme: Ambiguity.....	221
Figure 4: Theme: Organisational Issues.....	236
Figure 5: Theme: Perceptions Of Contamination.....	257
Figure 6: Theme: Professional Frustrations.....	283
Figure 7: Theme: Dealing With Difficulties.....	299

Dedication

To the hospital staff who work so hard to provide treatment and care for patients in NHS hospitals

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Declaration

I confirm this thesis is my own work and has not been submitted for a degree at another university.

Abstract

Implementation of protocols and guidelines is an important strategy used by hospitals in their fight against healthcare-associated infections (Pratt *et al.*, 2007), yet their use remains a challenge (Boaz *et al.*, 2011; Grimshaw *et al.*, 2001). This thesis addresses the topic of behavioural change through exploring how protocols and guidelines are used on hospital wards to manage the risk from *Clostridium difficile* infection, the difficulties ward staff faced with their use and what happened in practice as difficulties were experienced.

A qualitative study was conducted using a single case study methodology (Yin, 2009) with one acute NHS hospital in the UK. Methods used included non-participant observation (184 hours), informal conversation, interviews (49) and document review. An adapted version of the topic guide developed by Michie *et al.* (2005) based on their theoretical framework of behavioural change was used in the interviews. Data collected was analysed inductively using NVivo 8 and compared against Michie *et al.*'s (2005) framework.

The findings illustrate that nurses and doctors were detached from protocols and guidelines. Instead they relied heavily on informal sources of knowledge to guide their practice. Examples include experiential knowledge, common sense, intuition, ‘rules of thumb’ and ‘mind lines’ (Gabbay and le May, 2004, 2011). They also took account of preferences, their perceptions of risk, social norms and other contextual issues. Four emergent themes illustrate the complexity of factors hindering and assisting the use of protocols and guidelines into practice. These are ambiguity, organisational issues, professional frustrations and perceptions of contamination. Variations in practice were widespread as protocols and guidelines were ‘worked around’ and improvisations were made as ward staff struggled against a tide of organisational constraints, unrealistic conflicting priorities and difficulties with protocol ambiguity. The way that difficulties were being solved on the ward means that the underlying causes were not being addressed as concerns were not brought to the surface. Professional frustrations such as feeling overwhelmed and powerless acted as barriers to nurses’ reflection.

The study has empirically expanded Michie *et al.*'s (2005) behavioural framework whilst exploring the dynamics and complexity of categories influencing the use of protocols and guidelines through a ‘thick’ description of the study findings. This study has made a conceptual contribution to the literature by identifying that Michie *et al.*'s (2005) framework does not seem to take into account tacit and experiential knowledge, professional knowledge, how sense is made of information from the local context or the process of reflection as part of learning. Recommendations are made to address the findings from this study.

Introduction

Introduction

“People don’t choose their careers, they are engulfed by them”

(Dos Passos, 1959).

Motivational Influences For This Study

My arrival at Warwick in January 2008 to undertake this study was not a direct path, but a circuitous route, although I had always imagined that one day I would study for a PhD. The motivation for the topic of this study has been influenced by past experience, including employment, people that I have met and things that I have learned along the way.

My first awareness of the role of organisational protocols stems from listening to my colleagues (experienced chemists) talking about feeling de-professionalised as the company introduced standard operating procedures. I remember being issued with a huge file and being asked to read and sign a sheet of paper to confirm that I had understood the ‘rules’ yet I questioned the purpose of this task to myself. At the age of 22, I worked as a laboratory technician in a radioactive plant in Cardiff. Batch manufacturing was being introduced to assist the company to be more efficient, improve quality and production and gain a competitive edge in the market place, based on Deming’s philosophy of Total Quality Management

(Deming, 2000). On occasions I deviated some of these new 'rules' and I wondered about my own behaviour. During an audit by The National Radiological Inspection Board, the inspector identified a step that I had omitted with my practice as he observed me purifying a radioactive isotope. As a result, my manager addressed the whole team as a lesson to be learnt from my experience so that this did not recur. I was curious about how this inspector, an outsider, could know so much about our work and have such an impact in relation to our work processes. This influence stayed with me.

I went on to study a degree in Environmental Health and worked as an enforcement officer within Local Government. Over time I became frustrated because of the lack of involvement I was able to provide to help owners of local businesses from being prosecuted. I therefore moved to the private sector and worked as a consultant where I was able to provide advice and assistance to businesses, which I found more rewarding, often having to negotiate with enforcement officers when legal action was pending. Part of my role as a consultant was to design and develop 'systems' to support a due diligence defence in case of civil claims or legal action. I became fascinated as to why companies would pay thousands of pounds for these 'systems' yet these would sometimes gather dust on a shelf. I often wondered about how protocols were used in practice.

I read books by Ricardo Semler (1993, 2003) and how in his business he had turned the conventional corporate rule book on its head by not having a mission statement or policies and procedures (Caulkin, 2003). I was intrigued about organisational culture and its influence on behaviour and performance. I enrolled on a three year MSc programme. I chose the course because I wanted to learn about organisational accidents (human factors) and the effect organisational culture has on behaviour in the workplace. My dissertation explored how the safety culture influenced practices on farms and rural estates across the UK managed by a large international property management company. A site-based contractor had died on one of the estates, there had been an inquiry and the organisation was keen to let me study their practices.

After finishing the MSc I worked with a psychologist delivering workshops for behavioural safety. I also used safety climate surveys, interviews and focus groups to explore employee perceptions of safety for companies such as BAE and Balfour Beatty. My curiosity to understand more about behaviour, behavioural theories and work-based standards continued to drive me and I actively looked for a PhD to learn more about the topic. Hence my PhD journey started when I successfully applied for a studentship looking at the management of healthcare infections.

My journey has been emotional, demanding, yet fulfilling and very enlightening. I have learned a lot about myself and my own motivations as much as I have deepened my knowledge of the topic I have studied.

About The Study

Healthcare-associated infections are deemed the most frequent result of unsafe patient care worldwide (Allegranzi *et al.*, 2011) and protocols and guidelines play a key role in their management (World Health Organization, 2009). Despite the widespread availability of these documents, a substantial gap exists between research evidence and practice (Allegranzi and Pittet, 2009; Gould *et al.*, 2008; Mathai *et al.*, 2010). Behavioural theories and frameworks from psychology have been suggested as a useful means to further our understanding of the implementation process (Davies, *et al.*, 2010; Michie, 2011). This study uses a behavioural change framework from psychology (Michie *et al.*, 2005) to identify and understand the complexity of factors influencing the use of infection control protocols and guidelines on a hospital ward. The sections that follow outline the study aim, research questions and the structure of the chapters of this thesis.

Study Aim

The study aims to gain a fuller understanding of how healthcare professionals and other healthcare workers experience the use of protocols and guidelines designed to prevent and control *Clostridium difficile* infection.

Research Questions

The research questions are as follows:

1. How are infection control protocols and guidelines perceived and used on the hospital ward to manage the risk from *Clostridium difficile* infection?
2. What challenges, difficulties or dilemmas are experienced by ward staff with implementing protocols and guidelines in the management of *Clostridium difficile* infection?
3. What happens if difficulties are experienced?

Thesis Outline

The work is presented in five chapters.

Introduction: This section has provided a brief background about the researcher, explaining the influences that have played a part in the topic of this study. It outlined the study aim and research questions. The presentation of the chapters that will follow are outlined below.

Chapter One provides a background and setting for the study. It discusses the epidemiology of healthcare-associated infection and provides an introduction to *Clostridium difficile* infection explaining how it is caused, the symptoms of infection, the risk factors, how it is diagnosed, treated and prevented. It discusses the strategies that are being used to tackle healthcare-associated infections world-wide and explains how protocols and guidelines fit into this strategy. A final section critically examines accident models and discusses how safety defences can be by-passed.

Chapter Two presents a review of the literature. It critically examines what is known about how infection control protocols and guidelines are used in healthcare and the difficulties with their use. The strengths and limitations of behavioural theories used with these studies are discussed. The chapter ends by introducing the behavioural framework that underpins this study.

Chapter Three presents the methodology and the methods chosen for this study. It summarises my epistemological and ontological perspective and research approach used, presents a rationale for the use of a qualitative case study design, and provides a discussion about how the data was collected, analysed, the difficulties encountered with this process and how these were overcome or minimised.

Chapter Four presents the findings of the study. These are organised around three research questions:

Research Question 1. This section relates to ward staff perceptions about how infection control protocols and guidelines were used on the ward to manage *Clostridium difficile* infection and highlights the difficulties with their use.

Research Question 2. This section presents the findings surrounding the theme of ambiguity, organisational issues, professional frustrations and perceptions of contamination. These influences were seen to assist and hinder the use of protocols and guidelines into practice.

Research Question 3. This section presents the findings relating to perceptions about what happens when difficulties arise as a result of putting infection control protocols and guidelines into practice.

Chapter Five provides a discussion of the key research findings addressing the three research questions. The conclusions of the study are discussed along with the original conceptual and empirical contribution to knowledge. The chapter acknowledges the study limitations and makes conclusions and recommendations for changes in practice, education and policy and suggestions for further research.

Chapter One

Setting/Background

Chapter One: Setting/Background

Introduction

This chapter is a critical review of the existing literature pertinent to the research topic. The research study will be positioned within this literature and provides a background and setting to the study findings. This chapter is an examination of the context of healthcare-associated infection, a discussion of why it is a global concern, reviews the strategies that are being used globally and nationally to tackle the high levels of infection, including the introduction of guidelines for hand hygiene in healthcare, and the legislative framework within the UK to ensure basic standards are met to reduce infection.

Protocols and guidelines are placed into context within a system to manage the risk from healthcare-associated infection. Accident models are used to explain how incidents and adverse events can occur, with protocols and guidelines being one layer of defences to prevent harm. The final section discusses how these safety defences can be by-passed. Key terms used in the literature search can be found in Appendix 1. The next section discusses and defines the terms used in relation to infections associated with the healthcare environment.

Meaning of the Term Healthcare-Associated Infection

Over recent years, the numbers of illnesses and deaths associated with the healthcare environment have escalated (Health Protection Agency, 2007) and there is concern regarding antibiotic-resistant pathogens (McDonald, 2006). Two organisms that are particularly problematic are methicillin-resistant *Staphylococcus aureus* and *Clostridium difficile* as these can have a considerable impact on the patient's treatment and recovery. Patients who become infected often require a longer stay in hospital, their treatment can be more complicated and the consequences can be severe, sometimes resulting in disability or death (Pittet and Donaldson, 2005). Illnesses and deaths attributable to antibiotic-resistant pathogens are known as 'hospital acquired infection', 'healthcare-associated infection' or 'nosocomial infection.'

The World Health Organization (2002, p1) defines hospital acquired infection as:

“An infection acquired in hospital by a patient who was admitted for a reason other than that infection” (Ducel *et al.*, 2002).

“An infection occurring in a patient in a hospital or other health care facility in whom the infection was not present or incubating at the time of admission. This includes infections acquired in the hospital but appearing after discharge, and also occupational infections among staff of the facility” (Benenson, 1995).

Both definitions suggest that a ‘hospital acquired infection’ is a clinically evident infection unrelated to the patient’s original diagnosis, which has been transmitted to the patient during their stay in hospital whilst receiving a procedure or treatment for a different condition. The second definition widens the scope by including patients in other healthcare establishments, which could mean outpatient clinics, or nursing homes, although this is not defined. It also includes infections transmitted to hospital staff. The word ‘nosocomial’ means an infection originating from hospital (Collins English Dictionary and Thesaurus, 2000). For the purpose of this study, the more generic term ‘healthcare-associated infection’ will be used as the other terms are now considered obsolete (Horan *et al.*, 2008).

Epidemiology of Healthcare-Associated Infections

Prevalence surveys can be a useful tool to provide a snap-shot of the burden of disease (Coello *et al.*, 2011), providing a picture of existing and new occurrences of healthcare-associated infection (Farmer and Miller, 1991). Gathering data on the epidemiology of infections through surveillance is considered an essential and important part of the overall management of healthcare infections (Gould and McDonald, 2008). Prevalence surveys differ from incident reporting, in that the latter method provides information on the number of new cases only that occur during a specified period in a defined population (Farmer and Miller, 1991). Prevalence surveys are easier, less expensive and less time consuming to perform than incident reporting, can be undertaken on a large scale (Humphreys and

Smyth, 2006) and can supplement other surveillance methods (The RAISIN Working Group, 2009).

Within Europe, the estimated incidence of healthcare-associated infection ranges from 4% to 10% of hospital admissions (Pratt *et al.*, 2003) and within developing countries the rate has been estimated to exceed 25% (Pittet *et al.*, 2008). In the United States in 2002 an estimated 1.7 million patients developed a healthcare-associated infection (Klevens *et al.*, 2007) and reported mortality rates increased from 5.7 per million in 1999 to 23.7 per million in 2004 (Karas *et al.*, 2010). In Canada an estimated 22,000 healthcare infections occur each year (Gould *et al.*, 2010), contributing to the fourth leading cause of death within the country (Baker *et al.*, 2004). Within the UK in 2004, the Department of Health estimated that there were 300,000 healthcare-associated infections each year (House of Commons Committee of Public Accounts, 2005), costing over a billion pounds annually (National Audit Office, 2009). In 2007, approximately 9,000 deaths were recorded in the UK with methicillin-resistant *Staphylococcus aureus* blood stream infections or *Clostridium difficile* infections as the underlying cause or contributory factor (Office for National Statistics, 2008).

Within the epidemiology literature the strengths of using prevalence surveys have been highlighted. Gastmeier *et al.* (2000) reported that repeated surveys can provide a baseline from which improvements with infection control programmes can be measured and priorities identified to focus resources (Humphreys and

Smyth, 2006). France reported improvements in their five yearly prevalence survey rate, from 6.7% in 1996 to 4.9% in 2006 (Carlet *et al.*, 2009). Muhlemann *et al.* (2004) reported that repeated surveys are a simple, cost effective method of benchmarking rates between hospitals and this is important to encourage learning. Various studies have reported that the prevalence of infection varies by speciality (Fitzpatrick *et al.*, 2008; Klavs *et al.*, 2003) suggesting the importance of implementing hospital wide infection control policies and standard precautions (Reilly *et al.*, 2008).

Despite the strengths of using a prevalence survey as a surveillance tool, there are various limitations that need to be considered. Firstly, the rate determined is a crude estimation of infection which can vary depending on the type of establishment and the case mix. For example, a seven day survey in Switzerland in 1998 reported an overall prevalence of 11.3%, with 8.4% in acute wards and 16.4% in chronic wards (Sax *et al.*, 2001). Secondly, as national prevalence surveys are expensive and time consuming, point prevalence surveys are more likely to be undertaken (Coello *et al.*, 2011), which may only include a sample of settings (type of hospital or unit) and sample of infections and the results may not be generalisable. Thirdly, although the definitions of infection used may be agreed within a country, for example the 1994 survey undertaken within the UK was agreed within a steering group (Emmerson *et al.*, 1996), the definitions used may not be comparable with other internationally agreed definitions. Wilson *et al.* (2004) reported that the mean percentage of wounds infected varied depending on the definition of surgical wound used. Therefore, the differences in the data

collected, the definitions used to identify infection and the period over which data is collected may to some extent explain why rates of infection vary between countries. For example, Germany reported a prevalence rate of 3.5% and 4% respectively (Gastmeier, 1998, 2000), yet only confirmed cases of infection were included, which may partly explain their low rate compared with other countries (Humphreys and Smyth, 2006). A national prevalence survey undertaken in Spain (Rossello-Urgell *et al.*, 2004), using data from surveys carried out from 1990-2002, reported that the results varied depending on the day of the week in which the survey was undertaken. Rossello-Urgell *et al.* (2004) reported a rise in prevalence of healthcare infection as the week progressed, with the highest prevalence being Saturday – Monday. The authors suggest that patients who contract healthcare infection become progressively worse as the week progresses, and discharge on a Friday may therefore be postponed. They use this to explain why a higher rate of infection may be detected over the weekend, and advise that surveys are carried out Tuesday-Friday, preferably on the same day, to avoid changes in admission/discharge rates that can occur throughout the week. Results may also differ depending on the use of antibiotics (Jodra *et al.*, 2006), or the implementation of infection control measures such as hand hygiene (Struwe *et al.*, 2006). These examples highlight the caution that needs to be taken when comparing prevalence rates between countries due to differences in the surveillance approach used (Pratt *et al.*, 2003).

In 2006 a prevalence study was undertaken in the UK and the Republic of Ireland for the first time using internationally agreed definitions from the Centres for

Disease Control. The rate was found to be 7.6% (Humphreys *et al.*, 2008; Smyth *et al.*, 2008) compared with a reported rate of 19.1% in 1980 (Meers *et al.*, 1981) and 9% in 1994 (Emmerson *et al.*, 1996). Scotland was excluded as it used a different methodology (Reilly *et al.*, 2008). Argentina carried out a prevalence survey in 2008 using an identical methodology employed by the UK (Smyth *et al.*, 2008) yet differences in their sampling strategy and case mix make comparisons difficult (Durlach *et al.*, 2012). The overall prevalence rate of healthcare infection within Argentina was found to be 11.30% (Durlach *et al.*, 2012), which is much higher than the level found within the UK (7.6%). These differences could be due to environmental factors, standard of hygiene, difference in infrastructure and equipment, relationship between staff and patients, differences in knowledge and implementation of infection control measures (Durlach *et al.*, 2012). For example, Struwe *et al.* (2006) compared a point-prevalence survey undertaken in Sweden (Huddinge), Latvia (Riga) and Lithuania (Vilnius). The rate of healthcare infection was higher in Huddinge (15%) despite easier access to hand disinfectants. Whereas, staff in Riga (3%) and Vilnius (4%) were encouraged to use pocket containers of alcohol hand rub because of lack of hand wash basins. This suggests that even though the comparison of crude infection rates may not seem meaningful (because of the reasons already explained), comparisons between countries can contribute to valuable discussions about the quality of care.

There has been pressure for the standardisation of methods with agreed definitions of infection to facilitate direct comparisons between countries, within countries or institutions over time (European Centre for Disease Prevention and Control,

2008). In May/June 2011 - May/June 2012, the European Centre for Disease Prevention and Control led a point prevalence survey of healthcare infection within acute hospitals. All participating EU countries for the first time used standardised methodology to enable comparisons to be made from the results. All European countries were encouraged to participate however taking part was voluntary. The survey will be repeated every five years and the results of the first survey are due to be released shortly (European Centre for Disease Prevention and Control, 2012).

Data on levels of MRSA infections as a proportion of all *Staphylococcus aureus* bloodstream infections indicate that the UK has one of the highest levels in Europe (European Antimicrobial Resistance Surveillance System, 2007) (See Table 1). In comparison, the Netherlands and Denmark have the lowest levels of methicillin-resistant *Staphylococcus aureus*. This has been attributed to their strict 'search and destroy' policy, whereby carriers and infected persons are identified by screening and treated in isolation using barrier precautions (Wagenvoort, 2000).

Table 1: Proportion of <i>Staphylococcus aureus</i> blood isolates resistant to methicillin (i.e. MRSA)			
Denmark	0.8%	France	28.5%
Netherlands	1.4%	Portugal	48.4%
Austria	9.2%	Italy	38%
Germany	16.3%	Greece	48%
Spain	25.5%	United Kingdom	35.6%

Source: European Antimicrobial Resistance Surveillance System data for 2007

Epidemiological data for *Clostridium difficile* is sparse within Europe. To provide a more complete overview Bauer *et al.* (2011) carried out a prospective study within 34 European countries to test for *C.difficile*. In November 2008 a web based questionnaire was used to gather additional information about the infection after diagnosis and 3 months post diagnosis. This was undertaken with a maximum of ten of the first patients to be diagnosed per hospital. A high follow up rate (90% was achieved). Because only the first ten patients per hospital were included in the survey and hospitals were selected in relation to size rather than chosen randomly, the results may not be representative of each country. Some hospitals may have been selected because of outbreaks and no attempt was made to differentiate between relapses and re-infection (Bauer *et al.*, 2011), therefore bias may have been introduced. The authors reported that the incidence of *C.difficile* infection and the causative organism varied greatly between hospitals across Europe. They reported an overall figure of 4.1 per 10,000 patient days which is higher than the overall figure of 2.45 per 10,000 patient days reported by

Barbut *et al.* (2007) although the methodology of both studies differed. At 3 months follow up, 101 (22%) out of 455 patients had died and *C.difficile* infection was attributed to 40 (40%) of these deaths (Bauer *et al.*, 2011), which the authors noted was strikingly high.

Within the UK, since 2004 it has been a mandatory requirement to report all episodes of *Clostridium difficile* infection in NHS acute Trusts in patients aged 65 years and over. To enhance the surveillance of this infection, in April 2007 the age of mandatory reporting was lowered to patients aged 2 years and older (National Audit Office, 2009). In 2009/10 in England and Wales, there were nearly 2000 reported incidences of methicillin-resistant *staphylococcus aureus* (MRSA) yet over 25,000 reports of *Clostridium difficile* infection (12.5 times higher) (Health Protection Agency, 2010).

The cost to patients and their families from healthcare-associated infections includes unnecessary pain, anxiety and suffering (National Audit Office, 2009). Evidence suggests that the public fear hospital admission because of the threat of antibiotic resistant infections (Gould *et al.*, 2009; Hawkings *et al.*, 2007). Although the statistics for methicillin-resistant *staphylococcus aureus* and *Clostridium difficile* infection suggest that the levels within the UK are falling, possibly due to healthcare interventions that have been implemented (Department of Health, 2003) there is continued emphasis to try to understand how further improvements can be made. According to the World Health Organization (2009),

most healthcare-associated infections are preventable and the implementation of infection control protocols and guidelines have an important part to play. Whilst it is acknowledged that attaining 100% prevention may not be realistic (Umscheid *et al.*, 2011), some studies have shown that between 10 - 70% improvement is possible by following evidenced-based strategies (Harbarth *et al.*, 2003).

The next sections review the literature relating to *Clostridium difficile* infection. It explains how infection is caused, the associated risk factors, the symptoms of infection, how it is diagnosed, treated and prevented and introduces some of the studies that form part of the literature review.

What Is *Clostridium difficile* And Where Is It Found?

Clostridium difficile (also known as *C.difficile* or *C.diff*) is a bacterium and a member of the *Clostridium* family. It is a gram-positive bacillus and an obligate anaerobe (Kee, 2012) which means that the vegetative cells (bacteria) will die when exposed to atmospheric levels of oxygen (Weber *et al.*, 2010). It is a particularly problematic organism, in that not only it is resistant to many antibiotics (Huang *et al.*, 2009) and new hypervirulent strains are appearing (Pant *et al.*, 2011), but during unfavourable conditions, for example when bacteria are shed in the faeces, it can form spores to survive for long periods within the environment (Weber *et al.*, 2010). Recent studies have demonstrated the potential for *C.difficile* spores to be transferred via the airborne route (Roberts *et al.*, 2006,

2008) as spores are shed when a patient has diarrhoea (Best *et al.*, 2010, 2012). Spores have been found in isolation rooms (Dubberke *et al.*, 2007; McFarland *et al.*, 1989), non-isolation rooms and other ward areas where nurses and doctors work, including computer and telephone key pads, medication carts, pulse oximeter finger probes and blood pressure cuffs (Dumford *et al.*, 2009), toilets, floors, bed sheets and bed frames, call buttons, radiators, curtain rails, window frames and equipment such as scales, electronic thermometers and feeding tube equipment (Gerding *et al.*, 2008; Wilcox *et al.*, 2003). The spores are resistant to a range of disinfectants (Fraise, 2011), including alcohol hand rubs (Gerding *et al.*, 2008; Vonberg *et al.*, 2008) making it more difficult to eradicate. The organism lives in the colon of about 1 - 3% of healthy adults and 5 - 80% of healthy infants, is commonly found in the soil (Sunenshine and McDonald, 2006) and the intestinal tract of animals (Williams and Spencer, 2009) and is becoming increasingly common within long-term healthcare facilities such as care homes (Kee, 2012).

How Do Patients Become Infected?

Patients with *C. difficile* infection or carriers of the disease excrete large numbers of spores in their faeces which contaminate the environment (Riggs *et al.*, 2007) providing a reservoir (source) for infection (Walker *et al.*, 2012). *C.difficile* spores are transmitted by the faecal-oral route through ingestion of the spores via the contaminated hands of a healthcare worker, patient or visitor or via a contaminated object, equipment or food which enter the patient's mouth or nose

and are swallowed. The normal stomach acidity is an important host defence against ingested pathogens and any vegetative cells will die (Kee, 2012). *C.difficile* spores are resistant to this acid, so will pass through the stomach and intestine and become excreted or they can lie dormant inside the colon until optimal conditions for growth develop, a process known as ‘asymptomatic colonisation’ (Gerding *et al.*, 2008). This means that some people (healthcare workers, patients and visitors) will become carriers and show no symptoms, yet can act as a vector of disease, by transmitting the organism to other people, usually via their contaminated hands (Riggs *et al.*, 2007). The mechanism by which the normal intestinal flora prevents colonisation by *C.difficile* and other potentially pathogenic organisms is called ‘colonisation resistance’ (Stecher and Hardt, 2011). Spores transferred to other people can subsequently grow and multiply in their colon, yet this is dependent on certain risk factors being present.

What Are The Risk Factors For *Clostridium difficile* Infection?

The ingestion of spores does not necessarily mean that an individual will develop *C.difficile* infection. The situation can change when broad spectrum antibiotics are administered and the normal gut flora becomes disrupted (Shannon-Lowe *et al.*, 2010). *C.difficile* is an opportunistic pathogen, and is able to use the altered balance of the gut flora to its advantage, that is, the spores are able to germinate and multiply. For hospital patients with already weakened immune systems, taking antibiotics puts them at increased risk of developing *C.difficile* infection (Johnson, 2009; Williams and Spencer, 2009). Other risk factors include previous

use of antibiotics, extended duration of antibiotic use, advancing age (>65 years), severity of pre-existing illness, extended stay in hospital and decreased renal function (Gerding *et al.*, 2008; Johnson, 2009; Williams and Spencer, 2009), nasogastric intubation (Poutanen and Simor, 2004; Sunenshine and McDonald, 2006) and gastric acid suppressants (proton pump inhibitors) (Johnson, 2009). Healthy hospital employees, children and pregnant women not thought to be at risk from the infection have contracted the illness yet the causal factors are not understood (Dorn, 2009; Sinh *et al.*, 2011).

What Are The Symptoms Of *Clostridium difficile* Infection?

C. difficile bacteria can produce two toxins A (enterotoxin) and B (cytotoxin) which cause the symptoms of infection. The toxins released by *C. difficile* bacteria attack the intestinal wall causing inflammation and damage to the colon. The incubation period of *C.difficile* infection is unclear (Gould and McDonald, 2008), although a recent study suggests that onset of symptoms can be from a few days after starting antibiotic therapy to 4 weeks, but can extend up to 12 weeks (Walker *et al.*, 2012). The first signs and symptoms include watery diarrhoea, abdominal pain and tenderness. Other typical symptoms include weakness, dehydration, fever, nausea and vomiting. In some cases there may be blood in the stools (Poutanen and Simor, 2004). The severity of infection can vary from a mild self-limiting diarrhoea to a severe condition known as pseudomembranous colitis (PMC), which may be life threatening and occurs in 4 - 10% of patients with the infection (Nobleft *et al.*, 2009). As PMC develops, the bowel becomes

more inflamed and the toxins damage the tissue of the inner lining of the colon which eventually fall off, giving the appearance of membranous patches covering the inner lining of the colon (Pant *et al.*, 2011). Patients with severe colitis are at increased risk of developing paralytic ileus and toxic megacolon (markedly dilated colon), which may result in a reduction or cessation of diarrhoea. Severe cases may present as fulminant colitis, with an acute abdomen and systemic symptoms such as fever and tachycardia (Poutanen and Simor, 2004). *C. difficile* infection has been known to cause other conditions, such as peritonitis which is an inflammation of the peritoneum lining the wall of the abdomen, perforations of the bowel, sepsis, multi-organ failure and death (Poutanen and Simor, 2004; Sunenshine and McDonald, 2006).

How Is *Clostridium difficile* Infection Diagnosed?

A history of antibiotic use is important in the diagnosis of *C. difficile* infection. Patients taking antibiotics or who have recently taken a course of antibiotics who develop abdominal pain and diarrhoea are usually tested for *C. difficile*. Colitis may occur yet diarrhoea may be absent (Poutanen and Simor, 2004) and the condition can mimic acute peritonitis, therefore diagnosis of *C. difficile* infection can easily be missed. Other intestinal diseases such as ulcerative colitis, chronic inflammatory bowel disease and Crohn's disease have similar symptoms and this may cause problems with diagnosis (Knoop *et al.*, 1993). Current UK guidelines recommend the consideration of *C. difficile* infection in any patient with symptoms of diarrhoea (Department of Health, 2009a).

Diagnosis of *C.difficile* commonly relies on detection of the toxin in the stools. A toxin-specific enzyme-linked immunosorbent assay (ELISA) is commonly employed due to the quick turn-around time, ease of use and reduced cost. The poor performance of this test is well recognised (Goldenberg and French, 2011) therefore the results should be confirmed using a second more sensitive method, a cytotoxin assay (Department of Health, 2009a). A recent survey carried out by Goldenberg and French (2011) reported that 70% of NHS Trusts surveyed in England were using a toxin-specific enzyme-linked immunosorbent assay as a standalone method, and were carrying out repeat testing of stool samples (Goldenberg and French, 2011) to increase the reliability of the result (Giannasca and Warny, 2004). Poorly performing tests increase the likelihood of false-negative and false-positive results. False-negative results may result in a patient with infection being missed, barrier nursing precautions not being taken, delays with treatment and unnecessary investigations for symptoms of diarrhoea. False-positive results may end up with patients being given antibiotics unnecessarily, the original antibiotic therapy being withdrawn unnecessarily, cohorting patients unnecessarily (placing them with other infected patients in a separate bay or ward, thereby increasing the risk of cross-infection) and failure to diagnose the true cause of the diarrhoea (Goldenberg and French, 2011).

New guidances released by the Department of Health (2012) confirmed that toxin-specific enzyme-linked immunosorbent assays were not sensitive enough to use as a standalone method for the diagnosis of *C.difficile* infection. Instead recommendations were made for NHS Trusts to use a new two test system which

provides greater accuracy to detect *C.difficile* infection (Department of Health, 2012).

How Is *Clostridium difficile* Infection Treated?

The most important step in treating the infection is immediately discontinuing the antibiotic responsible for provoking the diarrhoea (Kee, 2012). Treatment for dehydration and correction of the electrolyte deficiencies should also be given (Williams and Spencer, 2009). Uncomplicated infections may resolve within 4 - 5 days following the cessation of antimicrobial therapy. In some cases it may be unrealistic to discontinue the antibiotic treatment, for example in the case of treatment for a life-threatening infection. Changing to another antibiotic agent may be considered (Kee, 2012). If infection persists, the use of metronidazole or vancomycin antibiotics will be used to treat the infection. Metronidazole is generally preferred as the first-line of defence for *C.difficile* infection due to its reduced cost and in order to reduce selection of vancomycin resistance (Giannasca and Warny, 2004). In extreme cases, where patients have been diagnosed with toxic megacolon or colonic perforations, colectomy may be required (Nobleft *et al.*, 2009). Usually after treatment, between 7% and 26% of adult inpatients remain colonised as an asymptomatic carrier of *C. difficile* (Walker *et al.*, 2012), so repeat testing is not recommended (Poutanen and Simor, 2004). Treatment of carriers is not recommended as it is ineffective (Vonberg *et al.*, 2008).

Current guidelines for the control of *Clostridium difficile* infection suggest that contact precautions be discontinued 48 hours after diarrhoea resolves (Department of Health, 2009a). Sethi *et al.* (2010) conducted an observational study involving 52 patients receiving treatment for *C.difficile* infection and followed them up for up to 4 weeks after their treatment had ended. They reported that skin contamination and environmental shedding of *C. difficile* often persists at the time of resolution of diarrhoea, and recurrent shedding is common 1 - 4 weeks after treatment has ended. A more recent study by Walker *et al.* (2012) suggests that transmission can occur up to 8 weeks after diarrhoea has resolved. These results provide support for the recommendation that barrier nursing precautions and isolation should be continued until hospital discharge.

When patients recover from infection, relapse is common (Barbut *et al.*, 2000). In a recent study by Kamboj *et al.* (2011), 85 out of 102 patients who had recovered from a first episode of *C.difficile* infection had a second episode within 8 weeks and 88% of these were relapses. Distinguishing a relapse from a reinfection may be difficult depending on the type of method of analysis used (Kamboj *et al.*, 2011). Approximately 5% to 20% of patients will develop recurrent infection (Shannon-Lowe *et al.*, 2010). Recurrent infection is typically treated using a pulsed or tapered dose of metronidazole or vancomycin, based on a method first used by Tedesco in 1985 (Musgrave *et al.*, 2011). This method is thought to allow the spores to germinate at intervals, permitting the bacterial cells to be killed by the antibiotic (Musgrave *et al.*, 2011). Given the poor outcomes of treatment for *C.difficile* infection, researchers have been exploring other alternative

options. Examples include the use of probiotics and vaccination (Gough *et al.*, 2011).

Probiotic therapy includes drinks and supplements as well as faecal transplantation to re-establish the bowel flora (Kee, 2012). A meta-analysis of several different probiotic treatments found that although some appeared to help prevent infection, only *S. boulardii* (a yeast probiotic) was effective in treating recurrent infection (McFarland, 2006). Probiotics have been found to be safe with most patients and cause few problems by interacting with other medicines (Musgrave *et al.*, 2011). However, in some cases blood stream infections or fungemia have been reported in immunocompromised patients and in patients with central venous lines. The use of probiotics is not currently recommended as a form of treatment until further studies have been carried out (Kee, 2012; McFarland, 2010; Musgrave *et al.*, 2011).

When standard antibiotic treatment has failed for patients with severe infection, some studies have sought to restore their normal bowel flora by use of donor stools, implanted directly into the intestines via enemas or nasogastric tube (Kee, 2012). Although this method has shown some positive results, it is not a widely adopted method because of safety concerns about transfer of other infections and issues about the acceptability of the method (Gough *et al.*, 2011; Kee, 2012; Pant *et al.*, 2011).

Some people can generate an antibody response to toxins A and B following exposure to *C.difficile* infection and this is associated with a protective effect from further re-infection. When an individual is unable to develop an immune response, recurrent infection and/or severe disease is more likely to occur (Giannasca and Warny, 2004). Currently no vaccine has been approved for use against *C.difficile*. A limited number of studies on animals have shown vaccines to have a protective effect against the *C.difficile* toxin A (Gardiner *et al.*, 2009; Ghose *et al.*, 2007; Seregin *et al.*, 2012). Vaccination may provide a promising means of prevention in the future.

How Is *Clostridium difficile* Infection Prevented?

Prevention of *Clostridium difficile* infection in hospitals can be divided into two broad approaches: a restrictive approach to antimicrobial use (primary prevention) and preventing transmission of *C. difficile* to patients (secondary prevention). Primary prevention involves hospitals having clear guidelines regarding antimicrobial use and restricting 'high-risk' antibiotics (for example clindamycin, fluoroquinolones and cephalosporins) as these have been implicated as major causative agents. Restricting exposure of patients to other known *C. difficile* risk factors is also important by reducing the duration of the antibiotic course, the number of antibiotics given and the length of stay in hospital where possible (Malkan and Scholand, 2012). Secondary prevention of *C. difficile* infection involves having clear guidelines regarding a combination of measures. These include prompt diagnosis by sending a stool sample to the laboratory for analysis,

isolation of infected patients, coupled with thorough handwashing using soap and water, use of gloves and aprons before coming into contact with an infected patient, use of separate equipment, safe segregation and disposal of waste, and a comprehensive programme of environmental cleaning using a 1:10 dilution of bleach (sodium hypochlorite) as a disinfectant (Sinh *et al.*, 2011).

Handwashing is a key strategy for prevention transmission (World Health Organization, 2009). There is evidence from a limited number of studies that airborne transmission of *C.difficile* spores may play an important role in the spread of the infection within the hospital environment. *Clostridium difficile* spores have been recovered from the air after flushing lidless toilets (Best *et al.*, 2012) and from the air in the ward environment (Roberts *et al.*, 2008). Roberts *et al.* (2006) reported an increased production of spores during bed making tasks and movement of curtains, and suggests that the use of negatively pressurised isolation rooms and improved ward ventilation systems may help to reduce the spread of *Clostridium difficile* infection.

In summary, patients seeking care to reduce their suffering from an existing condition do not expect to be harmed from an infection that is acquired from the hospital environment where their treatment and care is provided. *Clostridium difficile* is a challenging infection that has serious consequences. Efforts to prevent healthcare-associated infection are vital and protocols and guidelines have a key role to play. The next section discusses the strategies that are used to tackle

healthcare-associated infections world-wide and how protocols and guidelines fit into this strategy.

World Health Organization Global Challenge

As a result of growing awareness of healthcare-associated infection, the World Health Organization created the World Alliance for Patient Safety. Challenges are set biannually to focus commitment and action on patient safety issues globally. In October 2005, the first challenge was launched under the banner ‘Clean Care is Safer Care’ aimed at targeting the prevention of healthcare-associated infection. Member states were invited to make a formal statement pledging their engagement to reduce infection rates at country level, to use the strategies that the World Health Organization promotes, and to share results and lessons learned. More than three-quarters of the world population joined the challenge (Pittet *et al.*, 2008; Pittet and Donaldson, 2005). A key objective of ‘Clean Care is Safer Care’ is to improve hand hygiene in healthcare, as compliance rates worldwide remain low despite evidence that hands are the most common vehicle for transmission of infection (World Health Organization, 2009). Recommendations known as ‘Guidelines on Hand Hygiene in Health Care’ (World Health Organization, 2009) have been developed, representing the best evidence available on this topic. These guidelines recommend the use of alcohol-based hand rub for routine use with the hospital environment.

Although alcohol-based hand rubs are highly effective against non-spore forming organisms such as methicillin-resistant *staphylococcus aureus* (Oughton *et al.*, 2009), concerns have been raised about the lack of efficacy of hand rub against *Clostridium difficile* as these pathogens form spores and there is a concern that encouraging the use of alcohol-based hand rub may contribute to increased levels of *C.difficile* infection (Allegranzi and Pittet, 2009). Several studies have demonstrated a lack of association between use of alcohol-based hand rub and a rise in incidence of *C.difficile* infection (Boyce *et al.*, 2006; Knight *et al.*, 2010; Rupp *et al.*, 2008; Vernaz *et al.*, 2008).

To deal with alcohol-based hand rubs being ineffective against spores, the hand hygiene guidelines recommend washing hands with soap and water where hands are visibly soiled or ‘‘if exposure to potential spore-forming organisms is strongly suspected or proven, including outbreaks of *C.difficile* [infection]’’ (World Health Organization, 2009, p.152). The concept of ‘visibly dirty’ and the complex association between culture and health was identified by the World Health Organization (2009) as a research topic area that remains underexplored. There is a suggestion that religion may have an important role to play, for example, Muslims are required to maintain scrupulous personal hygiene as specified in the Qur’an (World Health Organization, 2009).

It is thought that the mechanical friction of rubbing the hands and rinsing them with water may help to remove spores from contaminated hands (Jabbar *et al.*,

2010; Oughton *et al.*, 2009). Jabbar *et al.* (2010) compared the use of three different alcohol-based hand rubs and chlorohexidine soap and water, with plain water rubbing alone (control) to remove spores transferred by physical contact. The authors confirm that handwashing with soap and water demonstrates efficacy that is superior to the use of alcohol-based hand rub in reducing *C.difficile* spore counts on hands. The authors also report that *C.difficile* spores were readily transferred by a handshake after using alcohol-based hand rub. Participants (n=10) cleansed their hands with nonmedicated soap. The palm of each participant's hand was inoculated with a 100 µL *C.difficile* spore suspension of 500,000 colony-forming units and hands were rubbed for 15 seconds and air-dried for 3 minutes. A post-inoculation stamp for culture was performed before hands were cleansed with 1 of 5 agents described above. Immediately after hand hygiene a post hand hygiene culture was performed to assess the log reduction in spore concentration. Chlorohexidine soap and water demonstrated significantly greater log reductions compared with all 3 alcohol-based hand rubs and the water control. The results from this study are consistent with a study by Oughton *et al.* (2009). The authors reported that washing with antimicrobial soap or plain soap demonstrated significantly greater reductions in spore concentration than did use of alcohol-based hand rub (Oughton *et al.*, 2009).

Considering the findings from Oughton *et al.* (2009) and Jabbar *et al.* (2010), the recommendations within the World Health Organisation (2009) guidelines that hands should be washed with soap and water with patients that are colonised or infected with *C.difficile* may seem reasonable, whilst using hand rub routinely for

all other situations. However, this assumes that we always know which patients, staff or visitors are likely to shed spores. It also assumes we know where the spores are. Two studies previously discussed (Sethi *et al.*, 2010; Walker *et al.*, 2012) provide evidence to suggest that shedding of spores can continue from 4 - 8 weeks after symptoms of diarrhoea have resolved. Spore forming organisms shed by infected patients and carriers are capable of existing on surfaces and equipment for months or years (Rigg *et al.*, 2007; Shannon-Lowe *et al.*, 2010; Vonberg *et al.*, 2008) and these can lay dormant, hidden within the ward environment.

The hands of the healthcare worker are therefore an important vector for transmission of *C.difficile* to patients (Gerding *et al.*, 2008) either via direct contact with the patient or indirectly by touching contaminated equipment or surfaces (Weber *et al.*, 2010). Recent studies have demonstrated the potential for *C.difficile* spores to be transferred via airborne transmission, which may contribute to widespread environmental contamination (Best *et al.*, 2010; 2012; Roberts *et al.*, 2008). All these factors make it difficult for healthcare staff to prevent and manage *C.difficile* infection. Although the World Health Organization is tackling healthcare infections globally, countries such as the UK have their own strategies for tackling infection.

The National Patient Safety Agency

Within the UK, the National Patient Safety Agency was established in 2001 as an arms length regulatory agency to the Department of Health. The Patient Safety Division plays a key role in coordinating and reducing the risks to patients receiving treatment and care in the NHS and provides tools and campaigns to improve infection control (Keady and Thacker, 2008). A Root Cause Analysis Tool (National Patient Safety Agency, 2006) collects and records patient safety incidents and these are reported to the agency through a national reporting system. The aim is to learn from incidents and initiate preventative measures (Keady and Thacker, 2008). The data collected provides a baseline so that future trends can be monitored, compared and national alerts and guidance issued where necessary.

Fear of blame is recognised as a major factor to reporting incidents (Vincent *et al.*, 1999; Waring, 2005) in addition to lack of feedback (Evans *et al.*, 2006) and perceived lack of value in the reporting system (Kingston *et al.*, 2004). Hutchinson *et al.* (2009) explored patterns of reporting in England using the National Reporting and Learning System and found that higher reporting rates were positively associated with a supportive safety culture, particularly in relation to encouragement to report, reporting being treated as confidential, individuals who make errors are not blamed or punished and individuals involved within a near miss, error or incident are treated fairly. Evans *et al.* (2006) found that incidents such as healthcare-associated infections were reported less often compared to incidents that were attributable to a single event, such as a fall or

medication error. Reasons given to explain this were that healthcare infections developed gradually and were not seen as attributable to a single event or were commonly regarded as complications of prolonged hospitalisation. Incident reporting systems, although an important part of the prevention and management of infection, are reactive systems, in that they deal with a problem once an incident, error or near miss has occurred.

The National Patient Safety Agency were also responsible for coordinating the 'cleanyourhands' campaign throughout England and Wales (National Patient Safety Agency, 2004) which focused on improving hand hygiene and maintaining awareness about the importance of hospital cleanliness (Duerden, 2007). Countries throughout Europe have undertaken a similar hand hygiene campaign (Magiorakos *et al.*, 2010). The main components of the intervention was the use of alcohol hand rub at the bedside, reminders to wash hands by use of posters, regular audit and feedback on compliance and use of a campaign inviting patients to ask healthcare workers to wash their hands (Pittet *et al.*, 2011). Engaging patients to become actively involved in their care is seen as an additional way of reducing error (Doherty and Stavropoulou, 2012; Longtin *et al.*, 2010) and forms a core part of the World Health Organization's work on Patients for Patient Safety (World Health Organization, 2006). Some authors perceive that expecting patients to take on a role in managing their own safety whilst being cared for in hospital is a step too far (Koutantji *et al.*, 2005) because it is shifting the responsibility of risk onto the patient and away from healthcare systems and hospital staff (Entwistle *et al.*, 2005). Instead of adding to safety measures, some

authors argue that it may result in staff being less guarded about risk (Lyons, 2007). In their systematic review of the literature, Doherty and Stavropoulou (2012) reported that the most important barriers to patients being involved with the safety of their own care included vulnerability from their illness, their role as a patient as a subordinate and the doctor 'knowing best,' cognitive factors such as being labelled difficult and organisational factors such as busy ward environment.

Stone *et al.* (2012) carried out a study to evaluate the impact of the 'cleanyourhands' campaign within the UK. They reported an increased procurement of alcohol hand rub and soap during the intervention period and that rates of MRSA bacteraemia and *C.difficile* infection rates fell. The authors acknowledge that the effects of the campaign may have been due to other factors, such as the introduction of the Health Act 2006 (which forms part of the legislative framework) and a programme of monitoring to ensure compliance with the regulations (Stone *et al.*, 2012), the latter forming part of a system to manage risk. The legislative framework within the UK and the importance of systems to manage risk, which policies, protocols and guidelines form a part, are discussed in the sections that follow.

Legislative Framework For The Prevention And Control Of Healthcare-Associated Infections

The overarching health and safety legislation within the UK is the Health and Safety at Work etc. Act (1974) which requires employers to control risks to employees and members of the public. Within healthcare, the main legislation covering the prevention and control of healthcare-associated infection is the Health and Social Care Act (2008).

In England, the Department of Health (2009b) issued a Code of Practice for the prevention and control of healthcare-associated infections, which sets out national standards in the form of guidelines on how the requirements of the Health and Social Care Act (2008) are to be met. The Health and Social Care Act (2008) supersedes the Health Act (2006) which for the first time required NHS hospitals to have systems in place to manage the risk from healthcare-associated infections. In particular, the Board of each Trust must agree how they aim to minimise the risks of infection, develop policies and protocols which specify measures to be implemented to prevent and control risks, appoint a Director of Infection Prevention and Control reporting to the Board, provide adequate allocation of resources to ensure the implementation of an infection control programme, assess the risks from infection, provide information, instruction, training and supervision to staff and ensure a programme is in place to ensure policies and practices are audited, implemented, reviewed and updated. The standards are broad and

therefore open to interpretation, yet compliance with them ensures that the requirements within the Act are being met (Department of Health, 2009b).

In Wales, the Welsh Assembly Government launched a set of national standards (now called Healthcare Standards) (Welsh Assembly Government, 2004) similar to those within England. NHS Trusts are expected to meet these standards and to complete an annual self-assessment audit to monitor their progress. Scotland introduced a Code of Practice for the management of healthcare-associated infections (Scottish Executive Health Department, 2004) and healthcare standards (NHS Quality Improvement Scotland, 2008) similar to England and Wales. Northern Ireland has a framework for infection control in the form of Controls Assurance Standards (Department of Health, Social Services and Public Safety, 2010).

Enforcement Of Regulations And Standards

The Health and Safety Executive has general responsibility for enforcing health and safety law. They do not deal with clinical matters, except where there are management failures or failures of systems of work (Health and Safety Executive, 2008). The Care Quality Commission is responsible for assessing and reporting on the performance of NHS Trusts in England and their compliance with the national standards (Department of Health, 2009b). In Wales, the Healthcare Inspectorate Wales monitors NHS Trusts to ensure compliance with the Healthcare Standards

(Healthcare Inspectorate Wales, 2007). The regulatory bodies have powers to take action against Trusts where standards are not met by use of improvement notices (Department of Health, 2009b). In Scotland, the Healthcare Environment Inspectorate monitors and inspects hospitals to ensure standards are met (Healthcare Improvement Scotland, 2011), whilst in Northern Ireland, the responsibility for this role falls to the Regulation and Quality Improvement Authority (Department of Health, Social Services and Public Safety, 2010).

The Importance Of Systems To Manage Risk

The Health and Safety Executive (HSE), who enforce the legal framework for health and safety within the UK, have for many years advocated the importance of implementing a system to manage health and safety risks arising from an organisation's activities (Health and Safety Executive, 1997). The key elements include a policy setting out objectives, arrangements for implementing the policy, the use of risk assessment to prioritise hazards and eliminate risks, procedures based on legislative requirements and best practice to guide behaviour, active and reactive measures to monitor the organisation's performance and feedback to ensure that identified gaps are corrected and the organisation learns lessons. The emphasis of this approach is similar to Deming's (2000) concept of Total Quality Management, International Standard Organisation (ISO) series for quality (ISO 19001, 2008) and environmental management (ISO 14001:2004) and the British Standard for occupational health and safety management (BS 18001, OHAS :2007). Each system focuses on systematic management and continual

improvement (Health and Safety Executive, 1997), based on the Plan-Do-Check-Act model (Labodova, 2004), which is considered essential for an organisation to learn from past experience (Health and Safety Executive, 1997).

Learning From Past Industrial Disasters

The introduction of policies, protocols and guidelines and safe systems of work, are of limited use if these are not implemented. Successful health and safety management is determined by how organisations 'live' their systems (Fleming and Lardner, 2002). Within industry, high profile disasters over the past two decades have heightened awareness of the complex nature of organisational accidents, often having multiple causes and involving many people at differing levels (Reason, 1997). Investigations into disasters such as Piper Alpha (fire and explosion on a North sea oil platform), Zeebrugge (car ferry capsized), Clapham Junction (rail crash), Chernobyl (explosion of a nuclear power reactor) and more recently BP's Texas City (explosion at an oil refinery) revealed that complex systems broke down disastrously, despite the adoption of technology and management safeguards, because people failed to do what they were supposed to do (Fleming and Lardner, 1999). Similarly, within the healthcare sector, complex failings at multiple levels have resulted in unnecessary suffering and deaths. Examples include outbreaks of *Clostridium difficile* infection at Stoke Mandeville Hospital and Maidstone and Tunbridge Wells NHS Trust (The Healthcare Commission, 2006).

Lessons Learned Within Healthcare

The Healthcare Commission (2006) published a report into two outbreaks of *Clostridium difficile* infection at Stoke Mandeville Hospital, Buckinghamshire Hospitals NHS Trust. The aim was to share lessons learned about best practice relating to the prevention and control of healthcare-associated infection at a local and national level. The report found that between 2003 and 2005, 334 patients were infected and 33 patients died. Serious errors were made by the hospital's management during the outbreaks and standards fell below the expected level. Practices identified as the root cause included a failure to isolate and restrict the movement of infected patients, lack of support by senior management to implement advice and a failure to learn from past mistakes. Factors contributing to the outbreak included the poor repair of the environment, lack of facilities including wash hand basins and isolation rooms, poor condition of the sluices, inadequate staff training on infection control, priority given to meeting targets over safety, and lack of staff resources resulting in failure to wash hands, wear aprons, gloves and cleaning of equipment and surfaces (Healthcare Commission, 2006).

A further outbreak of *Clostridium difficile* at Maidstone and Tunbridge Wells NHS Trust in 2007, where 50 patients died, highlighted deficiencies in the Trust's policies and guidelines for the management of *Clostridium difficile* infection. The trust had no effective system for surveillance for this organism and as a consequence failed to identify an outbreak in 2005 involving 150 patients. An

investigation found that infection control policies were out of date, roles and responsibilities were ill-defined, key infection control policies were missing and only 51% of staff had received updated training in infection control. Observations identified unacceptable levels of contamination, including washed bedpans that were still visibly contaminated. Interviews with staff, patients and their families revealed that nurses failed to undertake hand hygiene, empty and clean commodes, clean mattresses and equipment properly and wear aprons and gloves (Healthcare Commission, 2007). The errors and inefficiencies during these outbreaks were not the result of solitary actions of individuals, rather these arose *“from conflicting, incomplete or suboptimal systems to which the individuals were a part”* (Carayon *et al.*, 2006, p.50).

Waterson (2009) used Rasmussen's (1997) risk management framework to examine the causes of the outbreak at Maidstone and Tunbridge Wells. The contributory factors of the outbreak were mapped onto the framework and relationships between different system levels (for example, hospital management and clinical management) as well as the system as a whole were explored in addition to possible causal linkages. Waterson (2009) suggests that the question remains as to why senior managers ignored or failed to realise the seriousness of the outbreaks and their consequences. He identifies that many of the managers interviewed in the investigation by the Healthcare Commission said they were aware of how serious the situation had become but had become powerless to do anything about it. Waterson (2009) suggests that managers over time began to accept and take for granted the infection risk and identifies a similarity with what

Vaughan (1996) termed ‘normalisation of deviance.’ Weick and Sutcliffe (2003) analysed data from the Bristol Infirmary Report (Department of Health, 2001a) and concluded that hospital staff became locked into patterns of behaviour which Waterson (2009) associates with ‘cultures of entrapment’ that can over time lead to adverse events. Toft and Mascie-Taylor (2005) suggest that individuals can fail to challenge or question the consequences of what they are doing in their work and termed this ‘involuntary automaticity’ which in turn limits organisational learning (Waterson, 2009). Organisation learning is discussed in a later section (See p.68).

Amplification Of Risk Following Adverse Events

Major adverse events, such as the industrial incidents and outbreaks of infection previously described, often become amplified by the media making headline news (Crawford *et al.*, 2008). This can lead to increased perception of risk, with people viewing healthcare infection and hospitals as more dangerous (Gould *et al.*, 2009; Hawkins *et al.*, 2007). Attention becomes diverted towards a particular risk problem and away from the commoner (Kasperson *et al.*, 1988) “mundane” adverse events, such as incidents of healthcare-associated infection, which still have big implications for the individuals involved, yet as they usually affect one person at a time are less visible (Kohn *et al.*, 2000). An adverse event can be defined as “*an unintended injury or complication resulting in prolonged hospital stay, disability at the time of discharge or death and caused by healthcare management rather than by the patient’s underlying disease process*” (deVries *et*

al. 2008, p.216). Such events can represent system failure, including failure to implement protocols and guidelines (Kohn *et al.*, 2000). Dealing with these depends on two main types of approach.

The Person Approach Versus The Systems Approach

A common strategy for dealing with accidents and adverse events is to eliminate the immediate cause of harm or loss and blame the individual responsible. This approach, known as a 'person approach' (de Vries *et al.*, 2008), fails to examine the underlying cause and contributory factors leading to the event. Lessons learned within industry and the healthcare sector has demonstrated that disastrous events are influenced by a range of personal, social and organisational factors (Amalberti *et al.*, 2006; Cullen, 1990). This has led to a shift in thinking about how accidents and adverse events should be managed.

The Department of Health acknowledges in policy documents (Department of Health, 2000a) that to understand and manage safety in healthcare, rather than utilising a 'person approach' which has been the dominant tradition in medicine (Reason, 2000), a 'systems approach' is essential (Parker and Lawton, 2003). This approach assumes that mistakes will occur, yet instead of focusing attention on the individual, the aim is to manage risk by targeting the individual, the task, the team, the work environment, the tools, technologies and the organisation as a whole (Carayon *et al.*, 2006; Reason, 1997; Vincent *et al.*, 1998). The 'systems

approach' focuses attention on the underlying conditions within which individuals work and aims to build defences into the system providing a safety net to prevent errors from occurring or lessening the effects of any adverse outcome (Reason, 2000).

Leape (1994) has argued that more attention must be paid to psychological and human factors in the nature, mechanisms and causes of medical error, especially as propensity to make mistakes is strongly affected by the context. Critical analyses of incidences of medical error illustrate the complexity of the chain of events that may lead to an adverse outcome. The root cause may be due to several intertwined factors, such as poor communication, lack of supervision, excessive workload and training deficiencies (Vincent *et al.*, 1998). Work by Reason (2000) into accident causation is useful in understanding how accidents and adverse events occur.

The 'Swiss Cheese' Model Of Accident Causation

Reason's (1997, 2000) analogy of accident causation proposes the image of 'Swiss cheese'. He argues that in complex systems, to prevent human loss, hazards are prevented by a series of defences, represented as slices of cheese. These defences include (but are not limited to) an understanding and awareness of hazards, and use of administrative controls such as protocols and guidelines. Layers of protection are stacked one behind the other, with each layer a precaution

in case of failure of the one in front (Reason, 1997). Reason (2000) argues that each defence has unintended weaknesses and he likens these to the holes in 'Swiss cheese'. He suggests that the holes are of varying size and position and open and close at random, and these correspond to the 'active failures' of individuals on the front-line. 'Active failures' represent the unsafe acts, errors and omissions of a nurse or doctor's behaviour which have unintended consequences. Examples include selecting the wrong equipment for the task, cognitive failures, such as memory lapses, mistakes through ignorance or misreading a situation, misinterpretation of a rule and 'violations' or deviations from safe operating procedure (Hoffmann and Rowe, 2010).

When by chance all holes become aligned, the hazard causes harm and an adverse event occurs (Reason, 2000). Whilst the 'active failures' may have directly caused the adverse event, it is the 'latent conditions' such as inadequate knowledge due to lack of training or poor supervision that can be regarded as a contributory or latent causal factor which influenced the individual's behaviour. Latent factors include organisational influences (for example, management decisions, unworkable processes, unworkable protocols or guidelines, time pressures, heavy workloads) and cultural influences such as leadership, role models, communication and competing targets over safety. The 'latent conditions' can lie dormant until they interact with local circumstances to defeat the system's defences (Reason, 1997).

Strengths And Weaknesses Of Accident Models

Reason's (1990, 1995, 1997 and 2000) model is useful in that it attempts to show the causal chain that can lead to patient harm, by focusing attention on the systemic causes as opposed to the individual's failure (Perneger, 2005). The model is similar to Haddon's matrix (Haddon, 1972) which is an epidemiological model used with injury prevention (Brasel *et al.*, 2000; Lett *et al.*, 2002). Vincent *et al.* (1998) expanded on Reason's (1997) model and incorporated a framework for medicine including extra features such as patient characteristics (how ill the patient is, the patient's language and personality which may influence communication with staff), team working and the unique regulatory and economic context common within the healthcare setting. Carayon *et al.* (2006) expanded on Reason's (1995, 1997 and 2000) model by allowing understanding of how the design of the work system can impact not only the outcome of patient safety but also employee outcomes (safety, health, morale, stress) and organisational outcomes (staff turnover, injuries, illnesses, and organisational health, for example, profitability).

The strength of these models lies in their focus on the aetiology of accidents and adverse events (Carayon *et al.*, 2006). They are valuable because they make clear that accidents have complex causes, which include the organisation, the work environment, the task and the individual. They also bring to the surface latent conditions that may be hidden from view (Reason *et al.*, 2006). They are useful to classify factors contributing to injury, to identify a range of influences that may

cause harm so that steps can be taken to prevent a recurrence (Carayon *et al.*, 2006) and are useful as a framework for accident investigation.

One criticism of Reason's (1997, 2000) 'Swiss cheese' model is that the nature of the holes in the cheese, their inter-relationship with the other holes and how the holes line up are not defined (Dekker, 2002). Secondly, Carayon *et al.* (2006) point out that Reason's model is limited because there is no consideration of the processes that are involved. For example, with the prevention of *C.difficile* infection this includes isolation of the patient, barrier nursing, decontamination of equipment and ward cleaning. A third criticism is that these accident models may have over emphasised the importance of latent conditions whilst placing less importance on the contribution of the individual (Reason *et al.*, 2006). Shorrock *et al.* (2005) identified that highlighting management problems, although important, may hide very real human factor issues, like the impact of emotion on performance. Fourthly, as these models are often used with accident investigation, they rely on good quality incidence or injury data. Incident forms may be incomplete due to problems with recall and there may be a lack of standardisation when completing forms (Hoffmann and Rowe, 2010), and people may chose not to report something for fear or discovery, blame or medical malpractice litigation (Brasel *et al.*, 2000). Failure to completely capture all contributory factors may result in failure to improve and learn from past experience. A fifth criticism is that there is an abundance of retrospective studies using these models with accident investigation. A proactive method would be to use a bottom-up approach to investigate the contextual factors (Dekker, 2002)

before an accident occurs. Lastly, these models do not provide any guidance as to which elements of the system are critical to enable a positive outcome.

Hazard Analysis Critical Control Point

One model that does provide understanding of elements that are critical to ensure a safe outcome is Hazard Analysis Critical Control Point (HACCP), which is a quality assurance system widely used in the food industry as part of regulatory compliance (Griffiths, 2006). HACCP is similar to the models previously described in that it shares the same end goal, which is to identify and analyse hazards and potential risks in a product, process or service to prevent harm. It differs in that it is a prospective approach to risk management. Rather than waiting for something to go wrong, and then investigating what went wrong and why, it actively seeks out potential problems before harm occurs. During the process, points or steps which are critical to a process (critical control points or CCP's) are identified so that controls can be applied and monitored to prevent harm. Two studies were identified using HACCP in healthcare, one relating to the management of medical waste (Kojima *et al.*, 2008) and the other to prevent eye surgery infection (Baird *et al.*, 2001). The benefit of using HACCP has been recognised within the United States and consideration has been given to using it within healthcare policy (McDonough, 2002). The model requires a high degree of resources, use of a multi-disciplinary team and a high degree of monitoring and audit (Griffiths, 2006), which may explain why few studies were identified applying it within the hospital environment.

Defeating The Defences

Administrative controls such as protocols and guidelines have been identified as the weakest form of control (Card, 2012) in relation to the hierarchy of risk controls (National Institute for Occupational Safety and Health, 2011) because it relies on individuals taking the correct action. Understanding the reasons why employee behaviour may not be aligned with organisational policies, protocols and guidelines is crucial to designing ways to improve. A mis-match between what the organisation wants to achieve and what actually happens in practice can result in failure of the systems defences, which may lead to an adverse outcome.

Deviations from rules and standards are often tolerated or even encouraged as work pressure gains the upper hand, especially during lengthy periods without any adverse events occurring (Tucker and Edmondson, 2003). Over time this can result in a progressive drift in practice resulting in a steady erosion of system defences as these are 'worked around' (Amalberti *et al.*, 2006). Once an adverse event occurs, the organisation focuses on preventing a reoccurrence (Amalberti *et al.*, 2006), yet as time passes, safety once again becomes traded off in favour of an advantage, such as increased performance. This may lead to a more serious adverse event, and the level of protection is increased again. Eventually a catastrophe may occur (Reason, 1997).

Deviations from best practice occur frequently in all industries, even safety critical ones with good safety records such as aviation (Amalberti *et al.*, 2006). Identifying where, when and why defences, such as protocols and guidelines, are not being implemented, and what happens if difficulties occur, is the first step to diagnosing what strategies are required to prevent a recurrence (Hakkennes and Dodd, 2008). Much of the work to date within healthcare has used a retrospective approach to understanding how patient harm may result from healthcare-associated infection. Understanding the difficulties with putting protocols and guidelines into practice to prevent healthcare-associated infection may assist with reducing harm to patients.

Conclusion

Healthcare-associated infections cause unnecessary deaths and suffering and waste valuable NHS resources. *Clostridium difficile* infections at Stoke Mandeville and Maidstone and Tunbridge Wells NHS Trust hospitals illustrate that the failure of staff, including senior management, to implement organisational protocols and guidelines relating to infection control was a root cause of the outbreaks. The nature of organisational accidents and adverse events is complex involving many factors. Official statistics of the more commonplace ‘adverse events’ indicate that healthcare-associated infection is a worldwide concern, and highlights the importance of this topic area.

The accident models and frameworks described in this chapter are useful when considering the many factors within a 'system' that may affect clinical practice and subsequently have an adverse effect on outcomes and patient care. The approaches used within healthcare to manage risk have tended to be retrospective, learning from experience after an incident has occurred, possibly because this has been emphasised as a key approach by the Government.

Administrative controls such as protocols and guidelines have an important part to play in an organisation's system to manage risk, yet these have been identified as a weak form of control (Card, 2012; National Institute for Occupational Safety and Health, 2011), because they rely on individuals implementing the recommended best practice. Understanding how protocols and guidelines are being used, the difficulties experienced with this process, and gaining insight into what happens to resolve difficulties may assist with improving patient care.

The next chapter will identify the literature surrounding the use of infection control protocols and guidelines in the context of the hospital environment to prevent healthcare-associated infection. Gaps in practice that have been identified from the literature will be discussed along with the factors that influence protocol and guideline use. The chapter will end by identifying the research questions that will address these gaps.

Chapter Two

Literature Review

Chapter Two: Literature Review

Introduction

This chapter is a critical review of the literature relating to infection control protocols and guidelines within healthcare and there is a critical discussion of what is known about how protocols and guidelines are used in practice and the factors influencing their use. The chapter moves on to explore the psychology literature. Theories, models and a behavioural change framework are critically reviewed to aid understanding of the factors that may influence the use of protocols and guidelines in practice, and explanation given as to why gaps between ideal standards and actual practice can arise on the hospital ward. The chapter ends by setting out the research questions of this research study that address gaps in the literature.

Guidelines For The Prevention And Control Of Healthcare-Associated Infection

There is an increasing drive within the developed and increasingly within the developing world to base healthcare on evidence, known as evidence based medicine or evidence based healthcare. Evidence based medicine has been defined by Sackett *et al.* (1996, p.71) as “*the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients.*” One way of incorporating evidence into decision making is

by using evidence-based clinical protocols and guidelines (Grimshaw *et al.*, 2004b).

The Cochrane and Campbell Collaborations produce systematic reviews of research evidence to assist decision making. The former reviews evidence of healthcare interventions from clinical trials and other studies, whilst the latter reviews evidence from social, behavioural and educational fields (Flemming, 2007). Systematic reviews aim to identify, evaluate and summarise the findings from a large body of relevant studies, making the evidence more accessible and usable. Explicit methods are used to search for and critically appraise evidence (NHS Centre for Reviews and Dissemination, 2009). These reviews are regarded as the highest level of medical evidence in the medical profession (Flemming, 2007).

Clinical guidelines are usually underpinned by evidence from systematic reviews of the literature (Livesey and Noon, 2007). Within the UK, several sets of evidence based guidelines have been developed, including national guidelines for preventing healthcare-associated infections in NHS Hospitals in England (Pratt *et al.*, 2007), guidelines for the control and prevention of methicillin-resistant *Staphylococcus aureus* in healthcare facilities (Coia *et al.*, 2006) and recommendations for the prevention and management of *Clostridium difficile* infection (Department of Health, 2009a). These guidelines rely on a combination of measures to prevent the spread of infection, including the detection of infected

or colonised patients, isolation or cohort nursing of infected patients, good hand hygiene, cleaning and decontamination of the environment and equipment, a restrictive approach to broad-spectrum antibiotic prescribing and the implementation of a surveillance system whereby local infection rates are measured over time to identify trends.

The National Institute for Clinical Excellence (NICE) is the independent organisation responsible for setting clinical guidelines in NHS hospitals, where there are areas of uncertainty (NICE, 2008). They have recently developed guidance on the prevention and control of healthcare-associated infections in hospitals (NICE, 2011) in the form of quality improvement statements, which are intended for the board of the Trust rather than the individual. Under clinical governance arrangements, NHS organisations should take account of NICE guidance when they develop policies on infection control. There is some overlap between these statements and the national standards laid down by the Health and Social Care Act (2008) code of practice (Department of Health, 2009b). The usefulness of the quality statements is that they are supported by examples of evidence. These examples may be used to indicate that compliance with the national standards laid down by Health and Social Care Act (2008) are being met (NICE, 2011).

The Purpose Of Protocols And Guidelines

The terms ‘protocols’ and ‘guidelines’ have been used interchangeably in the literature (Walkling-Lea, 2004). These terms lie under an umbrella term known as protocol-based care, which includes algorithms, care pathways, care bundles, procedures and policies (Ilott *et al.*, 2006, 2010; Rycroft-Malone *et al.* 2009). Ilott *et al.* (2010) suggests that protocol-based care encompasses documents that formalise working practices by making explicit ‘who should do what, where, when, why and how.’

Clinical practice guidelines have been defined as “*systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances*” (Lohr and Field, 1992, p.346). The Department of Health (2001b, p.13) provide a broader definition by proposing that National guidelines are:

“driven by practice need, based on evidence and subject to multi-professional debate, timely and frequent review, and modification. National guidelines are intended to inform the development of detailed operational protocols at local level....”

Protocols are guideline-like documents, yet these are developed by organisations and informed by policies and guidelines (Squires *et al.*, 2007). Protocols should be systematically developed, based on an evaluation of the current best evidence (Hewitt-Taylor, 2004), however may be based on consensus and occasionally on

clinical judgement (Flynn and Sinclair, 2005). They should also reflect legislative requirements. Protocols have been described by Long (1994, p.4) to represent:

‘Modification of a national guideline for local application, giving operational detail...and leading eventually to a more detailed clinical care plan.’

Protocols and guidelines are viewed as a mechanism to standardise patient care by assisting with effective decision making (Rycroft-Malone *et al.*, 2008, 2009), reducing inappropriate variation in behaviour (Ilott *et al.* 2010; Thomas *et al.*, 1999) and contributing to evidence-based health care (Hewitt-Taylor, 2004). Guidelines provide advice rather than instructions and are aids to and not substitutes for clinical judgement. In deciding whether a guideline should be applied, clinical expertise needs to be used to consider how it compares with the condition of the individual and the situation. Therefore preferences of the patient and the practitioner will be taken into account (Sackett *et al.*, 1996). Guidelines can be used to assist practitioners in keeping abreast of medical advances (Sackett *et al.*, 1996), as long as they are kept up to date and practitioners are aware of them. In comparison, protocols have the potential to be less flexible to individual need and give less scope for professionals to use their professional judgement (Hewitt-Taylor, 2004).

Terms Used In Relation To Protocol And Guideline Use

Within the literature, there is an abundance of terms used to express the use of protocols and guidelines. These include *adherence* (Leape *et al.*, 2003), *compliance* (Afif *et al.*, 2002; Berhe *et al.*, 2005; Cabana *et al.*, 1999; Haas and Larson, 2007; Hansen *et al.*, 2007; McCahill *et al.*, 2007), *implementation* (Hakkennes and Dodd, 2008), *uptake* (Sinuff *et al.*, 2007) and *use* (Squires *et al.*, 2007). Godin *et al.* (2008) suggest avoiding the word *compliance* as this implies that healthcare professionals are passively obeying ‘rules’, which may reduce internal motivation and ownership of a behaviour. Collins English Dictionary and Thesaurus (2000) defines *adherence* as ‘to follow exactly’; *implementation* as ‘to carry out; put into action’ and *use* as ‘to put into service or action; employ for a given purpose.

The process of translating evidence into practice is often termed *knowledge translation* (Tetroe *et al.*, 2008). Other terms used include *knowledge transfer*, *dissemination*, *research use*, *implementation research* (Graham *et al.*, 2006), *knowledge exchange*, *knowledge creation*, or *knowledge sharing* (Oborn *et al.*, 2010), *diffusion of innovation* (Greenhalgh *et al.*, 2004; Rogers, 2003), *knowledge utilisation*, *evidence-based decision making* and *research uptake* (Estabrooks *et al.*, 2006), *evidence-based* or *evidence-informed decision making* and *mobilisation* (Armstrong *et al.*, 2011). The process is recognised as being unpredictable, slow and haphazard (Agency for Health Research and Quality, 2001).

How Are Protocols And Guidelines Being Used?

Ilott *et al.* (2010) carried out a systematic review of papers between 1991 – 2006, to explore how nurses, midwives and health visitors developed, implemented and audited protocol-based care. The authors found their review challenging due to the inter-changeable terms used in the literature relating to protocol-based care and the limited number of studies covering this topic. One observation they made was that the studies presented a positive outlook on their experience of protocol-based care rather than a critical or reflective perspective, possibly because the authors were looking at the issue from a practitioner perspective rather than from a research perspective. Less than a third (10/33) of the papers reviewed had documented a recognised research method and many studies did not refer to a theoretical model or framework. Of the 33 papers reviewed, 22 of them were focused on how protocols were developed. Much less attention was given to how protocols were being used and put into practice (Ilott *et al.*, 2010).

Of the 33 papers reviewed, Ilott *et al.* (2010) reported that there was almost unanimous assumption that use of protocol-based care as a means of standardised practice was a ‘good thing’ with little consideration of the implications on patient outcome. Graham *et al.* (2003) reported that only 5% of guidelines had been evaluated to determine the effectiveness of their outcome on health. A systematic review carried out by Aboelela *et al.* (2007) identified four out of thirty-three studies that reported reductions in the level of healthcare-associated infection (Brown *et al.*, 2003; Coopersmith *et al.*, 2002, 2004; Higuera *et al.*, 2005) as a

result of increasing compliance with infection control protocols and guidelines. These studies used bundled interventions known as ‘care bundles’, which have been defined as “*the bundling together of several scientifically grounded elements essential to improving clinical outcome*” (Aboelela *et al.*, 2007, p.105). This approach is a new way of formalising care and a method being promoted by the Department of Health (2007a) as part of a high impact intervention. According to Grimshaw *et al.* (2004b) protocols and guidelines relating to infection control can contribute to improved care by preventing or controlling healthcare-associated infection, but only if they succeed in moving actual practice closer to the behaviours specified. For this to happen, the recommendations need to be put into practice (Davis and Taylor-Vaisey, 1997).

Of the 33 studies reviewed by Ilott *et al.* (2010), the authors reported that inadequate consideration had been given to experience, roles, dynamics between professionals, hierarchy or the effect of using protocols and guidelines on staff outcomes, rather the latter were noted in passing. For example, Kinley and Brennan (2004) suggested that nurses had been empowered by sharing best practice but they did not give any consideration to the potential of the use of protocols to challenge decision making between nurses and doctors. Wood (2002) reported how nurses became more confident as a result of using protocols, and thereby insisted that doctors abide by their use. A limitation of this systematic review is that only studies from the UK were included, and the included studies focused on nurses, midwives and healthcare visitors, whilst studies from doctors were excluded. The findings from this study confirmed findings of recently

published studies about protocol and guideline use in NHS settings (Rycroft-Malone *et al.*, 2008). Bick and Rycroft-Malone (2010) reviewed the work of Ilott *et al.* (2010) and confirm that little attention has been paid to the use of protocols and guidelines and that future research needs to address this gap.

The Importance of Context

Using codified knowledge laid down in protocols relies on the individual making sense of the information in the context in which it is applied (Li *et al.*, 2009). Kitson *et al.* (1998) defined context as the environment or setting in which people receive healthcare services. The importance of context has been recognised as an important factor that needs to be considered when putting evidence-based protocols and guidelines into practice (Greenhalgh *et al.*, 2004; Grol and Grimshaw, 2003).

Context takes into account organisational culture, which is defined simply as “*the way things are done around here*” (Drennan, 1992). Organisational culture can affect efforts to implement change (Ferlie and Shortell, 2001) and implementation strategies that work in one context may not work in a different setting with a different context (Schultz and Kitson, 2010). Several tools have been developed to measure the safety culture within an organisation through workforce perceptions.

Colla *et al.* (2005) carried out a systematic review of the quantitative tools available to measure an organisation's safety culture in healthcare. The authors identified five domains (safety dimensions) common to each tool. This included leadership, policies and procedures, staffing, communication and reporting. Management was missing as a domain, yet this has been identified as a vital element of a positive health and safety culture within the organisational management literature (Guldenmund, 2000). A later systematic review of healthcare studies by Flin *et al.* (2006) identified important domains as management/supervisors, safety systems, risk perception, job demands, reporting/speaking up, safety attitudes/behaviours, communication and feedback, teamwork, personal resources and organisational factors. Their review identified a much broader number of dimensions than the review by Colla *et al.* (2005). It is unclear whether the domain of management/supervisors covers aspects such as commitment and leadership.

Some of the domains identified from the organisational literature as being important determinants of a positive safety culture were missing from the systematic reviews discussed above. Competence was not identified as a domain, yet this was identified as an important influence in a review by Flin *et al.* (2000) and relates to knowledge, skills and training. Priority of safety was not identified as a domain in the healthcare reviews by Colla *et al.* (2005) or Flin *et al.* (2006). Within the organisational literature, pressure to achieve a high work load has been implicated in accident causation and dangerous practices may be encouraged by management even though they contradict formal safety policies (Flin *et al.*, 2000).

In a climate of cost reduction and organisational restructuring, work pressure is likely to impact on the safety culture as time and resources become stretched. Employees may then take short-cuts due to time pressure (Flin *et al.*, 2000). Neither of the two reviews within the healthcare literature (Colla *et al.*, 2005; Flin *et al.*, 2006) identified roles and responsibilities, yet uncertainties in roles and responsibilities can lead to accidents and accountability is considered important (Gadd and Collins, 2002). Risk perception was not mentioned by Colla *et al.* (2005), whilst Flin *et al.* (2006) acknowledge that their review did not include attitudes to risk. Risk perception has been identified as an important factor in decision making (Guldenmund, 2000). Compliance with procedures/rules did not emerge as a domain in either review, although Flin *et al.* (2006) identified two studies which measured whether unsafe practices were corrected by supervisors and/or workmates. Lack of compliance with procedures can give insight to the lack of management commitment given to safety (Flin *et al.*, 2000). Lastly, workforce participation or involvement in safety was not identified in either review. This is the process whereby employees are involved in decision making, such as the development of protocols or monitoring compliance with them. Participation or involvement allows workers to take ownership and responsibility for safety and is a key motivational tool used in organisational studies (Shearn, 2004).

Verhoeven *et al.* (2010) reported their findings from a multi-phase study which used healthcare professionals to adapt expert-driven paper based MRSA guidelines in the design of a website for the communication of the existing

guidelines. The study was part of a wider Dutch-German study for the prevention and control of methicillin-resistant *Staphylococcus aureus* (Friedrich *et al.*, 2008). In the development phase of the study, 28 healthcare workers (doctors, nurses and nursing assistants) were asked to 'think aloud' about MRSA tasks, before and after the development of the web-based guidelines. The tacit assumptions of healthcare professionals were taken into account during the design of the web-based MRSA guidelines (See p.71 for explanation of tacit knowledge). The authors reported that the findings not only provided improved means of communicating the guidelines, but also developed a sense of ownership of the guidelines and a willingness to integrate the guidelines into routine infection control practice (Verhoeven *et al.*, 2009, 2010).

The Department of Health (2008a) recognise the importance of organisational culture in their document *Board to Ward: how to embed a culture of HCAI prevention in acute trusts*. They suggest six key areas which Trusts should focus on to embed a culture of safety. This includes establishing a clear vision, providing leadership, ensuring staff competence and measuring compliance, communicating accountability and escalation of policies, putting in place an assurance framework, and learning from others. The next section discusses organisation learning and how this can influence the use of infection control protocols and guidelines in practice.

Organisational Learning

The Department of Health stress that repeated instances of failure in healthcare could be avoided if the lessons of experience were properly learned (Department of Health, 2000b). Nutley and Davies (2001) define organisational learning as *“the way organisations build and organise knowledge and routines and use the broad skills of their workforce to improve organisational performance”*.

Nicolini and Meznar (1995) argue that such definitions limit our understanding of organisational learning. They propose a wider framework built upon the work of other authors, which takes into account continuous cognitive change within an organisation. They recognise that the social construction of knowledge is deemed to be an important part of the learning process, and that there should be reflection on knowledge. They also suggest that new knowledge is created, it becomes normalised, and action is taken to put this new knowledge into practice. Fiol and Lyle (1985) conceptualised organisational learning as a two-staged cognitive process involving low-level (single-loop learning) and high-level (double-loop learning), based on the work of Argyris and Schon (1978) and Bateson (1972). Argyris and Schons' (1978) conceptualisation of organisational learning involves single-loop learning, a process whereby workers detect and correct discrepancies within a system. It also involves double-loop learning which suggests that self-reflection must take place in association with error identification/correction. Bateson (1972) described organisational learning as a two-staged process,

learning skills within a context and learning how to learn (how to change the context).

Education is commonly used by organisations as a form of learning. Ward (2011) carried out a literature review to identify the role of education in the prevention and control of infection. The review focussed on the implementation of precautions laid down in infection control protocols and guidelines and the influence this had on infection rates. The author reported that education may increase knowledge, yet there was no rigorous, convincing evidence that education improved compliance with infection control precautions. The author acknowledged that the review was limited because only three databases were searched, therefore important studies may have been missed and only nursing students and midwives were included.

The use of 'Communities of Practice' described by Lave and Wenger (1991) as a form of organisational learning is something that has recently started to achieve increasing attention in the healthcare literature as a means of generating and sharing knowledge (Li *et al.*, 2009; Ranmuthugala *et al.*, 2011). Lave and Wenger (1991) proposed that most learning takes place within the workplace rather than in a classroom environment, and this is a central element of their theory of 'situated learning'.

According to Li *et al.* (2009) labelling a group of people a learning community does not guarantee it will function as one. Tight bonds between members can become exclusive and present a barrier to newcomers, negatively influencing working relationships and the flow of information (Li, *et al.*, 2009). A strong learning community based on trust and mutual respect creates a social structure for individuals to share conversations, stories, insights, improvisational skills and shared meaning that help people make sense of new knowledge (Lave and Wenger, 1991). Social and cultural influences within the environment in which communities operate are likely to influence the effectiveness of the group (Ranmuthugala *et al.*, 2011).

Gabbay and le May (2004, 2011) carried out an ethnographic study over two years to explore how primary care clinicians (general practitioners and practice nurses) used evidence in their day to day decision making at the individual and collective level. They reported that during their observations not once did they see participants read the many clinical guidelines available to them. Rather knowledge was used and implemented from 'mindlines' which the authors defined as:

“collectively reinforced, internalised tacit guidelines. These were informed by brief reading, but mainly by their own and their colleagues’ experience, their interactions with each other and with opinion leaders, patients...and other sources of largely tacit knowledge” (Gabbay and le May, 2004, p.1).

Tacit knowledge ('knowing how knowledge') has been described as an innate, unconscious practical wisdom, acquired through personal experience, shared across communities, dependent on the context and not readily accessed (Greenhalgh and Wieringa, 2011). This differs from the explicit knowledge, derived from written packaged information, such as protocols and guidelines that can be readily accessed and shared (Greenhalgh *et al.*, 2008). Healthcare professionals may not be able to fully describe what they know, because this may relate to taken-for-granted assumptions about their work. The knowledge may only be revealed through the action itself (Greenhalgh *et al.*, 2008).

Greenhalgh and Wieringa (2011) have recently argued that the key to understanding how evidenced-based knowledge is taken and put into practice is by taking into account what Kemmis and Smith (2010) calls 'personal praxis,' that is, learning through experience, by reflecting on practice within a social group. Difficulties with the implementation of protocols and guidelines may be facilitated by discussions with colleagues or mentors or by observing others in practice and then trying out the knowledge for themselves (Li *et al.*, 2009).

Prieto and Macleod Clark (2005) carried out a single case study to explore the perspectives of 19 nurses and healthcare assistants and the difficulties with implementing infection control practice. A secondary aim was to design an intervention to improve practice using facilitation and to determine the self-reported changes of participants in relation to their own practice. This was an

uncontrolled before and after study with no theoretical framework specified. The authors reported that nurses had uncertainty about the rationale for infection control practice and concerns about the risk to their own health from exposure to infection influenced their behaviour. These findings led to the development of new guidelines and supervision of practice so that questions could be answered as concerns arose. One of the limitations of this study is that observations were only made in relation to isolation practices. Although difficulties with hand hygiene were included in the study, environmental hygiene, including cleaning of equipment was not explored. One recommendation highlighted from the study was for further research to understand healthcare workers' perspective of the problems associated with implementing infection control practice. Considering this finding, and that previous systematic reviews have identified that future research needs to consider how protocols and guidelines are used (Bick and Rycroft-Malone, 2010; Ilott *et al.*, 2010) (See p.64), the following research question was devised to fill the gap:

How are protocols and guidelines being used on the hospital ward to manage the risk from Clostridium difficile infection?

Context has been identified as a factor that can influence organisational learning. Haddock reported being short staffed as a barrier to nurses reflecting and questioning their work routines (Haddock, 1997). A systematic review of the literature by Rashman *et al.* (2008) relating to organisational learning identified

that further research is needed to examine the learning processes within healthcare and how the context influences learning. This presents another gap in the literature which the current study aims to fill by asking the question:

What happens if difficulties are experienced when protocols and guidelines are put into practice?

In summary, protocols and guidelines have an important role to play in reducing healthcare-associated infection and standardising the care given by healthcare providers. The importance of the topic area of this study has been identified as a global concern. The literature review has identified that little is known about how robust knowledge contained within protocols and guidelines is used and put into practice to prevent and manage healthcare-associated infection. Context was identified as being important when considering how people make sense of explicit knowledge, and tacit knowledge was identified as a 'way of knowing' yet this type of knowledge may be difficult to access. The literature review has also identified that little is known about how learning is taking place within healthcare and how contextual factors may influence this process.

This thesis will therefore make an important contribution to the literature by using research questions to address gaps in the literature review through a case study of protocols and guidelines. This study aims to contribute to the literature by

exploring the use of infection control protocols and guidelines in practice from the perspective of nurses and doctors that are implementing them, exploring any difficulties they experience and examining what happens if difficulties occur.

The sections that follow discuss the factors that may influence the use of protocols and guidelines into practice.

Factors Influencing The Use Of Protocols And Guidelines

Effective implementation of evidence based protocols and guidelines into practice is a complex process, which is influenced by a wide range of factors, however our understanding of these factors remains poorly understood (Godin *et al.*, 2008; Grimshaw *et al.*, 2004a, 2004b). Factors at both an individual level (care giver and patient) and contextual factors (social, organisational, environmental, economic and political) need to be taken into consideration (Grol and Grimshaw, 2003; Lizarondo *et al.*, 2011; Ploeg *et al.*, 2007).

Ploeg *et al.* (2007) carried out a study to describe and compare the perceptions and experiences of administrators, nurses and project leaders about factors influencing the implementation of nursing best practice guidelines. The authors reported several factors as being important in this process, including how individuals learned about the guideline, positive attitudes and beliefs from other

staff, leadership support and champions, integration of the guidelines into processes, time and resource constraints, team work and collaboration. Lizarondo *et al.* (2011) carried out a systematic review of individual determinants influencing allied health professionals and their uptake of evidence into practice. They identified the level of education of the individual, being involved in research and having positive perceptions, attitudes and beliefs about evidence based practice. Grol and Grimshaw (2003) suggest that guideline use is influenced by whether these are evidence based, reflect current standards, reduce the complexity in decision making and whether new skills or changes are required to follow the recommendations. Gurses *et al.* (2008) identified systems ambiguity to characterise barriers to guideline use aimed at reducing healthcare-associated infections. Ambiguities related to tasks, responsibilities, methods, expectations and exceptions. An analysis of 12 systematic reviews by Francke *et al.* (2008) relating to factors that may influence guideline implementation for healthcare professionals identified the guideline, professional, patient and environmental characteristics as key influencing factors.

A vast amount of implementation research has been undertaken to determine which methods are most effective at promoting the uptake of research findings into practice (Gould *et al.*, 2011; Grimshaw *et al.*, 2004b). Implementation research includes the study of influences on healthcare professionals' behaviour and interventions to enable them to use research findings more effectively (Eccles *et al.*, 2007). Strategies used to embed guidelines into practice include education, audit, feedback and reminders, computerised decision support, financial incentives

and multiple interventions, yet only modest effects have been found (Grimshaw *et al.*, 2004b). Although some strategies may be successful in changing behaviour, others may fail to exert a positive impact due to barriers operating at the individual level and within the social and organisational contexts of care (Cheater *et al.*, 2005).

A Cochrane review of hand hygiene intervention strategies by Gould *et al.* (2011) concluded that due to a poor evidence base there was no clear evidence of the effect of the interventions to promote hand hygiene compliance. They reported that there seems to be a trend towards using product as a measure of compliance rather than direct observation of practice, and account needs to be taken of contextual factors such as nurse/patient ratio, accessibility of products and skill mix.

Given the wide range of factors that may influence guideline and protocol use, it has been argued that it is important to ensure that any exploration is undertaken from a perspective that is wide enough to include the complexity that exists in practice (Gurses *et al.*, 2008). Understanding the impact of factors on behaviour is one of the first steps to designing an effective strategy directed towards changing behaviour (Pittet, 2004). Change is more likely to become embedded within an organisation when both barriers and facilitators are taken into consideration (Hamilton *et al.*, 2007), and a necessary step to ensure that resources are targeted effectively (Grimshaw *et al.*, 2004a). This study will

therefore address this gap by considering individual, team and organisational factors that may influence protocol and guideline use.

Importance Of Using Theoretical Models In A ‘Diagnostic Analysis’

Theory has the potential to offer a generalisable underlying framework for studying behaviour (Eccles *et al.*, 2007), yet the majority of implementation research has been undertaken atheoretically, almost like ‘trial and error’ (Grimshaw *et al.*, 2004b). Erasmus *et al.* (2010) carried out a systematic review of observed and self-reported compliance with hand hygiene guidelines in healthcare. The authors reported that although the evidence base has matured and stronger designs have been used (larger sample size, better controlled studies), only 7 out of 96 empirical studies reviewed had used a behavioural framework. The authors confirm that results from this field of research are scarce and inconclusive.

Theoretical models can assist in the design of a diagnostic analysis by identifying motives influencing guideline use (Hamilton *et al.*, 2007), by providing understanding of what should be measured, monitored or compared (Lunt *et al.*, 2005) and by developing testable, useful interventions for behaviour change (Estabrooks *et al.*, 2006) once barriers have been identified.

Elements of diagnosis are evident in some stage models of change, notably the preliminary stages of force field analysis (Lewin, 1951), and Transtheoretical Model of Behaviour Change (Prochaska and DiClemente, 1983). However, these models assume that change is linear and can be planned (Hamilton *et al.*, 2007). As change within the healthcare environment is likely to be disorderly, dynamic, complex and uncertain it has been argued that these rational-linear stage models are inappropriate and consideration should be given to using contextualist approaches which consider internal organisational factors (Pettigrew *et al.*, 1992). Examples include the Diffusion of Innovation Theory (Rogers, 2003), How to Spread Good Ideas (Greenhalgh *et al.*, 2004) and the Promoting Action on Research in Health Services framework (Rycroft-Malone, 2004). These models are limited in that they fail to explain the individual decisions that are taken when the information contained within protocols and guidelines are put into practice. Some authors have argued that we need a better understanding of the cognitive mechanisms underlying behaviour, using social cognitive models (Gould *et al.*, 2011) if we are to close the intention-behaviour gap (Godin *et al.*, 2008). This highlights a gap in the literature which the current study aims to fill, by asking the following question:

Which behavioural theory, model or framework should be used to identify the factors that are influencing the use of infection control protocols and guidelines in practice?

The sections that follow highlight and discuss the literature surrounding this question.

What Are Behavioural Theories?

Behavioural theories and models, originating from psychology, assist us by providing understanding of human behaviour and our inclination to change. They can be used to predict and explain the underlying reasons why people engage or fail to engage in a specific behaviour (Godin *et al.*, 2008) and may assist with explaining the variability in behaviour. Robertson *et al.* (1996) defined behavioural theories as “*an organised collection of ideas which serves to predict what a person will do, think, or feel*” (p.51). Behavioural theories are based on the assumption that social behaviour is best understood as a function of people's perceptions (Conner and Norman, 1995).

Variables or constructs used in the models include, for example, knowledge, motivation, intention, perception of consequences, perceived control over the behaviour and social pressure. These variables are believed to shape behaviour and are considered susceptible to change (Pittet, 2004). Each theory or model uses different factors in attempting to account for behaviour. Each has been designed for a different purpose and has different strengths and weaknesses (Kretzer and Larson, 1998). Numerous behavioural theories exist, including the Theory of Reasoned Action (Fishbein and Ajzen, 1975, 1980), the Theory of

Planned Behaviour (Ajzen, 1985; Ajzen and Madden, 1986), Bandura's work on Self-Efficacy and the Social Cognitive Theory (Bandura, 1977, 1982, 1986), the Health Locus of Control (Rotter, 1954), the Protection Motivation Theory (Rogers, 1983), Transtheoretical Model of Change (Prochaska and DiClemente, 1983) and the Health Belief Model (Janz and Becker, 1984). All put forward a specific mechanism through which behaviours are thought to be performed (Michie, 2011).

Behavioural Theories Used With Health Behaviours

There is a large database of empirical support for the use of behavioural theories previously used to understand and predict health behaviours (For a review see Armitage and Conner, 2001; Godin and Kok, 1996; Noar and Zimmerman, 2005). Behavioural theories have been used to investigate adherence to smoking cessation guidelines (Puffer and Rashidian, 2004), medication adherence for infectious disease prevention (Munro *et al.*, 2007), safe sexual behaviour (Albarracin *et al.*, 2001) and injury prevention (Trifiletti *et al.*, 2005). Few studies were found using behavioural theories relating to infection control in healthcare, which will be addressed in the next section.

Studies Using Behavioural Theory With Infection Control

Godin *et al.* (2008) carried out a systematic review of psychological theories of behaviour that had been applied to healthcare from 1960-2007. The aim of their review was to quantify to what extent social cognitive theories had been used to explain intention of healthcare professionals to adopt behaviours laid down within protocols and guidelines. Their review covered previous reviews by Eccles *et al.* (2006), Perkins *et al.* (2007) and Sheeran (2002). Unlike previous reviews which have examined studies using either the Theory of Reasoned Action or the Theory of Planned Behaviour, Godin *et al.* (2008) examined studies using a range of theories. This included the Theory of Reasoned Action, Theory of Planned Behaviour, Social Learning Theory, Trandis' Theory of Interpersonal Behaviour, the Self-Efficacy model, the Health Belief Model and other less known theories.

Of the studies they reviewed, seven related specifically to infection control practice. Each of these seven studies used self-report items in a questionnaire to predict intention to implement the specified behaviour. All seven studies used the Theory of Planned Behaviour. The type of participants included were physicians, doctors, nurses, nurse practitioners, therapists, healthcare assistants and medical laboratory workers. Sample size ranged from the smallest being 60 participants (Maue *et al.*, 2004) to 667 (Godin *et al.*, 1998). The type of outcome behaviour (dependent variable) studied included adherence to universal precautions for venipuncture (Godin *et al.*, 2000), compliance with practice guidelines (Maue *et al.*, 2004), adherence to hand hygiene recommendations (Jenner *et al.*, 2002;

O'Boyle *et al.*, 2001; Pessoa-Silva *et al.*, 2005) and glove use (Godin *et al.*, 1998; Levin, 1999). Multiple regression analyses determined which (independent) variables best accounted for or explained the percentage of variance in intention for the dependent variable.

The (independent) variables included in the final models of these seven studies were attitude, perceived behavioural control, social norm, perceived risk, habit, age, perceived barriers/difficulties, personal normative beliefs, personal responsibility and level of difficulty. Variance in intention ranged from 0.56 - 0.73. Between 0.27 - 0.44 of the variance in intention remains unexplained, which means that certain variables that may influence intention to implement the behaviour remain unaccounted for (See Appendix 2a).

Not all of these variables were derived from the Theory of Planned Behaviour. This is because Ajzen (1991) suggested that the Theory of Planned Behaviour is open to the inclusion of additional variables if it can be shown that they capture a significant proportion of the outcome variance. With a number of the infection control studies, additional variables have been added from other theories, and this may account for the relatively high level of variance found (56% - 73%). For example, Godin *et al.* (2000) used four items with the Theory of Planned Behaviour to predict nurses' intention to adhere to universal precautions for venipuncture. They found that 68% of the variance for intention was determined by three variables in the final model. Perceived barriers explained 61% of the

variance, yet adding subjective norm and personal normative belief to the model explained an additional 7% of the variance in intention. The latter variable was taken from Trandis' Theory of Interpersonal Behaviour (1980) and represents the feeling of personal obligation or moral norm regarding the performance of the behaviour (Gagnon *et al.* 2006). Studies have shown that inclusion of moral norm from Trandis' Theory (1980) is a significant predictor of behavioural intentions when used with the Theory of Planned Behaviour and can add to the explanatory power of the final model. A review of health studies by Conner and Armitage (1998) found that moral norm predicted an additional 4% of the variance in intention after controlling for the Theory of Planned Behaviour variables. This means that people's sense of obligations and responsibilities have an important role to play in whether people enact their intentions (Godin *et al.* 2008). Levin (1999) achieved 73% variance for intention to wear gloves. The final model consisted of attitude, perceived behavioural control and perceived risk, with the latter variable was taken from the Health Belief Model (Janz and Becker, 1984). The latter model is better at explaining how a person makes an assessment of the risk whereas the Theory of Planned Behaviour is better at predicting intention (Godin *et al.*, 2008).

Of the seven studies mentioned above, three also used an outcome measure to predict behaviour. Sample size ranged from 33 participants in the study by Maue *et al.* (2004) to 120 in the study by O'Boyle *et al.* (2001). Godin *et al.* (2000) used self-report measures to identify the number of times nurses adhered to universal precautions. Maue *et al.* (2004) used audit of medical records and

observation to assess use of guidelines, whereas O'Boyle *et al.* (2001) used observation of adherence to hand hygiene practice. The variance which accounted for the behaviour ranged from 0.0076% - 0.28. Modest variance was explained by Godin *et al.* (2000) (28%) (See Appendix 2b).

The only variable that was identified from these studies which significantly contributed to behaviour and has not already been mentioned is the intensity of the activity in the unit, which is a contextual influence. O'Boyle *et al.* (2001) found that intensity of activity in the unit accounted for 12% of the variance. The level of correspondence between intention and behaviour was reported to be poor in the study by O'Boyle *et al.* (2001) yet good in the studies by Godin *et al.* (2000) and Maue *et al.* (2004). Godin *et al.* (2008) suggest that the reason for poor correspondence between intention and behaviour may be due to failure to correspond what was measured (behaviour) and what was intended (intention). Godin *et al.* (2008) also suggest that prediction values can be lower due to sample size. Francis *et al.* (2004) suggest that a sample size of 80 is considered acceptable.

Godin *et al.* (2008) reported in their review that the Theory of Reasoned Action or the Theory of Planned Behaviour was used more frequently than any other theory with healthcare studies. Godin *et al.* (2008) suggest that whilst the Theory of Planned Behaviour is the most appropriate theory to predict behaviour, other theories such as Trandis' Theory better capture the dynamic underlying intention.

To understand why the former theories have tended to dominate the literature, they were examined and consideration was given to their strengths and weaknesses.

Theory Of Reasoned Action And Theory of Planned Behaviour

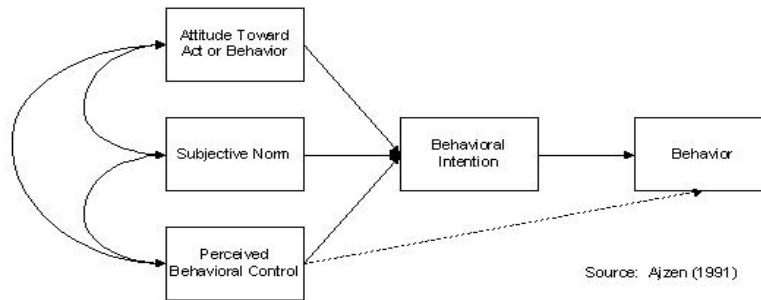
According to the Theory of Reasoned Action, the strongest, most immediate predictor of behaviour is an individual's intention to perform that behaviour (Ajzen and Fishbein, 1980). Intention portrays the motivational factors influencing behaviour and indicates how much effort an individual will exert. The stronger the intention, the more likely it is that the behaviour will be performed (Ajzen and Fishbein, 1980).

Intentions are predicted by two variables or constructs: attitude towards the behaviour and subjective norm. Attitude relates to an individual's overall assessment of performing the behaviour after weighing up the advantages (benefits) and disadvantages (costs) of the outcome. Subjective norm refers to perceptions of social norms or pressure from others to perform the behaviour and the individual's motivation to comply with these social normative beliefs. An assumption made by the Theory of Reasoned Action is that an individual's behaviour is completely under their wilful control, which was later found to be a limitation. To address this, the theory was modified to include behaviours that are

not under complete wilful control (Ajzen, 1991). The modified theory was called the Theory of Planned Behaviour (Ajzen, 1985, 1991).

The Theory of Planned Behaviour included a third determinant of intention labelled perceived behavioural control which influences both intention and behaviour (Conner and Abraham, 2001) (See Figure 1). This refers to the perceptions of an individual's assessment of their ability to perform the behaviour, and is similar to Bandura's (1982) concept of self-efficacy, which relates to the beliefs an individual holds about his/her capabilities to achieve a desired outcome. However perceived behavioural control has a broader meaning and consists of 'actual behavioural control' and one's confidence in performing the behaviour (O'Boyle *et al.*, 2001). It is influenced by control beliefs, which may be internal (information, skills, abilities, emotions or beliefs that the behaviour is futile) or external situational factors (resources, opportunities, dependence on others or patient preferences). Individuals who perceive that they have the necessary resources, opportunities or lack of obstacles to perform the behaviour are likely to have a high level of perceived behavioural control (Conner and Armitage, 1998). According to the theory, the more positive an individual's attitudes, subjective norms and the greater their perceived behavioural control, the stronger the person's intention to perform the particular behaviour is likely to be (Conner and Abraham, 2001). The strengths and weaknesses of this theory will now be considered.

Figure 1: Theory Of Planned Behaviour



Strengths Of The Theory of Planned Behaviour

Unlike other behavioural models, the Theory of Planned Behaviour takes into account how an individual's perception of control over a particular behaviour is easy or difficult to implement. Control is seen as a continuum, with easily executed behaviours at one end and behaviours that need resources, opportunities or skills at the other (Conner and Armitage, 1998). It also allows for irrationality in decision-making as judgemental elements are recognised, such as the desire to comply with social norms and the impact of organisational culture (Lunt *et al.*, 2005). Horne (2001) suggests that social norms are statements that regulate behaviour and that enforcement of norms is achieved through social sanctioning. This means that if risk taking is an accepted practice, individuals may be encouraged to adopt similar patterns of behaviour. Francis *et al.* (2004) developed guidelines for the operational definition of the variables which are to be used in questionnaires. This and the fact that only a limited number of variables are included in the model, perhaps gives the impression that it is relatively easy to use. These strengths may explain why this theory has become more popular than

other behavioural theories. Despite these strengths, there are several weaknesses which need to be considered.

Weaknesses Of The Theory Of Planned Behaviour

Despite the model's ability to predict behaviour, there is an assumption that people with positive intentions will go on to perform the behaviour (Ajzen and Fishbein, 1980). O'Boyle *et al.* (2001) reported that the level of correspondence between behaviour and intention was poor with the variance identified for behaviour lower than the levels determined for intention. Even though people intend to do something (give up smoking or exercise regularly), it doesn't necessary mean that the behaviour will follow.

Two explanations have been put forward to explain why there may be an inconsistency between people's intentions and their behaviour. Gollwitzer (1993) proposed the concept of implementation intentions. These represent a motivational phase where the person decides to act and forms a goal intention, similar to Ajzen's (1985) formation of a behavioural intention. A second phase must then occur where the person makes plans to realise their goals or implement intentions, stating where, when and how the goal is to be achieved. This assumes that all behaviours are planned, yet behaviours which have been learned and are performed frequently, such as handwashing, can be automatic and unconscious (Bargh and Ferguson, 2000; Fazio *et al.*, 1986).

Despite the Theory of Planned Behaviour not taking habitual behaviour into account, it has been successfully used in a qualitative study to aid our understanding of the influences affecting handwashing on the hospital ward. Nicol *et al.* (2009) recruited 33 nurses and 11 doctors, a physiotherapist and a phlebotomist from two wards in two hospitals. Semi-structured interviews were conducted with 60 hours of observation over 3 months. Grounded theory was used to analyse the data. The authors reported that the most powerful factor that seemed to influence handwashing practices was a vivid episode of experience, such as a personal exposure to an outbreak of infection on the ward, which heightened awareness and strengthened an intention to comply with handwashing practice. Participants expressed a need for compelling evidence of mortality, morbidity and costs associated with healthcare-associated infection. This suggests the importance of beliefs about the consequences of failure to maintain infection control practice.

A second explanation for the inconsistency between intention and behaviour is that where people hold strong goal intentions, situational influences or emergency situations can occur which may interfere with the planned behaviour and may affect automatic behaviours such as handwashing (Nicol *et al.*, 2009). Levin (1999) found that gloves were least likely to be worn by healthcare staff during emergency situations, when workers were least likely to be in control of the events. According to Keith and Frese (2005), during emergency situations people's emotions may take over task engagement and this is when errors may

occur with the task. However, there is little evidence to support how emotion influences the implementation of infection control protocols and guidelines.

The Theory of Planned Behaviour also proposes that we hold simple good or bad beliefs and attitudes, yet some beliefs and attitudes may reflect a degree of ambivalence. Ambivalence in this context refers to holding both positive and negative beliefs simultaneously. An individual may hold strong positive beliefs that a particular behaviour is satisfying in the short term while simultaneously holding negative beliefs regarding the long-term impact of the behaviour (Shepherd, 2008). It has been shown that ambivalence about food choice acts as a moderator between attitudes and intention and between attitudes and behaviour (Conner *et al.*, 2003; Sparks *et al.*, 2001). Those higher in ambivalence showed less consistency between their attitudes and the behaviour and, this may present difficulties when trying to change those beliefs (Shepherd, 2008).

Several authors have raised concern about variables that are not included in the model and how these might influence the other components. Examples include emotion and personality (Conner and Abraham, 2001), moral obligation (Godin *et al.*, 2008), identity and professional obligation (Gagnon *et al.*, 2006), organisational support, competing goals, (Sheeran and Silverman, 2003) and past behaviour or habit (Skar *et al.*, 2008). Yet these variables are included in Triandis' (1980) Theory of Interpersonal Behaviour. The latter theory also specifies facilitating conditions (the environmental context).

The Development Of An Integrated Framework

The difficulty of choosing a theory to understand and explain behaviour and behaviour change has been recognised by others (Eccles *et al.*, 2006; Michie, 2011). The main contention is the lack of consensus in the literature regarding the different constructs used within each model. Authors argue that although there is similarity between the constructs, the terminology used is very different, creating the illusion that the theories are different (Noar and Zimmerman, 2005). Two projects have been undertaken with the aim of achieving consensus on core constructs, one by Fishbein *et al.* (2001), the other by Michie *et al.* (2005).

Fishbein *et al.* (2001) created an integrated theory based on core constructs of the Theory of Reasoned Action, with the addition of self-efficacy. A workshop took place in 1991 where theorists shared ideas. They decided on and described eight domains believed to be most important to health behaviour but specifically to safer sexual behaviour. Michie *et al.* (2005) sought to develop a framework grounded in psychological theory that would be useful to researchers working in healthcare, specifically in relation to the use of evidence-based guidelines. Michie *et al.* (2005, p.33) define a **framework** as “*a structure composed of parts framed together*”. A key set of twelve explanatory variables or domains were specified, derived from thirty three theories of behaviour to form a framework which may increase understanding of how guidelines are used and assist with targeting any difficulties with their use.

Table 2 shows the domains identified by Michie *et al.* (2005), how these relate to those identified by Fishbein *et al.* (2001) and their related constructs. The terms **construct** is defined as “*a concept specially devised to be part of a theory*” and **domain** is defined as “*a group of related constructs*” (Michie *et al.* 2005, p.33). The way in which these constructs are related to one another is not defined.

From the literature review undertaken in the current study, two extra variables were identified which have not been included in Michie *et al.*'s (2005) framework, these include frequency of past behaviour or habit and moral norm. Michie *et al.* (2005) developed interview questions for the framework to illustrate how the domains may be investigated. Use of these will assist with capturing the majority of important dimensions to study healthcare professionals' behaviour (Godin *et al.*, 2008). To date, this framework has only been used once in relation to infection control. Dyson *et al.* (2011) used the framework to identify barriers and levers to hand hygiene using a qualitative study, and this is discussed in the discussion chapter (See p.380). Processes other than hand hygiene, such as isolation of patients, glove and gown use and cleaning tasks were not explored by Dyson *et al.* (2011). A limitation of this study was that although semi-structured interviews, focus-groups and questionnaires were used, observation of behaviour was not undertaken. These factors were taken into account during the design of my own study.

Table 2: Theoretical domains for investigating the implementation of evidence based protocols and guidelines into practice: **Michie *et al.* (2005) Behavioural Change Framework**

Domains specified by Michie <i>et al.</i> (2005)	Domains specified by Fishbein <i>et al.</i> (2001)	Constructs
Knowledge		Knowledge, schemas, mindset
Skills	Skills	Competence, ability, skills
Social/professional role and identity	Self-standards	Identity, boundaries, role, social/group norms, organisational commitment
Beliefs about capabilities	Self-efficacy	Self efficacy, control, perceived competence, confidence, empowerment, perceived behavioural control, optimism/pessimism
Beliefs about consequences	Anticipated outcomes/attitudes	Outcome expectancies, anticipated regret, appraisal, reinforcement/punishment, incentives, rewards, perceived risk/threat
Motivation and goals	Intention	Intention, goals, intrinsic motivation, commitment, transtheoretical model and stages of change
Memory, attention and decision processes		Memory, attention, decision making

Source: Michie *et al.* (2005); Fishbein *et al.* (2001).

Table 2: Theoretical domains for investigating the implementation of evidence based protocols and guidelines into practice (continued): **Michie *et al.* (2005) Behavioural Change Framework**

Domains specified by Michie <i>et al.</i> (2005)	Domains specified by Fishbein <i>et al.</i> (2001)	Constructs
Environmental context and resources	Environmental constraints	Resources, environmental stressors and interaction, knowledge of task environment
Social influences	Norms	Social support, norms, leadership, team working, group conformity, organisational climate/culture, social pressure, power/hierarchy, boundaries/roles, management commitment, supervision, conflict, champions, feedback, competing demands, change management, crew resource management, negotiation, learning/modelling
Emotion	Emotion	Affect, stress, anticipated regret, fear, burn-out, tiredness, anxiety/depression
Behavioural regulation		Goal/target setting, implementation intention, action planning, self-monitoring, goal priority, feedback, moderators of intention-behaviour gap, barriers/facilitators
Nature of the behaviours		Routine/habit,/automatic behaviour, past behaviour, stages of change model

Source: Michie *et al.*, 2005; Fishbein *et al.*, 2001.

Conclusion and Research Contribution

The literature review has identified the important role that infection control protocols and guidelines play in the management of healthcare-associated infections. Despite this, studies have indicated that the use of protocols and guidelines in clinical practice is generally low (Grimshaw *et al.*, 2004b; World Health Organization, 2009).

Three main gaps were identified from the literature review. Firstly it has been identified that few studies have explored how protocols and guidelines are used in practice within the healthcare literature (Bick and Rycroft-Malone, 2010; Ilott *et al.*, 2010). Ilott *et al.* (2010) suggested that attention needs to be paid to experience, roles, dynamics between professionals, hierarchy or the effect of using protocols on staff outcomes.

Secondly, Prieto and Macleod Clark (2005) identified that future research needs to focus on understanding the difficulties that healthcare professionals experience when putting infection control protocols into practice. Any exploration needs to be undertaken from a wide perspective, taking the individual, the team, organisational and contextual factors into account.

The literature review identified the importance of taking into account social cognitive factors. Only a small number of infection control studies were identified using behavioural theories and models to assist with identifying the motives influencing protocol and guideline use. These studies were predominantly used to predict factors influencing intention or behaviour. Only a small number of qualitative studies using behavioural theory were identified. As quantitative studies remove contextual influences, and as such influences have been identified as being important, a qualitative design would be more appropriate to use with any exploration of protocol and guideline use.

The quantitative studies identified in this review have used the Theory of Planned Behaviour (Ajzen, 1985) and the possible reasons for this have been explained. The strengths and weaknesses of this theory were examined. The review identified a behavioural change framework developed by Michie *et al.* (2005) which may assist with capturing a wider range of factors that may influence the use of protocols and guidelines. This framework has only previously been used once with infection control. Dyson *et al.* (2011) used the framework to identify barriers and levers to hand hygiene using a qualitative study using semi-structured interviews, focus-groups and questionnaires. The current study will use the framework to explore a wider range of infection control behaviours, such as isolation of patients, glove and gown use and cleaning tasks using observation as one important method of collecting data.

Thirdly, the literature review identified that future research in healthcare needs to explore how the context is influencing organisational learning. Little is known about what happens if difficulties are experienced with the use of infection control protocols and guidelines, how contextual factors may influence this process and the effect this can have on organisation learning.

Based on the gaps identified in the literature, this study aims to fill those gaps by using a qualitative case study design (Yin, 2009) using a behavioural framework developed by Michie *et al.* (2005) to explore individual, team level, organisational and contextual factors that influence the use of protocols and guidelines in practice.

This study aims to identify and understand the underlying behavioural influences that may affect the use of infection control protocols and guidelines by exploring the issue from a wide perspective to cover the complexity that exists in practice. Rather than testing hypotheses and predicting factors influencing protocol and guideline use, this study seeks to use the behavioural framework developed by Michie *et al.* (2005) to provide understanding of what factors facilitate and/or hinder use, how these factors influence behaviour and to explore what happens if difficulties occur. A qualitative approach may assist with uncovering the complexity that exists in the reality of infection control practice on the ward.

Patient and visitor as well as staff experiences will be included to consider the problem from a range of perspectives. Understanding the difficulties of implementing best practice to manage the risk of healthcare-associated infection increases our ability to improve that care. The knowledge gained from this study can be used to address barriers and utilise any facilitators to increase the use of infection control protocols and guidelines into practice. This study will contribute to the existing literature by using the following research questions to provide knowledge relating to the gaps described above.

Research Questions

The research questions are as follows:

1. How are infection control protocols and guidelines perceived and used on the hospital ward to manage the risk from *Clostridium difficile* infection?
2. What challenges, difficulties or dilemmas are experienced by ward staff with implementing protocols and guidelines in the management of *Clostridium difficile* infection?
3. What happens if difficulties are experienced.

Chapter Three

Methodology and Methods

Chapter Three: Methodology and Methods

Introduction

This chapter starts by setting out the methodology used in this thesis. It discusses the chosen paradigm, justifies the rationale for the research design, the potential limitations of the design and the controls put into place to minimise these. The chapter goes on to explain the rationale for the choice of methods used to collect data and the site chosen for the research. Negotiation of access is discussed, how consent forms were piloted and ethical approval obtained. The remaining sections in this chapter discuss the process of field work and analysis of the data.

Research Methodology

A methodology is defined as “*an analysis of the assumptions, principles, and procedures in a particular approach to inquiry*” (Schwandt, 2001, p. 161). Research methodology is therefore a set of decisions about the design of the research, which together with beliefs about how the social world can be studied and how knowledge produced by the research can be assessed, provide justification for the methods used to gather data about the social world (Pope and Mays, 2006).

Chosen Paradigm

To understand the purpose, goals, methods and procedures of a study requires an understanding of the paradigm within which the researcher is “located” (Ponterotto, 2005). The objectives of this research will be addressed through a predominantly interpretive epistemology and constructivist ontology. Epistemology relates to a branch of philosophy concerned with debates about the nature and scope (limitation) of knowledge and how it relates to notions of truth, belief and justification (Carter and Little, 2007). It addresses questions such as “What is knowledge?” “How is knowledge acquired?” “What do we know?” “How and why do we know what we know?” “Are we part of the knowledge, or are we external to it?”

Ontology is a branch of philosophy concerned with the nature of reality (Carter and Little, 2007). The ontological nature of constructivism proposes that each individual constructs their own experience. Our epistemological and ontological perspectives can influence what we ask and what methodology and methods we choose to use (Pope and Mays, 2006).

The following sections clarify the philosophical assumptions that underpin the justification for the methodology and methods used in this study.

Interpretivism

Interpretivism is defined as “*an epistemological position that requires the social scientist to grasp the subjective meaning of social action*” (Bryman, 2008, p.694). The goal is to make sense of, or interpret, phenomena in terms of the meanings people assign to them (Creswell, 1998). According to Denzin and Lincoln (2000), meaningful action is intentional. They suggest that to grasp the meaning of action, the context and the type of language used within that environment needs to be understood. They also suggest that understanding the meaning in any action implies interpretation of that action. Interpretivism requires the researcher to try to identify with the participant (Denzin and Lincoln, 2000). In this study effort will be made to try to understand from the perspective of ward staff what it is like trying to put protocols and guidelines into practice to manage the spread of *C.difficile* infection. Geertz (1979) argues that understanding can only be achieved from watching and conversing with participants and trying to work out what is going on. Interpretivists reject the notion of value free research. Instead, the researcher’s own subjectivity is acknowledged (Bryman, 2008), by bringing any preconceptions to the surface and this is discussed in a later section.

Interpretivist perspectives favour *naturalistic inquiry*. It is the preferred approach where research aims for understanding the individual in a natural, uncontrolled setting (Lincoln and Guba, 1985). This approach is in direct contrast to positivist perspectives, where research aims to uncover general patterns of behaviour in a more controlled environment, where the emphasis is on objective measurement

and/or prediction of phenomena rather than in-depth understanding (Bryman, 2008). Positivism strips the research of context and only considers a certain set of variables, yet other variables may alter the findings if allowed to exert their effects (Guba and Lincoln, 1994).

Constructivism

The assumption underlying constructivism is that all knowledge is socially constructed. Constructivists reject the assumption of a single reality (truth). Rather knowledge is subjective, transactional and socially created depending on the meaning that people place on their experience (Guba and Lincoln, 1994). Constructivism favours the belief that there are multiple accounts of reality which are in a constant state of construction and re-construction. Understanding and meanings are revised and interpretations remade in the light of continual changes within the environment. Knowledge is provisional and a product of the interactions and relationships between the researcher and the participants in the specific context of the study (Bryman, 2008).

Within the constructivist ontology, there may be different stances concerning the degree to which it is possible to think of and research an external reality (Gains, 2011). These include the constructivist stances of realism (sometimes referred to as naïve realism) and relativism, which may be considered to be oppositional but not clearly delineated (Gains, 2011). Mays and Pope (2000) define naïve realism

as “*a belief that there is a single, unequivocal social reality or truth which is entirely independent of the researcher and of the research process*” (p.50). In comparison, the ontological branch of constructivism known as relativism (Guba and Lincoln, 1994) is underpinned by the assumption that there is no objective truth to be known (Mays and Pope, 2000). Extreme relativism asserts the belief that all perspectives are unique and equally valid, and there may be a rejection of any criteria for evaluating the quality of the research (Mays and Pope, 2000). In comparison, naïve realism asserts that the world is largely knowable as it appears and there is concern with ‘truth’ and the importance of evaluating validity, generalisability and reliability. Naïve realism is therefore more aligned to the philosophical ideals of positivism (Cohen and Crabtree, 2008). The issue is discussed further in a later section (See Increasing ‘Trustworthiness’ Of The Study on p.111).

Although these views discussed above can be considered to be opposite ends of a continuum, within each position there may be a range of views (Mays and Pope, 2000). In the current study, the researcher holds assumptions that are consistent with other authors, such as Hammersley (1992) and Mays and Pope (2000), who acknowledge that all research involves subjective perceptions, different methods will produce different pictures of the participants being studied and the underlying reality can be studied. Subtle realism has been described as an epistemological position that is mid-way between extreme realism and extreme relativism (Hammersley, 1992) and an attempt to represent the reality being studying rather than to try to attain “the truth” (Mays and Pope, 2000). Subtle realism is

therefore an epistemological position in which the researcher believes that one cannot claim to have absolute certainty regarding the findings of his or her research (Duncan and Nicol, 2004). Rather:

“...the objective should be the search for knowledge about which we can be reasonably confident. Such confidence will be based upon judgements about the credibility and plausibility of knowledge claims” (Murphy *et al.* 1998, p.69).

Constructivism holds the assumption that objectivity and reliability are rejected in favour of reflexivity and researcher perspective. Multiple data collection methods are favoured for the richness they can provide and consensus of views is not a goal of this position (Madhill *et al.*, 2000). The assumption that knowledge and reality are created through interpretation and construction means that reflexivity is used as a demonstration of the researcher’s way of knowing (Cohen and Crabtree, 2008). This is discussed in a later section (See Reflexivity p.173) but firstly, justification of the chosen research design is presented.

Research Design: The Case Study

The research design chosen for this study is the Case Study using ethnographic field work as a method. A case study has been defined as *“...an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident”* (Yin, 2009, p.18). In this case study, the boundary is the ward and the

practice being explored is the use of infection control protocol and guidelines to manage the spread of *Clostridium difficile* infection.

Being able to study what is going on within a real-life context is important due to the influence that organisational culture and the surrounding environment has on behaviour (Yin, 2009). The use of a case study is important to understand the complexity of influences, particularly in relation to the ward context and how this influences the way that infection control protocols and guidelines are put into practice.

The use of an in-depth case study was chosen as the most appropriate design for conducting empirical research within the interpretivist tradition to produce a rich description of the phenomena under investigation. According to Yin (2009), case studies can be descriptive, exploratory or explanatory and a case can comprise single or multiple units. This study uses a single site as its case, as it aims to provide depth rather than breadth of knowledge. This is in contrast to the use of multiple case studies, which would be more appropriate where the concern is to allow theoretical replication and cross-case comparisons (Yin, 2009). This case study will be simultaneously descriptive, exploratory and explanatory. The aim is to describe, explore, understand and explain the difficulties and dilemmas that stakeholders experience in relation to putting into practice the infection control protocols and guidelines on the hospital ward to prevent *Clostridium difficile* infection. It may be defined as an *instrumental* case study, as the focus will be on

the insights that individuals within the case can provide, and the identification of improved practice. The possibility for generalisation of the findings to other similar settings (Stake, 1995) is discussed on p.116 and in Chapter Five (See Study Limitations, p.407), by providing a ‘thick description’ (Geertz, 1973) of the study findings.

There are several reasons for choosing a case study design. Firstly, understanding human behaviour is a complex process and the case study acknowledges that behaviour is partly shaped by the context (Luck *et al.*, 2006). To understand the use of protocols and guidelines it will be necessary to understand how relationships and processes within the setting influence the action taken (Denscombe, 2003). The naturalistic style of case study research allows human behaviour, thoughts and feelings to be studied in a given situation as it exists, rather than studying phenomena under artificially generated circumstances (Denscombe, 2003). A case study is therefore appropriate for examining complexity and the practical application of knowledge (Luck *et al.*, 2006) in a complex environment such as healthcare.

Secondly, the case study is appropriate when ‘how’ or ‘why’ questions are put forward and when there is lack of control over events taking place within the environment (Yin, 2009) such as a hospital ward.

Thirdly, a case study is a flexible approach which provides the ability to deal with multiple sources of evidence, as no one source of evidence is likely to be sufficient on its own to capture the whole context (Gillham, 2000). A variety of research methods can therefore be used to investigate the relationships and processes of interest, providing a more holistic account of “what is going on” rather than dealing with isolated factors (Denscombe, 2003). Luck *et al.* (2006) argue that “...because any set of methods that will help to develop understanding can be used, a case study is a bridge that spans the research paradigms” (p.105). Case studies can be qualitative or quantitative (Yin, 2009) or both. This case study will be a qualitative inquiry, using multiple methods to provide a holistic, meaningful and rich knowledge about events taking place within the boundary of the case.

Finally, a case study draws attention to what can be specifically learned from the case. The detailed workings of the relationships and processes leading to certain outcomes can be emphasised in the case description and explanations given as to why certain outcomes happen (Yin, 2009). To achieve this, behavioural theories, models and a framework from psychology were used to guide the collection and analysis of the data. However, an open mind was maintained concerning their value as although theory is a way of seeing, it may exclude other ways of seeing.

The literature review identified that the majority of studies using theories from psychology have used a quantitative approach without consideration of the

context. The aim of this study is to use several qualitative methods using Michie *et al's* (2005) behavioural change framework to explore factors that may be influencing the behaviour of staff on the ward in relation to infection control practice, taking into account the context.

Consideration needs to be given as to why this study is being framed as a case study, rather than as ethnography or grounded theory. Approaches such as grounded theory (Glaser and Strauss, 1967) are used to develop theory; however theory building is not an aim of this study. Case studies and ethnography appear to have similar elements. Both are holistic interpretive approaches concerned with providing rich detailed knowledge about phenomena and culture is important. Both approaches can use interviews, non-participant or participant observation and document review, and common methods of analysis are used. Cohen and Court (2003) suggest the major difference between case study and ethnography is the intention of the study. They propose that whilst ethnography is inward looking, the case study is outward looking. They suggest that ethnography is more concerned with the extraction of the unknown rules within a culture and is more descriptive, although it can also be explanatory (Cohen and Court, 2003). However, a case study, is also concerned with culture, it can be explanatory in nature, although it can also be descriptive (Yin, 2009). The distinction between the two is therefore blurred. It could be argued that case study and ethnography differ because they have different philosophical underpinnings and therefore use different methods. For example, a case study can be based on positivism and use

surveys as a method of data collection, whereas use of surveys within ethnography is unlikely.

In the current study, a case study was identified as the most suitable design using ethnographic methods, for the reasons previously described. An additional reason is that the original intention of the study was to compare two wards and a case study design is useful to compare multiple cases (Yin, 2009). Due to difficulties with the field work one case study was used in this study (See Negotiating Access p.128 for an explanation). Despite the strength of this approach, there are potential limitations which need to be considered.

Potential Limitations Of The Case Study

Positivists have argued that case studies are a weak method (Yin, 2009) because they lack rigour, are prone to bias, lack generalisability (Jensen and Rogers, 2001), are too time consuming and result in an enormous collection of unreadable data which is difficult to analyse (Luck *et al.*, 2006). These potential limitations can be overcome in the design and planning of the study (Luck *et al.*, 2006) and are discussed in the next section.

Increasing The ‘Trustworthiness’ Of The Study

For some authors, building in validity, generalisability and reliability into a study can be ensured by the researcher following a verification strategy (Morse *et al.*, 2002) or set of principles (Daly *et al.*, 2007) designed into the research process and carried out in a rigorous fashion to produce ‘scientific’ evidence (Rolfe, 2006).

Some authors have an opposing view of ‘rigour’ and use different terminology. Sandelowski (1993) argued that it is important for qualitative researchers to establish ‘trustworthiness’ of the data rather than ‘truth’ or ‘value’ as the latter are for positivists. According to Sandelowski (1993), “*trustworthiness becomes a matter of persuasion whereby the scientist is viewed as having made those practices visible and, therefore, auditable*” (p.2). Lincoln and Guba (1985) suggest that qualitative research can be evaluated by considering the overall ‘trustworthiness’ of a study, which they have subdivided into credibility, transferability, dependability and confirmability. Table 3 shows a comparison of the different concepts that may be used depending on the study design.

Table 3: Criteria To Critically Appraise Findings From Qualitative Research

Aspect	Qualitative Term	Quantitative Term
Truth value	Credibility	Internal Validity
Applicability	Transferability	External Validity or generalisability
Consistency	Dependability	Reliability
Neutrality	Confirmability	Objectivity

Source: Hannes, 2011

Many examples of criteria or tools have been developed to provide indicators of the quality of the research when appraising a study. Whilst some of these tools are generic, others have been designed for a specific purpose, for example, when deciding to include a study into a systematic review (See Hannes, 2011). The strategies used in this case study to increase ‘trustworthiness’ are discussed below.

Credibility

Credibility in qualitative research is concerned with establishing that the findings are believable. Techniques that Lincoln and Guba (1985) recommend to use to enhance credibility of the findings include prolonged engagement in the field, persistent observation, negative case analysis, member checking and triangulation.

Data in this study were collected from a hospital ward for eight months with 184 hours of observation conducted. The data was analysed throughout this period and this process continued for a further eight months after leaving the field. The researcher therefore became very 'close' to the data. The use of negative case analysis, triangulation and member checking is explained below.

Negative Case Analysis

Lincoln and Guba (1985) suggest searching for and discussing parts of the data that contradict patterns or explanations that are emerging from the data analysis, to show that alternative explanations have been considered and researcher bias has been minimised. The study findings include quotes from participants to demonstrate that alternative perspectives were searched for and included in the analysis. The discussion chapter also includes a critique of the underpinning behavioural change framework that was used to guide the data collection and analysis process and considers its failure to capture certain events, based on the research questions (See Chapter Five).

Triangulation

Drawing on the multiple perspectives from the differing participant roles, triangulation can be seen as a means of capturing a fuller, holistic and contextual snap-shot of the phenomena being studied (Jick, 1979). The use of multiple data collection methods may enhance the 'trustworthiness' of the data by adding to the

jigsaw puzzle of knowledge (Knafl and Breitmayer, 1991) by providing different perspectives of reality. Multiple sources of data were used in this study, including non-participant observation and informal conversations, semi-structured interviews and a document review. Triangulation is useful to check one set of data against another (Bryman, 2008). This was used with interview and observation data where people's reactions can become altered due to the researcher's presence (Knafl and Breitmayer, 1991). Discrepancies between what people said during interviews and what they actually did in practice was explored, for example, how they implemented infection control precautions on the ward. Sometimes issues were mentioned during interviews that had not been observed on the ward and vice versa, therefore these issues were actively looked for and explored (See example given on p.155).

Documents were used in a similar manner, by exploring ideal ways of working against what actually happened in practice (Denzin, 1970), not for the sake of any gaps that may exist, but to focus data collection to understand why any gaps might exist. Other ways of triangulating the data included comparing different times of the day and different staff roles. Yin (2009) highlights the importance of demonstrating a 'chain of evidence' to increase the reliability of information in a case study to corroborate the findings. This was achieved by cross referencing and linking documents during the data collection, data analysis and writing phases. This allows the reader to trace the steps taken from forming conclusions from the study questions or vice versa (Yin, 2009).

Member Checks

Lincoln and Guba (1985) suggest employing member checks to ensure credibility of the findings and respondent validation (Bryman, 2008). Member checks were used by Belk *et al.* (1988) in a study of consumer behaviour which involved enlisting one member from each of the various participant roles to check all or a sample of the final report. Commentaries on the interpretations were sought as a check on the viability of the interpretations. Differences of agreement were documented and participant reactions were incorporated into the study to confirm and correct perceptions of the investigated phenomena, as identified by the researcher (Belk *et al.*, 1988). Pope and Mays (2006) suggest this may be useful as a process of error reduction where it generates additional original data which in turn requires interpretation rather than a straightforward check on validity. However, there are a number of difficulties associated with the use of member checks. McDonnell *et al.* (2000) considered using this technique by feeding back interview transcripts to participants for validation. They took account of concerns raised by Sandelowski (1993), and decided this technique to be riddled with difficulties. These included requests by participants to remove or review data because their views had changed, were regretted or forgotten. More importantly, the impact on participants of seeing what they have said in print has yet to be fully explored and care would need to be taken to ensure that confidentiality is not breached (McDonnell *et al.*, 2000). Sandelowski (1993) argued that in qualitative research, if reality is to be assumed to be multiple and constructed, repeatability of the findings, either by an expert researcher or a participant, is not necessary. By trying to increase credibility and/or dependability in this way, it might involve a

forced or artificial consensus and conformity in the analysis (Rolfe, 2006). For these reasons, member checking was not used in this study.

Transferability Of The Study Findings

Transferability is concerned with the degree to which the study findings can be generalised beyond the research context to other settings (Bryman, 2008). A common criticism of qualitative research is that the findings are only applicable to the setting in which they were obtained (Greenhalgh, 1997). Yin (2009) suggests use of a theory in single-case studies as a tactic that may be used to enhance the quality of the case study design. In the current study, theory was used to guide the collection and analysis of the data and an evaluation of this has been included in the discussion. Lincoln and Guba (1985) recommend using a ‘thick description’ as a technique to establish transferability of the findings. A thick description (Geertz, 1973) is produced from the research findings, providing a rich detailed account of the research context (See Chapter Five). Lincoln and Guba (1985) argue that a thick description provides other persons who wish to “transfer” the findings to a different context to make judgments about the relevance of the findings to their setting.

Dependability

Dependability looks at the repeatability of the study findings (Lincoln and Guba, 1985). To establish dependability of the research in terms of trustworthiness (Lincoln and Guba, 1985), meticulous recording keeping at all stages of the study has been undertaken to provide an audit trail, which may be viewed by others so that they may see how the findings have been produced (Bryman, 2008; Yin, 2009). Greenhalgh (2001) emphasises that the researcher must ensure that all research findings are “*independently and objectively verifiable*” by indexing all quotes so they can be “*traced back to an identifiable subject and setting*” (*ibid.* p.175). All quotes and extracts from field notes have been clearly identified so that these may be traced back to the original field notes.

Confirmability

Confirmability is concerned with the neutrality of the research findings. Steps were therefore taken to confirm that the findings of the study arose from the experiences and ideas of the participants, rather than the preferences of the researcher. Techniques that were used to enhance the confirmability of the findings include triangulation (See p.114), reflexivity and positionality by making the assumptions and preconceptions of the researcher explicit (See p.173) and producing an audit trail (See p.169-172).

In summary, the strength of the case study is seen in its flexible approach, allowing us to “get under the skin” of the case, to find out what really happens in practice and interpret and make sense of the multiple meanings given by individual experience. It provides a high level of contextual knowledge, allowing connections to be made between theoretical abstractions with applied practice (Luck *et al.*, 2006). The detailed workings of the relationships and processes leading to certain outcomes can be emphasised in the case description and explanations given as to *why* certain outcomes happen (Denscombe, 2003). The aim is to use a single case study using several qualitative methods to provide a detailed insight into the use of infection control protocols and guidelines on a hospital ward to manage the spread of *C.difficile* infection.

Research Methods

Introduction

This section starts by discussing the chosen research methods that were used to collect and record data in the case study. Additional sections discuss the rationale for the selection of the site of the case study, how access was negotiated and ethical approval obtained. Later sections discuss the field work including the consent process, sampling, data collection and analysis.

Rationale For The Chosen Methods

The chosen data collection methods include non-participant observation, informal conversations, semi-structured interviews and document review. These methods were selected in relation to the nature of the case, the research questions and anticipated level of researcher control within the setting (Yin, 2009). The rationale for the chosen methods, the potential limitations associated with their use and how these limitations were minimised during the field work is explained next.

Non-Participant Observation

Non-participant observation is a research method whereby the researcher observes the behaviour of participants under investigation yet does not participate (Bryman, 2008). All the researcher's senses will be utilised and there will be a 'detachment'

from what is going on (Polit and Beck, 2008). 'Detachment' is used in the sense that by not being involved in the work activities, there will be less distraction from observation. Non-participant observation was chosen rather than participant observation as the latter method would require a nursing qualification (Wind, 2008). The researcher does not have a nursing background therefore would not be participating in any work activities. Observations would be unstructured to provide understanding of behaviour. Observation is a useful method as it deals with what people actually do, rather than what they claim they do, and allows the researcher to witness first hand what happens in practice (Gillham, 2008). Unstructured observation is particularly suited to understanding processes and relationships between people, events and activities where understanding of the cultural context is important. The meanings or realities that people attach to their understanding of their experience can sometimes be accessed and revealed (Jorgensen, 1989) and holistic explanations inferred between the interlinked factors (Denscombe, 2003). It may be possible to infer 'invisible' elements such as thoughts, feelings, values and attitudes through observation of behaviour, however such attributes do not always correlate with behaviour (Gillham, 2008). Observations can also be misinterpreted. To avoid misunderstanding about practices that are witnessed, observations were followed up with informal conversations with participants and/or key informants.

Collecting Observations

The aim was to focus observations on staff behaviour relating to infection control practice during the routine treatment and care of patients on the ward. This included hand hygiene, isolation and barrier nursing, use of personal protective equipment (gloves and apron), bed-making, disposal of infective waste, ward cleaning tasks, decontamination of equipment and other issues recommended in infection control protocols and guidelines. Contextual issues such as staff numbers, nursing skill mix, relationships, the ward layout and structural issues, availability of facilities, equipment and other resources were observed.

Observations followed the sequence of phases similar to those described by Leininger and McFarland (2006) and include:

1. **Phase 1**-Preliminary Phase - observation and active listening.
2. **Phase 2**-More focused observation. Themes start to emerge.
3. **Phase 3**-Special observations (Denscombe, 2003). Themes followed up and more specific data collected.
4. **Phase 4**-Reflective Observation.

The potential limitations to using non-participant observation and how these were addressed in the study are discussed next.

Limitations Of Non-Participant Observation

Anxiety and concern may develop as people may be uncertain about the purpose of the research. Healthcare participants, especially ward staff, may believe that the researcher is scrutinizing whether their work is being carried out correctly (Wind, 2008). Patients and their visitors may become fearful and distrusting about the topic of the study. Often families are not always informed straight away that the patient has an infection and the study may provoke fear. Strategies were developed to gain trust and rapport and reduce anxiety and fear within the setting. During the consent process, the purpose of the study was clearly explained and questions encouraged. Consent was re-negotiated regularly to build trust, rapport, confidence and to ensure informed consent was obtained on an ongoing basis. When and how the observations took place was constantly negotiated (Wind, 2008). This meant being sensitive to the environment and the people. A sense of trust and cooperation needs to be developed otherwise, as Loos *et al.* (1999) suggest, attempts may be made to exclude the researcher from observations. This did happen during the early days of data collection. With some nurses it continued during the entire field work. These methodological difficulties are discussed in a later section (See Researcher Role p.174). There may be a general lack of interest in the project (Loos *et al.*, 1999). It was anticipated that by talking to participants, displaying posters and leaflets about the study, anxiety and uncertainty may be minimised and interest generated.

People may behave differently if they know they are being studied, known as the Hawthorne effect (Mayo, 1949). During long periods of study this may be minimised as the researcher becomes a 'fly on the wall' (Gillham, 2008). This can also be a disadvantage. According to Wind (2008), non-participant observation may result in a failure to see the reality of the everyday world from the position of the actors, and the inability to interpret the language, symbols and meanings underpinning daily social interaction. These limitations were minimised through informal conversations and interviews with staff, by being receptive and open to the experiences and the emotions of those being studied and to the ongoing events and activities taking place and via reflection on this process (Wind, 2008). It was anticipated that participants may ask to see what was being recorded in the field notes. All names (including third parties), locations and other identifiable features were disguised by using pseudonyms across the data set, including interview transcripts, field notes and journals, to protect identities and the identity of the Trust.

Document Review

To obtain evidence on strategies supporting the use of infection control protocols and guidelines, a review of documents was undertaken in relation to some Trust documents. Analysing this information can be a time consuming process and the quality of the documents used cannot be controlled (Yin, 2009). Therefore data from the document review was not analysed using NVivo in the same way that observation and interview data was analysed. Rather the data was analysed

manually using evidence to corroborate or conflict with other findings (Yin, 2009). The type of documents used, their purpose and how these were used are described on p.158. Access was not required to any medical records or personal data including patient records.

Face-To-Face Semi-Structured Interviews

Face-to-face interviews are a way of accessing participants' views and interpretations of actions and events. It can be a two-way process in that knowledge will be jointly created between the interviewer and the interviewee and reflection on this process will be important (Carter and Little, 2007). Completely unstructured interviews were considered too broad for this study as much is known about the topic. Semi-structured interviews were used as these provide the ability to ask the participants open-ended questions from a topic guide. This type of interviewing provides depth to the study findings by allowing individual experiences to emerge (Krueger 1998), whilst ensuring relevant issues are addressed (Green *et al.*, 2006). There is also scope to ask further questions in response to the replies (Bryman, 2008). The aim was to focus on the interviewee's concerns and experiences relating to infection control protocols and guidelines to gain insight into what was viewed as relevant or important and their understanding of the topic areas raised. This type of interviewing allows lines of thought identified by earlier interviewees to be taken up and presented to later interviewees, demonstrating a reflexive, iterative process of enquiry (Bryman, 2008).

Use Of A Vignette And Discussion Group

The NHS Institute for Innovation and Improvement, as part of their Safer Care Priority Programme, aim to raise awareness of patient safety in English hospitals. The Institute developed a ten minute vignette entitled 'Alison and Sue' which portrays the real-life experiences of one family affected by MRSA and *Clostridium difficile* infections. The story is told from the perspectives of Sue (the patient) and Alison (her daughter). Alison and Sue agreed to the development of the vignette so that their experience could promote discussion and understanding about health-care associated infection and how the issues are handled at both a policy and practice level. The NHS Institute for Innovation and Improvement required the vignette to be evaluated so that it may be used with hospital staff to engage with them and encourage improvement in relation to the management of healthcare-associated infection.

A number of themes emerged from the vignette and these are reflected in the literature. The vignette would have several purposes in this study. It may assist with grounding participants' views and accounts of behaviour in the situational context (Barter and Renold, 1999) and may help to engage with participants on sensitive issues (Barter and Renold, 2000). Stimulating participants with visual information may help them think about things which they have forgotten or have taken for granted (Bryman, 2008). Vignettes appear to be most productive when the scenarios depicted are real and conceivable to participants, and this may

encourage participants to voice their opinions and concerns (Barter and Renold, 1999).

How Would The Vignette Be Used?

To encourage discussion and reflection on the practices related to *Clostridium difficile* infection and the use of protocols and guidelines, the aim was to use the vignette during a discussion group. At the end of the data collection phase it was planned that one discussion group would be held on the ward with 3-6 key staff participants involved with the study. It was planned that the vignette would be shown using a laptop. At the end, participants would be asked to discuss their reactions to this video, including what themes emerged for them. The session would last up to 30 minutes and would be tape-recorded, subject to the participants' agreement and the data analysed thematically and triangulated with other forms of data collected. Due to the practicalities of taking staff off the ward the vignette was not used.

Development Of The Topic Guide

The topic guide developed by Michie *et al.* (2005) was adapted and used for the interviews. This guide was amended based on key themes identified from the literature review. Questions were devised to be open-ended, as neutral as possible, clearly worded and followed a logical flow where possible. Prompts were provided from the literature review (Denscombe, 2003) (See Appendix 9a,

9bi, 9bii, 9c). The next section discusses the rationale for the chosen site of the case study, how access was negotiated and ethical approval obtained.

Site Of The Case Study

The site chosen for the study was a 1000 bed NHS University Health Board teaching hospital in an inner city district. The site was selected purposively due to its large size and the high levels of *C.difficile* infection it was experiencing. After extensive negotiations with the hospital (See Negotiating Access p.128) two wards were chosen for inclusion as separate case studies, however as will be explained later, only one ward was used during the field work. The wards were chosen because both had very high levels of *C.difficile* infection and both wards had been involved in an intervention study in which healthcare improvement methodologies from the 1000 lives campaign had been used to reduce the level of *C.difficile* infection. Practices used in this intervention included the use of a multi-disciplinary team and the development of an algorithm to assist with decision making, representing the steps that needed to be considered once a patient is identified with diarrhoea. The intervention also included thorough washing of all beds following discharge of a patient, the use of green tape on the commodes to illustrate that these had been cleaned, a label for the administration of antibiotics and a label to indicate that the patient had contracted *C.difficile* infection, which sits in the notes to remind staff of the patient's diagnosis. The level of *C.difficile* infection significantly reduced on one ward yet not the other. The aim of using both wards was to compare the differences in relation to the use

of the infection control protocols and guidelines and the difficulties experienced with this process.

Although antimicrobial prescribing is related to the management of *Clostridium difficile* infection (Department of Health, 2009a), exploring the use of antibiotics is not an aim of this study, rather the focus is on infection control practice. Use of the antibiotic label and the other issues related to the intervention were explored to understand how the spread of *C.difficile* infection was being managed. A description of the site used as the case is discussed in a later section.

Negotiating Access

The Director of Infection Prevention and Control of the University Health Board was approached in 2009 to discuss the study and negotiate access. She was very helpful and enthusiastic about the study and offered to assist with finding two wards. This process took many months and included attendance at several infection control meetings attended by ward managers within the hospital. The purpose of attending these meetings was to present the study to the group, to generate interest in the study and gain approval from interested ward managers for their wards to be considered for inclusion in the research. The rationale for including the chosen wards is described in the previous section. One ward manager registered interest in her ward participating in the study at an early stage

as she was keen to continue reducing the level of *C.difficile* on the ward. The study was seen as a way to understand further barriers to practice.

A presentation was made to the ward manager and one of the deputy ward managers to discuss how the study would proceed. This included how time would be given for interested nurses to attend an interview, where interviews would take place, access to patients and visitors and how other teams would be informed about the study (which is described in a later section - Raising Awareness Of The Study p.142). The discussion also included further arrangements that needed to be made, such as clothing that needed to be worn on the ward and where the identification badge could be obtained. Written approval was given from both nurse managers on one ward for the study to commence and a start date was arranged. Within one month of the field work commencing, the ward manager who had agreed to the study moved to a different ward and the deputy ward manager involved in the earlier meeting became the ward manager. Although she had agreed to the study, she may have felt it difficult to refuse as the ward manager had given her agreement and was enthusiastic about it going ahead. Mulhall (2003) identifies these difficulties as being part of negotiating access from the top down. In the current study, this created some problems for data collection which are explained later (See Researcher Role p.174).

Negotiations with the second ward continued during the field work, but unfortunately approval from the second ward did not materialise. A further ward

was offered as a case study several months into the field work. However by this time there were time constraints. Although the ward manager for the first case study had agreed to the study taking place, this information had not been communicated with other nurses and managers on the ward and there was a lot of suspicion about why the study was being done. Trying to gain trust and rapport was extremely difficult and used up a lot of time. Trying to organise interviews with nurses and doctors fitted around their work caused more time delays. In addition, as my background was not nursing, trying to understand the practices on the ward took longer than anticipated. It was realised that it would be better to study one ward in depth rather than two wards superficially. Therefore only one ward was used as a case study.

The Director of Infection Prevention and Control agreed to act as the research sponsor for ethics purposes and agreement was made to commence data collection once ethics approval and NHS Research and Development approval had been granted. The process of piloting the consent forms and process will now be discussed before explaining how ethical approval was obtained.

Piloting The Consent Forms And Consent Process

The public and service users were invited to conduct ‘user testing’ of the information sheets and consent forms. The purpose was to receive comments on the design and content of these documents and to provide feedback on how these may be improved.

Benefit Of Involving The Public And Service Users

Involving the public and service users in ‘user testing’ was beneficial to the ethics process as it helped to consider the way that participants in the hospital would be approached, by ensuring that the documents were understandable and assisted by showing that important concerns and issues had been addressed.

Deciding Which Organisations To Use

Several organisations were approached and the potential for the public to become involved with the study was discussed. An application form was submitted to Involving People (<http://www.involvingpeople.org.uk>) and to Healthcare-Associated Infection Service Users Research Forum (SURF) (<http://www.hcaisurf.org>). Involving People was selected because it a research organisation which supports and encourages patient, public and service user involvement in health and social care research. SURF was selected because it is a similar organisation yet is specifically designed to support research into

healthcare-associated infections. Applications were also submitted to the National Concern for Healthcare Infections (<http://www.nc-hi.com>) and *Clostridium difficile* Support UK (<http://www.cdifff-support.co.uk>) because many of their members had been affected by *Clostridium difficile* infection.

Advertising For Public And Service User Involvement

All four organisations advertised the opportunity for their members to become involved in the study. Responses were received from three of these organisations. Three groups were identified to conduct ‘user testing.’ (See Table 4).

<u>Table 4: Groups Involved With Piloting Consent Forms</u>
People who had suffered from a healthcare-associated infection (<i>Clostridium difficile</i> or MRSA)
People who had or were caring for someone affected by a healthcare-associated infection.
Healthcare staff working or previously worked within a hospital (medical professionals, nurses, ancillary staff, housekeeping staff, porters, hospital volunteer) or people with an interest in healthcare-associated infection.

What Were The Public And Service Users Asked To Do?

Eleven people volunteered to become involved with the testing process. Participants were located across the country. It was not possible to bring them together due to travel costs. The information sheet and consent form were emailed to participants via their organisation. Participants were asked to read the documents and comment on the layout, wording, language used, amount of detail provided, whether they understood the information, and whether all concerns had been addressed. A feedback form was designed for this purpose. Any questions about the consent forms were fielded via the organisation. Participants were asked to return their comments by email via their organisation before being forwarded to the researcher. Minor amendments were made to the consent forms. Once testing was complete, feedback was given to the organisations involved and participants thanked for their time and assistance.

Piloting The Consent Process

The staff information sheet, the consent form and process was piloted with staff working at the hospital where the study was to be carried out. Two Cardiology Technicians and a Senior Infection Control Nurse agreed to help with this process. Testing was conducted face to face and each person completed a feedback form, commenting on the consent form and process. No amendments needed to be made to the consent forms following this process.

Ethical Approval

Applying for ethical approval from the local Research Ethics Committee to undertake the research took approximately eight months to complete and was a frustrating, time consuming exercise. A meeting with Research Ethics Committee Panel C took place on 25th June 2010 and included twelve committee members, who asked their questions in relation to ethical concerns about the study design and how data would be collected. The meeting went well and one minor revision to the ethics application was requested in writing from the panel. Ethics approval was granted from the Research Ethics Committee on 12th July 2010 subject to approval being given by the Research and Development ethics committee at the hospital (See Appendix 3a and 3b).

The Research and Development ethics committee responded to the application for ethical approval in a letter with some minor concerns about the study. These concerns were addressed in response from the researcher. A favourable decision from the Research and Development ethics committee was received a few days later. Agreement was made that the study would adopt the principles laid down in the National Research Ethics Service (NRES) guidelines, relevant legislation and NHS Codes of Practice. An Honorary Contract for the researcher was provided by the hospital for the duration of the study. Field work commenced in on 1st August 2010.

The Field Work

Introduction

The sections that follow outline the methods that were used in the study to collect data, which was achieved using non-participant observation, informal conversations, semi-structured interviews and document review. This section starts by providing a summary of the data collected and describes the ward environment. It goes on to explain how consent was obtained and how sampling was undertaken for the different types of data collected. The data collection and analysis processes are described including the difficulties that were experienced with this process.

Summary Of Data Collected

Data collection took place between August 2010 and March 2011. Three types of data were collected including field notes generated from participant observations and informal conversations, transcripts of in-depth qualitative interviews and a range of written hospital documents, for example, ward protocols, an algorithm, labels for *C.difficile* assessment and antibiotic prescribing, cleaning schedules, hand hygiene audits, commode audits and minutes of ward meetings. A summary of the observations collected is shown in Table 5.

Table 5: Summary Of Observations Completed

From August 2010 – March 2011

Total number of hours observed	184 hours
Number of observation visits per week	3-4
Total number of shifts observed	51
Range of hours observed	7am -7.30pm 7.30pm -7am [including 4 x weekends]
Duration of observation period	8 months
Number of training courses attended	1 x <i>C.difficile</i> awareness session (30 minutes) 1 x infection control study day (5 hours)
Number of audits observed	2 x commode audits
Number of meetings observed	2 x ward meetings 1 x infection control meeting
Total number of pages of observation field notes generated	282 pages

Hand written notes were generated at the hospital or immediately after leaving the ward. These were typed up the same day or the following day. A total of 40 staff interviews were completed (See Tables 6, 7 and 8) and 8 patient interviews (See Table 9).

Table 6: Nurse Interviews Completed

Staff Role	Male	Female
Registered Nurse (RN)	1	11
Auxiliary Nurse Technician	1	3
Auxiliary Nurse	0	5
Ward Manager	0	3
Total = 24	2	22

Table 7: Doctor Interviews Completed

Staff Role	Male	Female
Consultant	0	1
Registrar	2	2
Senior House Officer	1	3
Total = 9	3	6

Table 8: Ancillary Staff Interviews Completed

Staff Role	Male	Female
Physiotherapist	0	2
Phlebotomist	0	3
Housekeeper	2	0
Total = 7	2	5

Table 9: Patient Interviews Completed

Number of Patients	Male	Female
With MRSA	4	3
With C.difficile infection	1	0
Total = 8	5	3

In addition to the staff and patient interviews, one interview was also undertaken with one female visitor. Difficulties gaining consent from visitors is discussed on p.153. A total of 296 pages of transcript were generated from the taped interviews. Interviews were transcribed verbatim normally within a day or two after interviews were conducted. Observation and interview data were coded using Nvivo 8. Codes were built up into categories and themes. This was an

ongoing process during the data collection and analysis phase and is described in a later section (See p.169).

Description Of The Ward Setting

The ward was a medical ward. It was initially divided into two areas, but within one month of the field work starting one area moved out of the ward, and the other area expanded to fill the whole ward.

The nursing team was headed by a ward manager and three deputy managers. There were 50 nurses employed to cover two shifts (20 registered nurses, 30 auxiliary nurse technicians and auxiliary nurses). A number of nurses were on long-term sick leave or study leave. There were three medical teams, each consisting of three consultants, two registrars and two/three junior doctors (senior house officers).

The two ward areas had eighteen and nineteen beds respectively, comprising two four bedded areas, two cubicles and an eight or a nine bedded area (See Appendix 4). One ward had three blocked beds to provide specialised treatment facilities for outpatients. The entrance to the ward led to a central reception. Off this central area was a patient day room, the ward managers' office and a kitchen. Each ward had a shower room and separate toilet for patients. Ancillary rooms on each ward

included a waste collection room, equipment store room, stock room, linen room and sluice room. One ward also had a treatment room where patient lines were inserted and a medicines room. A staff room was provided for nurses and a separate room for doctors outside the ward in the adjoining corridor. There were no changing or showering facilities provided for nurses or doctors.

Doctors worked 9am - 5pm. Two - three doctors covered the ward out of hours (6pm - 9am). The nursing shift pattern on the ward was two 12.5 hour shifts with half an hour overlap to allow handover between nurses.

Day shift: 7am - 7.30pm

Night shift: 7pm - 7.30am

Staffing levels varied but the ward manager aimed to provide each ward with four registered nurses with two - three nursing auxiliaries during the day shift. During the late shift the aim was to provide each ward with two qualified nurses and one nursing auxiliary. Visiting hours were 2 - 4pm and 6 - 8pm.

Handover took place at the start and end of a shift, overlapping for thirty minutes. Handover often ran over its allocated time, from between fifteen and thirty minutes. The process usually took place in the staff room and occasionally at the nurses' station. Qualified nurses handed over the information about their patients to the nurses and assistants using a printed form which nurses added to using their

hand written notes. Some nurses worked shorter hours and arrived on the ward mid-shift. Those nurses would receive a one-to-one handover with the nurse who was working an early or late shift, and this was often of shorter duration. Doctors handed over information about their patients at a computer terminal within the main reception. This usually took place at 9.00am with ward rounds starting at 9.30am. Wards rounds with consultants were held three times per week. Junior doctors held ward rounds twice per week. Nurses were expected to attend the ward rounds, yet often this did not happen due to time and staffing constraints. There was a multidisciplinary team meeting held once per week with a consultant and other members from different professions. Multidisciplinary team meetings were not attended by the researcher as part of the study as these were related to patient discharge. The following section describes the sampling procedure.

Participant Sampling Procedure

This section describes how people were made aware of the study, the sampling procedure and how the sample size was decided, how potential participants were identified, approached and recruited and how different forms of data were collected and recorded.

Raising Awareness Of The Study

An appointment was made with key personnel at the hospital to inform people about the study and to negotiate access. These individuals acted as gate keepers and include the Director of Infection Prevention and Control, the Director and Deputy Director of Nursing, the Medical Director and one Ward Manager and a Deputy Ward Manager. A one page letter summarising the study was sent via email to managers of all departments where staff interfaced with the ward. This included the medical and nursing team, pharmacy, dieticians, physiotherapists, phlebotomists and housekeeping. This was organised by the Director of Infection Prevention and Control prior to start of data collection. This process was repeated by the Director of Nursing during the first week of field work. Ideally meetings with the wider teams working on the ward would have been beneficial to improve staff awareness about the study. Every effort was taken to make hospital staff, patients and visitors aware of the study, by displaying a poster in the corridor at the entrance to the ward and displaying leaflets on notice boards, within staff rooms, the patient day room and at reception. Leaflets were also issued to potential participants as part of the consent process (See Appendix 5a and 5b).

Sampling Design

Consistent with naturalistic enquiry (Lincoln and Guba, 1985) an emergent sampling design was used for the observations, informal conversations, interviews and hospital documents. Participants within the sampling frame (the ward), were

selected on the basis of illustration, depending on, for example, their characteristics, role or the task they were undertaking (McDonnell *et al.*, 2000). A mixture of purposive sampling (Lincoln and Guba, 1985) and theoretical sampling (Glaser and Strauss, 1967) was used to provide information rich cases, depending on the contribution and insight participants offered (Denscombe, 2003). Cases were chosen because they illustrated a typical example or they illustrated an extreme or deviant instance (Yin, 2009). For example, one visitor was selected because she became involved with the care of a patient who had contracted *C.difficile* infection. This was the only example of a carer being involved in care that was identified during the field work and represents an exception to standard practice.

Purposive sampling is in contrast to random sampling, where a representative case may often not be the richest (Lincoln and Guba, 1985). During sampling, participants were selected so that comparisons and checks could be made as the data emerged (McDonnell *et al.*, 2000). Tasks, activities, locations, events such as meetings, audits, training sessions and documents were chosen in a similar manner. The emergent design allowed continuous adjustment of the sample, to aid the development and testing of interpretation of the findings, until saturation was achieved (Miles and Huberman, 1994). Only English speaking adults who gave informed consent were included in the study. A selection of participants were thus chosen for the observations, informal conversations and interviews from staff, patients and visitors (See Eligibility Criteria – Appendix 6).

Sample Size

Based on the results from other qualitative case studies (Flynn and Sinclair, 2005; Ginsburg *et al.*, 2007; Stetler *et al.* 2007) it was anticipated that 30 - 40 interviews would be carried out over a 7 month period until saturation of data was reached. Prieto and Macleod-Clark (2005) used a single case study to explore factors influencing infection control practice and adherence to *Clostridium difficile* guidelines. Semi-structured interviews were used with 13 registered nurses and 5 nursing assistants (total of 18 staff members). Observations were carried out over 60 hours. No other staff groups were used. The study did not include patients or their visitors.

In the current study it was decided that up to 8 doctors, 8 nurses, 8 ancillary staff, 8 patients and 8 visitors would be used as a guide for the interviews. The actual number of interviews completed can be found on p.137 and 138 (See Table 6, 7, 8 and 9). The purpose of including patients was to explore their experience of treatment and care and to provide a different perspective from healthcare staff. Patients may provide a richer insight into infection control practices (Hardy *et al.*, 2007).

Participant Selection, Recruitment And Withdrawal

The following section describes how potential participants were identified, approached and recruited. Data collection is discussed in a later section.

Obtaining Informed Consent

A mixture of informed consent and process consent was used in this study (Behi, 1995). Munhall (1988, p.151) describes informed consent as a “*static, past tense concept*” and process consent as a concept “*...to facilitate negotiation and renegotiation to protect our collaborators’ human rights.*” A total of 72 written consents were collected (See Table 10 overleaf).

Table 10: Summary Of Written Consent Obtained

Staff Role	Male	Female
Registered Nurse (RN)	1	22
Auxiliary Nurse Technician	1	3
Auxiliary Nurse	0	10
Ward Manager	0	3
Consultant	0	1
Registrar	3	2
Senior House Officer	3	4
Physiotherapist	0	2
Phlebotomist	0	3
Housekeeper	2	0
Maintenance	1	0
Doctor's Assistant	0	1
Infection control nurse	0	1
Patients	5	3
Visitors	0	1
Total = 72	16	56

Documenting Refusal And Withdrawal

Three members of staff and four visitors refused to participate in the study. No one withdrew their consent during the study. Details of how to withdraw consent were explained during the consent process and included on the information sheet. One participant died during the data field work. As this patient had previously consented to the study their anonymised data was included in the analysis.

Obtaining Informed Consent

The sections that follow discuss how informed consent was obtained.

Identifying Healthcare Staff And Obtaining Consent

The first two weeks of field work were used to settle into the ward, become familiar with the staff and allow them to become familiar with the study and my presence. Written consent was sought from all potential case-study participants at commencement of the study. All eligible ward nurses that were working on the ward at the time of the study were approached individually, informed of the study and invited to participate. No identifiable personal information was used to screen for potential staff participants.

Commencement of field work coincided with the changeover of placements for the junior doctors (senior house officers) which takes place every four months. This was perceived as an advantage, as these doctors were new to the ward. Each doctor was approached and invited to take part. A sample of registrars and consultants were chosen purposively and invited to take part.

There were two physiotherapists who regularly worked on the ward. Both were invited to take part. A sample of phlebotomists and housekeeping staff were also invited to take part. Physiotherapists and phlebotomists were chosen because of the close contact they had with patients and the potential risk of cross-contamination involved with their work. Housekeeping staff were chosen because of their cleaning duties and the importance of cleaning in relation to infection control.

Taking consent was a difficult time consuming process due to the large number of staff working on the ward, the dynamic nature of the environment and the busyness of the ward. Staff worked different shifts, some worked part-time, some nurses worked only nights and it was not possible to talk to large numbers of staff in groups. Consent was therefore slower than anticipated because individuals had to be approached individually, and consent needed to be obtained to fit around their busy work schedule.

During the consent process, the information sheet and informed consent form (See Appendix 7a) were explained to participants. It was explained that staff may opt to take part in either the observations or interview only, or the observations and the interview, or not to take part at all. Reassurance was given that taking part was voluntary, they may refuse to be observed, engage in informal conversations or answer interview questions. It was explained that all comments made would remain confidential, all information would be anonymised to protect identities and that they may withdraw consent at any time. Explanation was given as to what information would be collected, the anticipated risks and benefits of the study and how these risks have been addressed. Explanation was given as to how the data would be used, stored and who would have access to it. The source of funding for the study, my university and department, contact details of my academic supervisors were disclosed. Concerns or questions were encouraged and discussed. Where participants agreed to take part, a day or so elapsed before the person was approached again, to allow them time to think about the issues and change their mind. This was explained to them. On return, subject to their agreement, participants were asked to sign the consent form. Signed consent forms were filed. A copy of the information sheet was left with each person.

Verbal consent was sought from all participants before any observations and informal conversations were carried out. Where possible, staff, visitors or other unexpected persons who were not part of the study, that entered a location where observations were taking place, were approached and the reason for the researcher's presence explained. If these individuals were unhappy for

observations to be carried out whilst they were present in an area, the researcher left the area. This happened in a few instances, for example, where a patient had arrested. This was documented in the field notes. Verbal consent was re-negotiated frequently throughout the study, for example, at the start of each observation session and at the time of the interviews.

Identifying Patients And Obtaining Consent

During the study there was no requirement to access patient medical records. No identifiable personal information was used to screen for potential patient participants. Before a patient was asked to participate, the nurse-in-charge was asked to assist with confirming the inclusion and exclusion criteria. Where it was felt by the nurse-in-charge that a patient was too ill, too depressed, too vulnerable, under too much stress, not able to consent for themselves or the intrusion would be insensitive to their needs (Hardy *et al.*, 2007) they were excluded from the study. Care was taken to ensure that eligible patients were not invited to participate in the study before they had been informed about information that made them eligible, for example, being infected with *Clostridium difficile* infection. Confirmation of infection was sought from the nurse-in-charge prior to approaching a potential participant.

Initial contact with a patient to discuss the study and to invite them to take part was made by the researcher on the ward. Consideration was given to using a

member of the nursing team to approach the patient in the first instance, however the ethics panel considered this to be impractical due to time constraints. Patients were made aware that the researcher was not a member of staff and their care would not be affected should they decide not to take part. Patients were asked if they wished to have a relative or friend present during the consent process to help them to make a decision, and if so arrangements would be made (Royal College of Nursing, 2006). The discussion about consent took place in either the day room or at the bedside. The process of obtaining consent was similar to that previously described with staff participants (See Appendix 5b and 7b). Extra time was taken with patients where necessary, depending on their needs, to improve understanding. A copy of the leaflet and information sheet was left with each patient. A government leaflet about *Clostridium difficile* infection was also given to them.

Where a patient agreed to take part, a day or so elapsed before the patient was approached again for a decision. This was explained and was to ensure that the patient still agreed and was well enough to take part. The extra time allowed patients to think about the issues, allowed them to change their mind and permits changing circumstances with their health status and needs (Hardy *et al.*, 2007). The consent process was repeated and questions were asked to check the individuals understanding. If a patient agreed to take part he/she was asked to sign and date the consent form. The discussions that took place with the patient and their decision to take part were documented in the field notes. Where a participant was unable to sign or mark a document to indicate their consent,

arrangements would have been made for their consent to be witnessed and documented, however this was not necessary as all patients approached were able to sign themselves. Care was taken to ensure that patients did not consent under any form of manipulation, coercion or undue influence from myself, ward staff, or family and friends. Signed consent forms were filed.

Once written consent had been obtained, the patient's verbal consent was re-negotiated regularly as an on-going process, before taking part in the observations and/or an interview. Verbal consent was documented in the field notes. If consenting patients changed their mind and did not wish to take part in the observations or the interview, they would have been excluded. If excluded patients had been uncomfortable with my presence on the ward I would have removed myself from the area for a specified period of time and documented this in the field notes. However this did not happen during the field work.

Identifying Visitors And Obtaining Consent

No identifiable personal information was used to screen for potential visitor participants. Visitors were identified by the researcher during visiting hours. Visitors were approached by the researcher on the ward during visiting hours and invited to take part in the study. After consideration of this issue with members of the public and service users, visitors were approached when they were sitting with the patient, rather than as they entered the ward. Introductions were made and the

study briefly described. If the visitor was interested, more detail was given and the information sheet and consent form were explained. The process of discussing consent previously explained for staff and patient participants was repeated with visitors. Where visitors were interested in considering taking part, a copy of the leaflet and information sheet was given to them (See Appendix 5b, 7c). One visitor agreed to take part in the study. Four visitors refused to take part. Taking into account the poor state of health of the patients on the ward and the difficulties with gaining consent from their close relatives, no further attempts were made to include visitors in the study. The next section discusses the process of data collection.

The Data Collection Process

The sections that follow describe how data was collected using the chosen research methods, which include non-participant observation, informal conversations, document review and semi-structured interviews.

Non-Participant Observation

Written consent was sought from all participants at the start of the study and verbal consent was re-negotiated regularly as described above.

With their consent, nursing staff were shadowed to allow understanding of routine infection control practices on the ward. Where nurses expressed that they were too busy to be shadowed, observations were quietly undertaken from the nursing station, a ward corridor or a ward, yet only with participants' consent. During the first 6 - 8 weeks of field work it was difficult to shadow some nurses, and this may have been due to their anxiety about the study. This was a frustrating time but it became easier as rapport and trust was built up.

Each site visit was negotiated with the nurse-in-charge of the ward and boundaries were defined. This includes areas and activities that were to be included in the observations and those that were to be prohibited, taking into consideration ethical conditions of the study. For example, it was explained to staff that the handover process may be observed with their consent, but there would be no requirement to review or document personally identifying patient information from medical records. These arrangements were continually and carefully negotiated, which required being sensitive to the environment and the people. For example some nurses consented to the observation of activities undertaken behind patient curtains, but they did not invite this for many weeks, until rapport and trust had

begun to become established. Where this happened, the verbal consent of the patient was sought and it was explained that observations were only looking at the nurse's practice.

The infection control practices laid out in ward protocols and guidelines were used as a guide to what to observe, in addition to the literature and informal ways of working mentioned by staff during informal conversations and/or interviews. The relevant instructions for patients and visitors contained in ward leaflets and displayed on notices were also used as a guide for observations. For example, hand hygiene procedures, the requirement for visitors to gown up before entering an isolation cubicle and the requirement for patients infected with *C.difficile* infection to use a commode rather than the patient toilet to prevent cross-contamination. Observations were undertaken usually three to four days per week for two months, before starting the interviews, but continued between interviews. Information from the observations was used to frame questions during interviews to prompt participants in relation to a line of questioning.

Similarly, information that a participant mentioned during an interview was actively looked for on the ward. For example, one nurse mentioned the isolation policy as being 'hit and miss' and that nurses were unsure about whether to barrier nurse patients or not. This process assisted in providing a deeper understanding of what was going on in relation to the difficulties that staff experienced with infection control practice, and highlighted issues that may not have come to light

if the methods had not been used together. Thus the data was triangulated to enhance credibility of the data (See other ways that were used to enhance credibility p.112). By comparing observation data with interviews and hospital documents, it assisted with corroboration of the data or highlighted contradictions, so that further questions and checks of the data could be undertaken (Yin, 2009).

A full range of times were observed during the day (7am - 7.30pm) and night shift (7.30pm – 7pm), including four weekends, in order to gain insight into the full twenty-four hours of the ward. Observations ranged from 2 hours to 6 hours with the average being 4 hours. During observations, themes started to emerge and the observations became more focused looking at perhaps one particular task in more detail, for example, isolation practices, barrier nursing on the open ward, glove and gown use or cleaning. The process was iterative and reflective. Themes were checked out and/or discounted and these sometimes led to different avenues of observation being undertaken yet still looking at infection control practice. Consent was also given to observe during infection control meetings, training sessions and a commode audit.

Recording Observations

During observations, where possible, notes were written down about things that were observed or informal conversations that took place on the ward relating to infection control. Informal consent was sought before using any conversation

with a participant, only if written consent had previously been given. To reduce the anxiety that was sensed on the ward in relation to the study, field notes were written outside the ward, often in the cafeteria or ward corridor. Sometimes observations were recorded with a tape recorder and transcribed later in the day or during the evening. Field notes aimed to capture information about the phenomena encountered and emerging themes as the project un-folded (Belk *et al.*, 1988). Notes were made each day of dates, times, locations of events, meetings, activities, occurrences and the number of hours spent observing. Contextual details about the environment, people and conversations relating to infection control were recorded (See Appendix 8).

Comments and interpretations about what had been observed were recorded in brackets to indicate these were notes about ‘the self’. These included impressions, difficulties, feelings and emotions, biases, speculations and theorising (Belk *et al.*, 1988). Notes were also made of ideas, changes of direction, motives, hunches and insights. Such records were used to retrospectively interpret field notes and make sense of the data. At the end of each day, field notes were hand written and typed up the next day. These records contained a narrative of events in the form of a ‘thick description’ (Geertz, 1973) providing a rich portrait of the phenomena being explored. Such records provide auditors with the faithfulness of the interpretations of the data (Belk *et al.*, 1988).

Document Review

To obtain evidence on strategies supporting the use of infection control protocols and guidelines, a documentary review was conducted on Trust documents. Permission was sought to see the infection control manual and associated protocols and guidelines used by staff on the ward. Permission was also sought to review supporting documents such as hand hygiene and commode audits, monitoring records for cleaning tasks and minutes of infection control meetings. Access to documents required cooperation with key informants, such as the infection control nurse, nurse director and ward manager. This was a relatively easy process with the infection control nurse and nurse director, as both were enthusiastic about the study. However, the ward manager that took over the management of the ward, blocked access to certain documents that were requested, often explaining that she was too busy to retrieve them. This suggests that she was asserting her power and control over data collection, possibly because she had not been involved with the decision for the study to go ahead, as agreement had been made by her predecessor. This raises the importance of building trust and rapport with key informants and involving key people at an early stage when negotiating access.

A document review was useful for several reasons. Firstly, it provided a starting point to understand organisational aspirations towards protocol and guideline adoption and to understand the way in which issues had been framed (Bryman, 2008). Secondly, the use of protocols and guidelines assisted with directing the

observations by providing a baseline measure against which any gaps in practice could be identified (Hamilton *et al.*, 2007) so that specific areas could be explored. Thirdly, documents assisted with the correct spellings and names of infection control procedures used on the ward. Fourthly and most importantly, documents were used to corroborate information from other sources. Where evidence was contradictory, further lines of enquiry were undertaken (Yin, 2009) to understand why this was the case. Sometimes documents were useful to corroborate the researchers own field notes. For example, minutes of meetings that had been attended were compared with hand written notes taken during these meetings, which sometimes highlighted additional useful information that could be further explored. Field notes taken during observations were compared with information from protocols and guidelines to confirm or contradict collected evidence. In both cases, further questions could be asked of the data.

Semi-Structured Interviews

Interviews commenced during the third month of data collection (See Appendix 9a, 9bi, 9bii, 9c). This time period allowed relationships to build with participants and allowed time to reduce anxiety about the study. This was important because by the time interviews commenced, some nurses had relaxed in my presence, which enabled them to feel they could share information about their concerns and difficulties experienced with infection control practice. However building trust and rapport was ongoing as new nurses were met at different stages of data collection, for example, some returned to the ward from leave. Some nurses

consented to an interview many months into the field work and confided that they had perceived my presence as a threat, because it involved the investigation of practice. Some nurses perceived that it was a management strategy with the intention of reducing the number of nurses on the ward.

Participants were chosen for interview because they had experience of the phenomena under investigation. The characteristics of the staff population were considered to ensure a range of roles, professional groups, hierarchy, gender and number of years in post, as these factors may influence their perceptions. Interviews were only carried out with participants who had given their written consent. Verbal consent was also re-negotiated. A total of 40 staff interviews were completed. Interviews were also undertaken with 8 patients and 1 visitor (See Summary of Data Collected p.135). All participants that took part in the study gave their time generously.

Agreement was made with the ward manager that a side room outside the ward could be used for the purpose of interviewing. This room was used for the majority of the interviews. Sometimes it was not possible to use the room as it was used for meetings. When the room was unavailable, the ward office was used, if it was available. This room was difficult to conduct interviews in as there were often disruptions from people entering to use the computer. On one occasion, a nurse was interviewed in the corner of the ward, as she was continually monitoring a patient and there was no cover. This was not ideal as the

ward was noisy due to machine alarms sounding, the nurse was interrupted by other nurses and the interview was carried out quietly, as other patients were close by. Staff rooms were occasionally used for interviews, which was difficult as the interview had to be stopped and re-started as people entered and left. Interviews with patients and visitors were conducted by the bedside or in the day room.

Fitting in interviews with staff was problematic due to their busy schedules. The ward manager gave permission for staff to be interviewed during their shift as long as work commitments permitted and other nurses gave their permission that they could manage for a short while. It was perceived to be unfair to expect nurses to be interviewed after their 12 hour shift had ended, as they were often mentally and physically exhausted. Some nurses chose to be interviewed at the start of their shift and a few nurses offered to be interviewed during their break. The best time for interviewing nurses during a day shift was often between 2 - 3pm, and between 1 - 2 am during a night shift, as these appeared to be the quietest times. Doctors and ancillary staff were interviewed on the ward and usually appointments were made to fit in with their schedules. Waiting for staff and rescheduling appointments was common practice and needed a great deal of energy and persistence.

On one occasion the ward manager prohibited an interview being carried out, even though the nurse said she had completed her work and the ward was quiet. This nurse had said to me afterwards *“see, I told you she wouldn’t let you talk to me.”*

On another occasion the ward manager sent another nurse to the interview room and requested the nurse to return to the ward. The interview was cut short after twenty minutes and had been particularly interesting. The nurse was later asked if she would like to continue with the interview another time, however she declined. On reflection, this may have been a way of the ward manager preventing certain people from expressing their views. A strategy developed to overcome the ward manager obstructing data collection was to find out which area she was working on, and collect data from the opposite ward.

Interviewing patients was much easier as they were often glad to have someone to talk to. Interviews with patients were arranged to fit around physiotherapy, meal times and visiting hours. Only one patient who had suffered from *C.difficile* infection was interviewed, although eight patients were interviewed in total. The difficulties with interviewing such patients were many. For example, patients were extremely unwell or dying. Some patients died. Other patients were moved to a different ward or a care home between the researcher's hospital visits. Sometimes information about patients infected with *C.difficile* was not communicated to the researcher.

Only one visitor was interviewed and she was the wife of a patient who had recovered from *C.difficile* infection. This case was unusual as the visitor was involved with caring for the patient on the ward. The interview took place during visiting hours with the patient at the bedside. Attempting to obtain interviews

with visitors was fraught with difficulties. Several visitors declined attempts to talk to them once the word 'study' was mentioned. This is understandable as patients on the ward were extremely ill and their time on the ward with the patient was valuable.

At the start of each interview, a few minutes was given to introductions, to explain the purpose of the study and the interview format. The purpose was to set the scene and relax the participant. Sometimes nurses and doctors would take coffee into the interview room which made the atmosphere more relaxing. Interviews lasted from 20 to 60 minutes. All participants consented to interviews being tape-recorded. General information was noted about each interviewee, to contextualise the answers given. For staff this included age, gender, role, number of hours worked and number of years employed. A note was made of each patients age, gender and whether currently infected with a healthcare-associated infection. Patients with infection were not approached unless they had already been informed by hospital staff of their condition which made them eligible.

Staff interviewees were presented with one key question asking what is it like trying to manage infections such as *C.difficile* on the ward. A series of open questions were used as prompts to allow the participant to provide a deeper response (Bryman, 2008). Care was given to being sensitive to using the person's own language when framing questions (Krueger, 1994). Every effort was made to practice good listening skills and not to lead the conversation (Denscombe, 2003),

yet sometimes it felt difficult knowing to what extent the interviewer should become part of the conversation. As an extended period of time was spent on the ward and due to the closeness of work with nurses it was difficult to become completely detached from ward life. Some nurses occasionally asked questions during the interview to obtain a reaction to matters that were raised in relation to constraints to practice. Where this happened, every effort was taken to empathise with the difficulties they experienced without giving judgement. This opportunity was used to probe further, to find out what if any effect the constraint was having on them and their practice. During interviews, if participants appeared uncomfortable, anxious or hesitant and/or their reactions or body language suggested that a sensitive area had been touched, no further probing was undertaken. This happened in one particular instance where a nurse slipped out in conversation that he/she was an asymptomatic carrier for *C.difficile* infection. Embarrassment was sensed and no further questions were asked in relation to this. At the end of each interview, participants were given the opportunity to ask questions and thanked for their time and co-operation.

Post-Interview Process

As soon as possible after each interview, detailed notes were made in the first person about any emotions and feelings regarding the outcome of the interview and any problems that had arisen (Denscombe, 2003). Notes were made about where the interview took place and any other insights from the interview process such as further lines of enquiry. Tape-recorded interviews were listened to,

checked for audibility and completeness before being transcribed. When listening to the tape a critique was made of the interviewing style and transcripts discussed with supervisors. Early transcriptions highlighted that sometimes leading questions were asked or too much support was given to the participant's response. Sometimes overzealous questioning masked part of the participant's response which was frustrating as a potential line of enquiry was lost. This process was useful to enable subsequent interviews to be conducted in an improved manner (Polit and Beck, 2008).

Data from interviews was compared with other interviews, and checked against field notes from observations and other sources such as hospital protocols and guidelines or monitoring records. This assisted to corroborate the data or highlight any inconsistencies (Yin, 2009). Any follow up questions were documented so that further questions could be used as prompts to other participants during future interviews. This was an iterative process which continued until all critical lines of enquiry were exhausted.

The purpose of including patients in the interviews was to provide a different perspective from healthcare staff. After listening to the tapes it was realised that the patient data did not provide rich answers to the research questions. Patients were more interested in having someone to talk to and often raised concerns about how their diagnosis was being communicated to them or complained about the selection of hospital food that they were being served, rather than illuminating

issues relating to infection control. This was surprising considering that there was some evidence in the literature that the public are fearful of healthcare-associated infection (Gould *et al.*, 2009; Hawkings *et al.*, 2007). The decision was therefore made to exclude patient interviews from the analysis. The next section discusses the process of transcription and analysis.

Data Transcription And Analysis

Data from the observations and interviews were analysed thematically using NVivo 8 to assist with the organisation of large amounts of qualitative data. Strategies recommended by Miles and Huberman (1994), Richards (2009) and Bazeley (2007) were drawn upon during the analysis process.

Data Transcription

As soon as possible after, and normally within a day or two of the interview taking place, the data was transcribed verbatim by the researcher in order to provide a full and true account as possible (Miles and Huberman, 1994). Long pauses of silence, laughter and sighs, for example, were transcribed by writing the words in brackets [sighs] to provide the essence of what was being said (Kvale, 1996). The transcripts were annotated with non verbal cues and tone of voice, such as sarcasm or raising of the voice to consider interpretation of the data (Miles and Huberman, 1994). Interference was also noted, for example, the tape being turned off as someone entered the interview room (Bazeley, 2007). Where the

interviewee sometimes digressed from infection control protocols and guidelines, the conversation was transcribed to capture information that may be important (Richards, 2009).

Transcription typically took 8 hours per hour of interview (Polit and Beck, 2008). Being immersed in the data allowed the researcher to get close to the data (Bryman, 2008) and assisted with analysis. Difficulties with transcription included understanding what the participant had said. This happened where there was noise in the environment (for example, machines were sounding) or where the participant's spoke too quickly or their accent was difficult to understand. This often caused delays with transcription as the tape was played and replayed to pay attention to the detail. Difficulties with transcribing sometimes happened due to pauses in the interview as a result of interruptions. This sometimes affected the thread of the conversation, although this was not noticed at the time. These difficulties highlight the importance of having somewhere quiet to conduct the interviews, without disruptions. Participants sometimes named other individuals or locations during the interview and these were recorded on tape and anonymised during transcription to protect identities. Once the transcription process was complete, the tapes were deleted to satisfy data protection requirements.

Preparation For Data Analysis

Prior to entering the hospital an NVivo project was set up in preparation for data analysis. Folders were prepared for data records such as field notes from observations, interview transcriptions and hospital documents. A journal was set up to record an account of decisions that were made during data collection and analysis, including any changes in direction. This is important so that insights and the development of ideas can be captured and traced as the data is analysed and conclusions are made (Bazeley, 2007). Initially, ideas were recorded about preconceptions and expectations about what was likely to be found in the field, so that these may be brought to the surface and tested during field work (Richards, 2009).

Conducting Data Analysis

Analysis began during the field work as the data was collected and continued throughout the study, consistent with the emergent design of a naturalistic inquiry (Lincoln and Guba, 1985). The purpose of the analysis was to characterise the experiences of individual participants by general insights from the data as a whole, resulting in the generation of themes (Bradley *et al.*, 2006).

Each week, usually three to four days were spent in the field collecting data and the remainder of the time was used to write-up field notes, transcribe interviews and analyse the findings. Sources of data such as the observations collected from

field notes and interview transcripts were named, imported into NVivo 8, placed into separate folders and arranged in date order to organise the information. The first step in the process of analysis was to read each document in its entirety. The purpose was to allow immersion and to provide a general understanding without losing connections between concepts and their context (Bradley *et al.*, 2006).

Coding The Data

Coding provided the next step in the analysis of the data. Coding provided a formal system to organise the data, allowing the identification and documentation of links between concepts and experiences described by participants (Bradley *et al.*, 2006). Each document was read and segments of text were labelled with a code to convey meaning whilst preserving the context (Miles and Huberman, 1994). A mixture of broad-brush coding (Bazeley, 2007) (sometimes called “lumping”) and breaking the segments of text into smaller segments (“splitting”) was used (Saldana, 2010). Key words or phrases used by participants were coded, where possible, to keep their view intact.

The analysis used a mixture of deductive and inductive approaches. It was deductive in the sense that data was analysed with consideration of the research questions and the use of a simple coding structure as a starting point. It was inductive because data was read and re-read as part of an iterative process, where meanings were inferred to the raw data (Miles and Huberman, 1994).

Observation data was initially coded using free nodes without the use of a coding structure. Examples of early free nodes used included *uncertainty* about infection control procedures, such as disposal of infected waste due to changes in bin colours. Another example included *unclear responsibilities* relating to ordering of supplies such as alcohol hand rub. Sometimes a segment of text was coded more than once. This quickly became an unmanageable process as large numbers of free nodes were developed. Similar nodes were therefore organised into tree nodes to reduce the data and create an indexing system (Bazeley, 2007; Richards, 2009). Codes were frequently reviewed in addition to the coded segments of text. During this process codes were merged and free nodes re-coded, as the coding structure was refined.

A simple set of preliminary codes based on the plan, do, check, act cycle (Kim, 1993) was used for further coding of field notes. This model was used because it helped to consider the research questions. For example, issues relating to policy, protocols and guidelines were stored in a tree node labelled *policy*. This included perceptions about the infection control standards and recommendations and how staff became aware of these. Issues in relation to the implementation of protocols and guidelines were placed into a tree node labelled *implementing*. This was further sub-divided into *barriers* and *enablers*. Difficulties identified with learning from practice, such as issues relating to monitoring and feedback, were placed into a tree node labelled *actions*. Although it may be considered a disadvantage to use a simple structure to code at the initial analysis phase, it was an advantage because it helped to maintain focus on the research questions

(Richards, 2009) and was a useful starting point (Miles and Huberman, 1994). The coding structure was not rigid, rather it evolved as coding progressed (See example of the coding structure - Appendix 10).

Interview transcripts were coded in a similar pattern as described for the observation data. Initially the codes from the observation and interview data were kept separate so that any similarities and/or differences between the two sources of data could be easily identified. As coding progressed the two forms of data were analysed together, but it was still possible to identify which data related to observations and which related to interviews. Reflections on the data were written in memos, which were labelled with a description, dated and filed. Memos were used to make a note of changes to the coding system including connections and insights that were made as coding progressed. These were useful to document what was considered important and what was considered less important. Memos later assisted with the interpretation phase of analysis and the writing process. Each day the NVivo file was labelled with the date, and a copy made for back up purposes. Files were stored in folders by month and year to provide an audit trail (Richards, 2009).

Development Of Categories And Themes

As data analysis progressed codes were compared and contrasted to assess the degree of fit between their meanings. This was an analytical and interpretive

process, whereas the previous section describing how initial codes were formed was a descriptive process (Richards, 2009). As codes with similar related meanings were merged, tree nodes were re-coded as categories formed and a new meaning emerged, a process which Richards (2009) coined *coding on*. Questions were continually asked about the data, for example, *Why was a category important to the study? How did a category relate to other categories?* This process involved reading and re-reading the field notes and interview transcripts and reflecting on the data. Quotes were selected to convey the essence of each category and to represent contradictory perspectives between roles and within roles and to represent new insights (Bazeley, 2007). To provide an audit trail, each quote used from an interview transcript was referenced with the page number and line number from that transcript, for example, p1: L1. Each quote used from a field note was referenced by the line number, for example, L1.

Although the process of coding reduced the information collected, the goal was to learn from the data, to continually revisit the data until patterns and explanations emerged into themes (Richards, 2009). Categories eventually developed into the subtopics of themes. The first theme that emerged from the data was about participants' awareness and perceptions of the protocols and guidelines, and this related to the first research question. Four themes emerged from the data in relation to the second research question, which related to influencing factors which assisted and hindered the implementation of infection control practice. These themes included ambiguity, professional frustrations, organisational issues and perceptions of contamination. The final theme was related to the participant's

ability to deal with difficulties with implementing protocols and guidelines into practice.

Reflexivity And Positionality

As the interpretivist approach is based on the epistemological and ontological assumptions that knowledge and reality are created through interpretations, the values held by the researcher cannot be separated from the research process (Bryman, 2008), because by studying the social world, we become part of it (Hammersley and Atkinson, 1983). Reflexivity therefore becomes an important part of the research process, as not only can the researcher be influenced by the behaviour of participants and the setting (Coffey, 1999) but the researcher's presence can influence the behaviour of those being researched (Denzin and Lincoln, 2005). Reflexivity assists to provide a better understanding of the researcher role and the impact this can have on the research process and findings (Van Maanen, 1988).

Reflexivity means reflecting on and acknowledging these influences on the research process (Whitaker, 1996) whilst making these transparent to the researcher and the reader (Allen, 2004). Being reflexive is important throughout the research process. This includes consideration of how relationships were established, access was gained and issues faced in the field were overcome and how these issues shaped the data collection, analysis and reporting phases. Reflexivity also

means being sensitive to the ways in which the interpretations and the research process have been shaped by the researcher's past experience, interests, prejudices and pre-understandings (Alex and Hammarstrom, 2008). The researcher must therefore engage in reflexive activity to enhance the credibility, transferability and trustworthiness of the research findings (Allen, 2004). The following sections discuss how reflexivity was used in this study. A later section discusses the positionality of the researcher.

Researcher Role

Field notes were sometimes written with reflection as to how participants related to my role. Finlay (2002) describes this process as a form of intersubjective reflection, where the self in relation to others becomes the object of focus. I was viewed by some nurses with a high degree of suspicion, as someone who had come in to monitor their practice and report back to management, even though reassurance was given that this was not the case. I may have strengthened their suspicion unwittingly as I used knowledge about the bed cleaning trial and knowledge of names of directors whom I had met, as I explained how I had come to use this ward as the focus for my study. I believed that using this 'insider' knowledge may have helped to close the gap between the researcher and the researched. Unconsciously I may have been trying to restore the lack of power that I had felt as a (non-nurse) researcher and an 'outsider' trying to look at practice. In some cases this worked in my favour as I felt some nurses relaxed in my presence. In other cases, knowing something about their world and implying

closeness to the infection control and nursing directors may have heightened their anxiety, and reinforced their perception that I was being sent in to monitor practice. One senior nurse openly said in front of a group of other nurses that I was “*spying for the chairman.*” Some nurses who viewed me as a threat remained distant to me throughout the field work. Some nurses who had given their written and verbal consent avoided looking at me. Perhaps by keeping their distance they were avoiding me asking questions or shadowing them? Meetings had been arranged prior to the commencement of the study with ward managers, but registered nurses and auxiliary nurses had not been involved with this process. Difficulties relating to suspicion about my presence may have been overcome if meetings with ward nurses had been arranged prior to the start of field work to smooth the path. Also prior to the study commencing, a meeting perhaps should have been arranged solely with the ward manager who was to take over the management of the ward, which happened during the second month of field work. Although she had agreed to the study when I had met her with the other ward manager, and she had formally provided written support for the study to commence, she may have felt obliged to take part because the other ward manager had been so enthusiastic for the ward to be involved.

Difficulties with the ward manager who took over the ward caused numerous problems relating to access and were identified in my field notes with frustration and disappointment. This issue became apparent at the start of the field work when I asked her to spend some time with me to discuss how data collection would progress. She made excuses whilst I made several attempts to involve her.

On one occasion the ward manager prohibited an interview being carried out, even though the nurse said she had completed her work and the ward was quiet. This nurse had said to me afterwards *“see, I told you she wouldn’t let me talk to you.”*

On another occasion the ward manager had sent another nurse to the interview room and requested the nurse to return to the ward. The interview was cut short after twenty minutes and had been particularly interesting. Both nurses were later asked if they would like to be interviewed at another time, however both declined.

On reflection, this may have been a way of the ward manager preventing certain people from expressing their views. A strategy developed to overcome the ward manager obstructing data collection was to find out which area she was working on, and collect data from the opposite ward. On one occasion I believe the influence of the ward manager ruined the quality of one of the interviews. After working hard to build up trust with one of the deputy ward managers who had seemed hesitant to talk with me, she agreed to an interview. At first she was reluctant for me to use the tape recorder but I explained that its purpose was merely to allow me to concentrate on what was being said and she therefore agreed to it being used. The interview was carried out in the nurses’ office as the meeting room was not available. The interview started really well with the nurse immediately saying *“can I be honest with you?”* I explained that it was completely confidential and I assured her that anything she said would remain anonymous. She started by saying that she did not see why nurses had to wear blue aprons. I thought this was going to be a great interview, however a few minutes later the ward manager entered the room. I stopped the tape but I could see that the deputy manager was embarrassed. The ward manager asked us to

leave, so we moved into the empty ward next door which had recently been repainted. The nurse left me for about ten minutes whilst she went to find a chair, but on her return she had clammed up and was difficult to talk to. I closed off the interview after about twenty minutes as we were not getting anywhere and the conversation seemed artificial.

Access, Building Trust And Managing Relationships

One of the tensions that I experienced related to my previous employment. As a risk management consultant I had been welcomed into the workplace. My position was one in which I had authority to talk to individuals, to request access to information or enter areas that were necessary. As a researcher during the early stages of data collection, I felt impatience with the researcher role which is summed up in one of my field notes.

I'm not used to having to wait for tiny gaps before I can speak to people. It seems to be taking ages to get information...they are just so busy. After 2 hours today I was thinking of going home, however I stuck it out and I'm so glad because unexpected things happened...It has made me realise that sheer persistence is needed. I need to stay around and be here regularly to get under their skin. I'm never going to get people to open up to me otherwise. [Field note 16.8.10] [L117-120].

Initially observation data appeared to be superficial and I sometimes felt disheartened as I felt that I was not being allowed beneath the surface of the phenomena that I was investigating. A great deal of effort therefore went into building up trust and rapport with participants to encourage them to engage with

me and to open up and talk to with me as honestly as possible. It required confidence and stamina to continue and an ability to trust that things would work out in the end. Feelings of inadequacy and uncertainty lessened with time as people got to know me and felt more comfortable allowing me to observe, and I became more confident in my new role as a researcher.

On reflection, the way that I initially behaved on the ward perhaps mirrored what I was used to doing when I visited a client's premise to audit their systems. I realised several weeks into the study that this way of working was not useful and that I needed to change my behaviour. Opportunities were therefore taken to try to reduce the insider-outside barrier by, for example, having tea with participants or joining them on a cigarette break (even though I do not like being around people smoking) and sometimes dropping the role of the researcher (See field note below).

*I decided that I am not going to make progress if I don't start making polite conversation which does not involve asking questions about their practice...I think today's tactics worked anyway. It was difficult talking to *** initially but by the end of the shift I felt really comfortable with her. She was in the next morning and was helpful explaining things to me, so I think it was definitely worth the effort of dropping the researcher role. [Field note 2.9.10] [L26-31].*

In addition to asking lots of questions to nurses about their practice, many were curious to know about mine. I explained that my background was not nursing and that I had trained in public health and risk management. One nurse openly told several other nurses that there was no need to worry about my presence as my

background was not nursing, suggesting that I could not understand what was going on, which made it easier for me to ask lots of questions. Some nurses seemed curious when they saw me observing and asked me if I was bored. I explained that the things which they took for granted were interesting to me and that it was taking me some time to understand their practices. The reality was that many questions were running through my mind whilst I was observing, as I was trying to capture the mundane, the routine, the taken-for-granted and the verbal and non-verbal language in order to provide depth and nuance to my research findings (Gains, 2011).

As trust and rapport became more established, managing relationships on the ward became fraught with difficulties and required an awareness of maintaining a neutral position, especially when I felt I was being ‘tested’ to provide a reaction to their comments. Some nurses may have perceived my presence as beneficial to them, as if I could take sides, and some nurses may have perceived the study as a useful way of raising their frustrations. One example is the lack of spare uniforms available when nurses’ clothing became contaminated.

A registered nurse had explained about an incident that had happened the previous week where her clothing had got covered in blood on the ward. She had asked the ward manager for a clean scrub top but was told there weren’t any available, so she said she had to beg, borrow or steal from another ward. Then she added ‘that’s an infection risk, add that to your study!’ [Field note 15.9.10] [L74-78].

During later interviews as rapport and trust became more established, I felt that nurses confided in me as they spoke about sensitive information. They would say things such as “*can I be really honest with you*” and “*since this is confidential...*” One nurse openly said during an interview that she had never spoken frankly with other nurses about the issues we had discussed. Nurses may have felt more comfortable talking to me as they considered me as an ‘outsider.’

Because of these difficulties, I was sometimes unsure about what information to collect and what to leave out, so I collected the information anyway. This related to practical and/or historical issues that participants discussed. It did not relate to ethical issues. As I remained in the field for an extended period of time I became comfortable with several nurses, two of which became key informants. I was aware of the importance of striving for a balance between being friendly and maintaining my role as a researcher. Both nurses invited me to the Christmas party, which I declined as I felt becoming too friendly may blur the researcher-participant relationship and create difficulties with maintaining a certain level of detachment from the topic I was studying. This may have stemmed from my education which being science based, was aligned with positivism. As Murphy (2005) suggests, it is naive to think that strong parts of the researcher’s identity will not surface. Nevertheless, these feelings were mixed with relief, as attending such an event would have made me feel uncomfortable as some nurses did not accept my presence on the ward. Fuller (1999) discusses the issue of ‘*going native*’ which he describes as “*a sense of over-rapport between the researcher and those under study*” (p.221) and relates this to the repositioning of the

researcher's identity as the field work progresses. An example of repositioning my role and my motives for doing so is discussed in the next section.

Maintaining Ethical Practice

During the first few weeks of field work, a strategy that was used on one occasion to reduce suspicion about my role and build trust was to assist with a non-nursing task. Although ethical approval was only given for non-participant observation it was a justifiable decision that was made at the time as I felt so uncomfortable. The dilemma that I faced on that day was considered and I made a decision in the light of that moment and decided that the benefit outweighed the risk of harm to the participants that I was studying.

The ward appeared more busy than usual. Staff were moving around so fast, looking serious and stern. The atmosphere felt hostile and I felt very uncomfortable observing nurses from a corridor when they were under so much pressure. I eventually walked up to the ward manager and said 'I'm not supposed to do this, but do you want me to help?' She agreed that it would be useful if I could clean the external surface of some of the machines...I kept hoping that nurses would accept me if they saw me helping out. Several nurses passed me and smiled. [Field note 1.9.10] [L72-80].

As the extract highlights, my uncomfortable feelings were the motive to reposition myself as an 'insider' to cope with the emotions that I experienced, whilst observing in a highly charged context.

The following day I contacted my supervisor about this issue and we discussed that I should not repeat this. Punch (1994) warns that ethical dilemmas experienced during field work often have to be resolved situationally, even spontaneously, without sometimes being able to consult more experienced colleagues. Reflexivity was therefore an important part of maintaining ethical practice during the research.

Positionality

The positionality of the researcher is a *lens* through which to view the phenomena which is being explored (Busby, 2011), which reflects their individual history, biography as well as their theoretical perspective (Allen, 2004). As a researcher progresses through the research process, the researcher must recognise that he/she is a human instrument and a primary research tool. As such the researcher must consider their own biases, limitations and views throughout the data collection, analysis, interpretation and reporting phases of the research (Merriam, 2002). The section that follows discusses how the researcher's positionality, identity, background, education and previous experience influenced the data collection process and the study findings.

'Outsider' Perspective

The way that researchers present themselves personally in the field and what they *do* there is important as it will influence the way participants react to them, the

relationships they form and thus what they can observe and the information they can collect (Busby, 2011). To be able to analyse institutional processes researchers need to be able to retain distance so as not to *go native* (Burgess, 1984). This can include whether researchers choose to dress to fit-in or differentiate themselves as academics (Allen, 2004). During the field work, a pair of trousers and a short sleeved blouse were worn, however to differentiate myself I wore a waistcoat which I used to display my identity badge which was provided by the hospital which clearly displayed my role as a researcher.

During the field work I was positioned as an 'outsider' as my background was not nursing. Although I was used to auditing care homes, I had no experience of hospitals other than a brief period I spent training as a cardiology technician. One of the disadvantages of being an 'outsider' was that I had to work hard to understand what was going on and this often meant reading further about practices that I had observed to understand these more fully. This used up valuable time.

Some authors have argued that familiarity with nursing or the setting, although providing a privileged understanding, can be a disadvantage as certain routine behaviours could be overlooked and assumptions made about the meaning of events without clarification being sought (Bonner and Tolhurst, 2002). One of the benefits of not having a nursing background or being familiar with a hospital environment was that I did not take for granted what was going on within the ward. Everything that was witnessed was observed with a fresh pair of eyes.

Many instances were experienced where questions were asked about practices which participants took for granted. Sometimes making them think about these issues challenged them as they may not have thought about it in this way before. For example, during an interview I asked one of the senior doctors why there were separate processes for handover from doctors and nurses. She explained her reasoning for this but then openly questioned her own assumptions.

‘It’s very interesting talking to you, especially as someone who is not from the health service. Because I have been working in the NHS forever, so um, that’s how I think about things. And when you ask why are there doctors doing a handover and nurses doing their own handover and why are they separate, and there are quite good reasons why they are separate and also we talk a different language...but then you think well is that right? Should we talk a different language?’ [Doctor 8 interview] [p9: L36-42].

Researcher Identity

Some authors have explored the dilemmas they faced with their dual role and identity as a nurse-researcher and the tension they experienced between their professional and moral responsibilities as they observed practices that were detrimental to the care of patients (Gerrish, 1995; Johnson, 1992). Although I did not have a dual-role as a nurse-researcher, there were times during the field work when I felt dissonance between my background as a public health professional and my role as a researcher as I observed practices that I considered detrimental to the wellbeing of patients, for example, issues that had the potential to cause harm through cross-contamination. Although I felt unable to challenge nurses about their practice because I was concerned about the effect this would have on the data, by having informal conversations with nurses and asking further questions

this led to new insights, which sometimes felt disturbing. These issues were not reported to my supervisors, or to the ward manager because they were not incidences that were defined as reportable under the incident reporting framework (National Patient Safety Agency, 2010). Rather these were common habitual practices, such as poor hand hygiene that could lead to cross-contamination.

Professional Background, Education And Experience

My professional background and work experience may have also influenced what data was looked at. For example, my training in communicable disease and interest in risk perception may explain why I focussed on issues of cross-contamination during the field work. This in addition to theoretical issues identified from gaps in the literature review relating to emotion and visible dirt may explain why perception of contamination emerged as a theme in the study findings. Reflexivity was therefore used to remind the ‘self’ to allow the participants to reveal what was important and relevant to them, rather than my own perceptions, whilst keeping the research questions in mind. However, my own perspective and assumptions are part of this study.

Even though my observations may have been influenced by my background, work experience and education, I endeavoured to keep an open mind as I was unfamiliar with my new surroundings. I kept in mind that anything in the research context may be relevant to the study. According to Gellner and Hirsch (2001)

“ethnographers must adopt a curious cross-eyed vision where one eye ceaselessly roves around the context considering all aspects, while the other is tightly focused on the research topic” (p.7). My mind was always curious whilst in the field at what was going on around me and I was constantly triangulating the data. These are skills that I learnt from being an enforcement officer and as a consultant auditing practice which assisted with my field work.

Being immersed in a setting for a prolonged period of time is considered important if behaviour, activities and social processes are to be understood (Van Maanen, 1988). During this study, over eight months of field work, I became immersed in the setting and in the data and this continued during the analysis and writing up stages. The quality of the early interviews with nurses and doctors varied. Some participants expressed their interest in the study and were very chatty during interviews. One or two nurses agreed to be interviewed yet they gave away very little of their perspective. As my own understanding and confidence as a researcher grew within the field, so too did the quality of the interview and observation data, possibly because I was able to interrogate the data more effectively. However, the continual need to collect and interpret the data, write up the notes, reflect on the data, read between the lines, ask questions of the data, decide whether the data contradicts other data and decide what data to collect next was mentally and emotionally exhausting. Therefore strategies were used to allow my mind to maintain clarity and keep some distance from the data. Reflexivity was important in this process, but so too was meditation, exercise and keeping in contact with my supervisors.

Conclusion

This study has used a single case study design to explore how infection control protocols and guidelines were being used on a hospital ward and the factors that influence this process. This study also explored what happened in practice as difficulties were experienced with infection control practice. The study aimed to capture the different perspective of healthcare professionals, patients and their visitors. Due to the difficulties that were experienced with data collection and analysis, the perspectives of patients and their visitors were excluded from the findings chapter.

In summary, four methods of data collection were used: Non-participant observation and informal conversations, semi-structured interviews and document review. Several methods were used to increase the 'trustworthiness' of the findings. A thematic approach was undertaken to analyse the findings, using deductive and inductive analysis of the raw data. The findings of this study are presented in the next chapter.

Chapter Four

Study Findings

Chapter Four: Study Findings

Introduction

This chapter will present the findings of the study in three sections, based on each research question.

Research Question 1:

How are infection control protocols and guidelines perceived and used on the hospital ward to manage the risk from Clostridium difficile infection?

Theme: Awareness And Perceptions Of Protocols And Guidelines

The findings for this theme are presented under three categories (See Figure 2).

Figure 2: Summary Of Theme	
Theme	Awareness And Perceptions Of Protocols And Guidelines
Category	- 'Knowing' about protocols and guidelines - Explicit versus tacit and experiential knowledge - Protocols and guidelines: a benefit or a hindrance?

‘Knowing’ About Protocols And Guidelines

Trust documents were stored on the intranet and were accessible from ward computers. Ward staff had access to computers to access microbiology results, book porters, print labels and use the new rostering system. There was mixed awareness of protocols.

“I haven’t seen them. They may have been up on one of the notice boards at one time or other. I suppose they will argue that protocols are in the office if you want to see them.” [Auxiliary nurse technician 1 interview] [p2: L21-23].

“We have definitely got them...infection control brought them up. But now that you have asked me, I’d have to go and look for them.” [Ward Manager 1 interview] [p5: L27-28].

“The procedures were once printed off but they are bound to be really old and out of date.” [RN 7 interview] [p11: L14-15].

Some of the nurses assumed that protocols would be stored on the intranet.

“I don’t know where they are stored but I would look on the portal. I’m up on my IT, so I can pretty much find anything I want.” [RN 3 interview] [p5: L2-3].

Many of the auxiliary nurses acknowledged that they lacked the necessary computer skills and/or confidence to enable them to navigate the electronic system where protocols were stored.

“I don’t know [where protocols are stored]. I don’t deal with computers. ...We used to have them out in folders on the ward.” [Auxiliary nurse 2 interview] [p6: L27-29].

All grades of nurses were observed accessing computers to gain information about their shift patterns. Individuals who said they didn’t ‘deal’ with computers quickly learned how to use the new electronic roster.

None of the nurses recognised the guidelines relating to *Clostridium difficile* when shown these during the interview. One doctor confirmed she had seen the cover of the guidelines, but was unaware of its content.

Some doctors were aware of the algorithm for *C.difficile*, either because they had seen it in another hospital or ward where they had worked or they had seen it in the Good Prescribing Guidelines issued to them by the pharmacist during an induction. Some junior doctors may be unaware because they did not attend the induction.

“I know one exists [algorithm], I’ve used it elsewhere but I haven’t seen it here...I was on nights quickly after starting. Whether I missed something I don’t know.” [Doctor 4 interview] [p2: L13-14].

Few doctors or nurses mentioned the protocols or algorithm displayed on notice boards. For many nurses “knowing” about protocols was perceived as being a communication problem.

“They [C.difficile procedures] would be on the intranet I’d imagine. But if you don’t know the procedures are there you don’t know where to look. If you haven’t been told this you wouldn’t know.” [RN 7 interview] [p3: L30-31].

Difficulties with communication were perceived to be a problem for nurses returning to work from a break.

“I have been away...I’m finding a lot of things have not been handed over to me.” [RN 3 interview] [p2: L11-12].

“Information is not always filtered down to us...Communication is a massive problem, even between the ward managers.” [RN 7 interview] [p2: L16-20].

Auxiliaries and auxiliary nurse technicians mentioned looking up policy documents to find answers to contractual issues such as sickness policies and leave entitlements.

“I have downloaded information about sickness absenteeism. Who actually takes time to go and look at the protocols? Unless it’s an interest you have in that field, or you’re the manager and you need to print it off because there’s an inspection coming up.” [Auxiliary nurse technician 1 interview] [p2: L31-30].

Studying for an NVQ (in Health and Social Care) appeared to make auxiliary nurses more aware of the intranet and location of protocols as they were required to access documents to complete homework for their course. Protocols did not appear to have an important role to play in terms of staying abreast of infection control issues.

I asked the nurse why the MRSA policy on the intranet was dated 2002. I asked if there is a more recent one. She shrugged and brushed off the role of the policy. She snapped “when new things come in, infection control tell us. What are we supposed to do, print them all off and put them on the shelf? That’s not going to happen.” [Field note extract 4.8.10 - informal conversation]. [L97-101].

An infection control nurse explained that ward staff tend to put the onus of infection control onto the infection control nurse, taking responsibility away from them. Nurses may feel overwhelmed (See p.294 - 297), so passing responsibilities onto the infection control nurse may relieve them of some pressure. One way of increasing ownership might be to give nurses an opportunity to get involved with the development of protocols.

“Protocols are imposed on us. I wish we were given the opportunity to develop them so we could make the procedures ours.” [Field note extract 15.9.10 - informal conversation with auxiliary nurse technician 4] [L8-10].

“Until people actually use them, it wouldn’t be noticed that these were out of date. You could criticise them and then you might feel more involved.” [RN 9 interview] [p7: L4-6].

Protocols were seen by some doctors and nurses as being something to aspire to. There were perceived realities of practice and contextual difficulties which protocols did not take account of.

“It’s easy when you have the right amount of staff, time and resources. It could all go out the window when time constraints are put on you and if there’s an emergency...I feel it’s easy to know when to wash your hands, to know when to put pinnies on and what bins to use, but hard to follow it on.” [RN 9 interview] [p1: L8-12].

“Anyone who’s found positive or suspected of having C.diff diarrhoea is put into isolation, but that’s not always possible...The protocol we have is good enough...realistically, in practice it’s not easy to apply.” [Doctor 1 interview] [p1: L8-11].

Protocols relating to *Clostridium difficile* were amended midway during data collection. Several nurses and doctors mentioned the difficulty with keeping up to date with policy changes.

“I don’t think it’s rolled out Trust wide as well as it could be when there is a change in policy. If you are a new doctor and being inducted then you would get it, but if you are a doctor that is just carrying on you might not.” [Doctor 7 interview] [p5: L1-3]

“We don’t keep up to date...there’s no money for us to go off the ward. There’s no staff on the ward. It’s just not realistic to be going off the ward to read policies. There’s no time to read anything.” [Ward Manager 2 interview] [p4: L23-25].

Some nurses said they would be interested to read the protocols but had no opportunity to do so during work hours.

“When I qualified I said to myself I was gonna keep reading these protocols [sighs]...I’m yet to do it. You take such a battering in work, that when I’m out of work the thought of opening up something...It’s almost like once a month, which they would never do because of money, we could have a reading day.” [RN 9 interview] [p6: L27-33].

“When I first started here we had supernumery days. We had a big file that was kept in pigeon holes and we had to read about the procedures. Now we don’t have any supernumery days.” [Auxiliary nurse technician 3 interview] [p6: L14-17].

During a ward meeting, the ward manager raised the issue of the ‘honey pot syndrome’, that is, nurses gathering around the nurses’ station. It had been highlighted by the Nurse Director that when one nurse sits at the station to write up their notes, another nurse would come and sit and then another. She had used the analogy of ‘bees around the honey pot’. Nurses were therefore discouraged from sitting at the nurses’ station to read or write up patient notes. Although protocols were stored on the computer portal at the nurses’ station, many nurses argued that it would not look good if they were seen accessing the computer for any period of time to view documents.

“We’re told that we are not allowed to sit at the nurse’s station, so how are we gonna sit there and read the procedures? If you’re sat there, then there’s a kind of why are you sat there?...If the Nurse Director comes on the ward and we are sat at the nurse’s station, we’re in for it, regardless of what we are doing.” [RN 7 interview] [p11: L10-18].

Protocols and guidelines were only one source of knowledge about infection control. The section that follows illustrates other ways of ‘knowing’.

Explicit Versus Tacit And Experiential Knowledge

Apart from written protocols, there were other ways in which knowledge was being used to inform staff about infection control practice. The next section presents the explicit (authoritative, codified) sources of knowledge that were available to ward staff.

Explicit Knowledge Sources

Junior doctors were made aware of the antibiotic protocol and use of an antibiotic sticker (embedded form of protocol) during an induction, as part of their training. The purpose of the antibiotic sticker was to standardise antibiotic prescribing, which is an important part of the management of *C.difficile* infection (Department of Health, 2009a).

“Every time we move hospital we get an induction...They talked about the antibiotics to use, not to use. During the ward induction, the pharmacist told us about a new [antibiotic] protocol and antibiotic label that had to be used, because people were on antibiotics who ended up staying on them for a long time.” [Doctor 3 interview] [p2: L9-22].

Junior doctors were asked about the infection control training they had received in medical school.

“We’ve had lectures on it [infection control] but they focus on outbreaks more than anything. I guess in medical school you’re not really too concerned about it [how to prevent the spread of infection]. They are more concerned with the actual physiology and actual medicine side of things as opposed to pathways.” [Doctor 1 interview] [p2: L25-28].

Infection control training may or may not be given to junior doctors as part of their hospital training.

“I had very thorough infection control training at the hospital where I last worked. But standards here seem to be very lax.” [Doctor 3 interview] [p4: L17-18].

New nurses may not always be given induction on their arrival at the ward.

“I’ve had no induction, nothing. It’s an overall consensus with other nurses on the ward. When I arrived here...I was told there are no shadow shifts and we don’t have mentorships. I was told I was basically in at the deep end.” [RN 14 interview] [p2: L12-17].

It was a Trust requirement that nurses completed an electronic infection control module [e-module] as a part of their mandatory training. The module was accessed from the Trust’s portal. Few nurses said they had completed it. Reasons given for not completing the module included not knowing about it and not being given time to train.

“I wouldn’t say I’ve had any training on infection control...not since my student training. I’ve just picked it up from what I have watched.” [RN 3 interview] [p7: L6-8].

“All the infection control training that I’ve had has come about through the ward [on the job training]. I have never been on one of those 20 minute awareness sessions. You can miss out on a lot depending on your shift pattern.” [Auxiliary nurse 6 interview] [p4: L27-32].

One nurse found the e-module useful as a means of learning, but said there appears to be a lot of “not knowing” on the ward.

“I kind of like it because it makes you sit and think, especially if you are unsure. You have to have a good percentage to pass it. You only know what you know. So once you know something and you’re aware of it you carry it ‘round with you. But there does seem to be a lot of not knowing.” [RN 7 interview] [p11: L5-8].

Some nurses perceived the e-module as a formality and something to get through quickly.

“Mandatory training...its stuff I’ve already done, so I speed through it. ...Mandatory training I associate with red tape. Other members of staff think that too.” [RN 3 interview] [p7: L16-21].

The e-module lacked any information about *Clostridium difficile* infection. To fill this gap, infection control organised a twenty minute session to raise awareness of the organism. During eight months of data collection, only one session was organised and this was poorly communicated. Three ward nurses attended. The ward manager selected the nurses after the session had started and sent them to the training room.

“What we don’t tend to do on this ward, which I always had on every ward I have worked on, is training days. The link nurse would train you in 20 minutes. We have never had it here...I’m sure the unstructured ones [short training sessions] for 20 minutes, people would put their names down to go, if they knew it existed.” [RN 7 interview] [p10: L9-12].

Infection control provided a study day four times per year to update the knowledge of infection control link nurses. One session was observed. The ward link nurse did not attend because she said she was unaware it had been organised.

“There was talk about if you didn’t do it [attend training] they would take the link nurse role away from you, but nobody has ever done anything. ...There was a disc that we were all supposed to watch to do with C.diff, but I never saw it. I don’t think many people used it...They bring something new in, nobody checks on it and it falls by the way side.” [RN 17 interview] [p3: L7-13].

Lack of knowledge and inexperience may explain why some nurses were not aware of the existence of *C.difficile* spores.

“Spores from the faeces contaminate surfaces and these can live there for a long time. I was having a conversation about this only this morning with two newly qualified [registered] nurses. I explained that spores can live on surfaces and if you touch a surface and put your hands in your mouth you may get it. Neither of them knew that. I suppose that’s through education.” [Auxiliary nurse technician 4 interview] [p3: L25-29].

Some of the experienced auxiliary nurses said they did not know how *C.difficile* infection can be contracted or spread.

“I’ve heard that um... it’s an infection that has been brought about by the over use and the under use of antibiotics. People being prescribed too many unnecessarily and also people not finishing their course. That’s all I know.” [Auxiliary nurse 6 interview] [p8: L28-31].

Attending a training session may not necessarily mean that knowledge may be applied in practice.

The nurse said she attended a C.diff study day but it was ‘over her head.’ In her opinion the course was not meant for auxiliary nurses, because they talked about bacteria and antibiotic usage. When she came back from the course she said there wasn’t anything she felt she could implement in her practice. What she learnt was that C.diff was ‘caused’ by antibiotics that patients were given as part of their treatment. [Field note extract 9.8.10 - informal conversation with auxiliary nurse 7] [L110-115].

Ward meetings were used to share knowledge about practice. Nurses may not attend depending on their shift pattern, because they were too busy or failed to see any point in attending as nothing gets done (See also p.315).

‘I have never attended a meeting on this ward as I have been off when meetings have been held. Somebody takes the minutes and it’s written up and put in the news folder.’ [Auxiliary nurse 6 interview] [p7: L25-27].

‘If you’re like me and you work mainly nights, I might not do a day shift for a month.’ [RN 4 interview] [p3: L10-11].

‘I’m not bothered about going [to the ward meeting]. They [management] don’t do anything anyway.’ [Field note extract 1.10.10 – informal conversation with auxiliary nurse technician 1] [L13-14].

Nurses may therefore rely on colleagues to pass on vital information.

‘The ward manager had to explain in the meeting what we had to do [with a new procedure]. Some things you just get to find out. People say have you heard this?’ [Auxiliary nurse 5 interview] [p6: L14-16].

Handover sessions and ward rounds provided a source of communication about infection control practice. This is covered in a later section (See Communication Ambiguity p.231).

White boards at nursing stations were used for nurses to write messages and reminders about practice. Notice boards in corridors were used as a means of displaying protocols, for example, an algorithm for *Clostridium difficile*, a new hand hygiene protocol and a cleaning protocol were displayed. The majority of staff did not mention the use of these boards. Some nurses and doctors said that notice boards were over-loaded with information. This may have discouraged staff from using them.

“Sometimes I read them [protocols] displayed on the notice boards. I suppose I must have read them all at some point. There’s a lot of old stuff up there though. The stuff on there has been up there years.” [RN 4 interview] [p3: L17-18].

“We have notice boards across the corridors which have guidelines spotted here and there...mixed with everything under the sun...Having a guidelines only notice board would be useful.” [Doctor 2 interview] [p4: L20-29].

“They [protocols] should be more visible. I like the idea of having a big board in the corridor and every month it’s someone’s responsibility to do that board with guidelines that are important to the ward...so we can have continuous learning.” [RN 9 interview] [p5: 21-28].

Some nurses spoke about having to sign to confirm that protocols had been read and understood. This practice was no longer in place.

“They don’t do it anymore, but they used to say sign when you read this type of thing. It’s covering their arse isn’t it? They don’t tend to do that anymore, but would they have really read it if they had done it? They might only pretend to read half of it.” [RN 4 interview] [p3: L3-5].

The next section illustrates the reliance that was placed upon tacit and experiential knowledge to inform infection control practice.

Tacit And Experiential Knowledge Sources

Knowledge about infection control practice was perceived by many nurses as common sense.

“It’s common sense [infection control] because you hear it on the news. You hear so and so has died because of Clostridium difficile.” [RN 17 interview] [p9: L17-19].

“No I haven’t seen those [protocols]. I’m not being funny though, its common sense isn’t it, what you’d use and what you wouldn’t use. Its common sense.” [Auxiliary nurse technician 2 interview] [p6: L24-25].

Some doctors spoke about infection control being common sense.

“When I’ve got a cold I’m paranoid about not passing bugs around. A lot of my friends when they’re ill will be touching you and will leave their tissues lying around... I think its common sense.” [Doctor 1 interview] [p5: L21-25].

Implementing infection control precautions were behaviours that were frequent and habitual. Some nurses spoke about these behaviours as taken for granted assumptions.

“You’re so used to doing your job you don’t actually think...As soon as you do something you wash your hands, you gel your hands...you’re taught it...it’s ingrained into you. If someone has diarrhoea the first thing you do is send a stool sample. You automatically do it, especially with C.diff.” [RN 6 interview] [p1: L21-26].

Some nurses said they would refer to written protocols only where they felt their own knowledge was lacking. According to Wilson (1999) individuals will seek information to satisfy their needs.

“Sometimes I feel the need to go and look things up [from protocols] but usually when it’s something new, not for things like barrier nursing. If it was something new, like a new bug then I may feel the need to look it up.” [RN 6 interview] [p2: L11-13].

A number of registered nurses said they would be inclined to look up protocols to update themselves to changes in practice following a break from work, to give themselves confidence that they were doing things right.

“I would want to know that I was doing it the right way. So I would use them [protocols] for that...I have just come back from leave and they’ve changed all the bins...and they have changed all the colours of the pinnies. What’s that all about? Nobody tells you what it’s for. Unless you read it or catch somebody, you wouldn’t know.” [RN 4 interview] [p2: L18-27].

Nurses said they mainly learnt about infection control by word of mouth, similar to the ‘communities of practice’ described by Lave and Wenger (1991). Experienced nurses were seen as a source of information and tended to communicate standards as common sense or ‘know how’ rather than relate their knowledge to procedural documents.

The ward manager said the patient in the 9 bed ward had had diarrhea throughout the night, and it smelled like C.diff. She took a stool sample, put a barrier nurse trolley at the end of his bed and told him not to use the toilet, but to call for a commode. I asked her how she remembered what to do. Did she need to use the algorithm to help her make decisions? She

shook her head and said it was all in their [pointed to her head]. [Field note extract 3.8.10 - observation and informal conversation with Ward Manager 1] [L164-166].

Nurses shared information about patients they were caring for with other nurses who were involved with their care. They commonly used their sense of smell to identify patients that had contracted *C.difficile* infection. The field note extract below provides an example of a group of nurses that had discussed a patient diagnosis. Their decision making did not form part of the written protocol for diagnosis of *C.difficile* infection. It was knowledge that the nurses had learned through experience.

The nurse took me to a patient in the 4 bed room who'd had 2 bouts of diarrhea that morning. A stool sample had been taken but she explained that this patient had eaten crisps, sweets and juice yesterday when he wasn't supposed to and all the nurses expected that his diarrhea was a result of this and his diabetic bowel rather than C.difficile infection. [Field note extract 5.8.10 - observation and informal conversation with RN 9] [L51-53].

Many nurses who were uncertain about their practice said they would be more likely to ask a colleague, a senior nurse, a manager or the infection control nurse, rather than refer to written protocols as a source of knowledge.

'I don't think I'd have time to go and look up things. I'd quite happily phone up senior people and pass my problem onto them. I would try infection control ... I wouldn't even think to look up protocols.' [RN 3 interview] [p5: L1-10].

Infection control nurses are a source of information although some nurses seemed reluctant to use them.

“I wouldn’t go to them. I don’t think they get involved in stuff like that. I’d rather ask the ward manager...If they pride themselves as a resource for advice then why don’t we know about that? You’d think they’d shout about that wouldn’t you?” [RN 6 interview] [p7: L1-4].

The lack of visibility of the infection control nurse on the ward may give a sense of being uninvolved with ward practice, which may explain why some nurses said they would not use them.

“I haven’t seen them up here for months. It has got bad. We used to see them up here every morning. They used to ask us if we had any questions and problems...I don’t really feel supported by them.” [RN 17 interview] [p2: 14-22].

“The infection control nurse seemed to be a bit more involved with what was going on [where I previously worked]. They have probably been here but I’ve not seen them. They just seemed to be more visible [in the last hospital where I worked].” [Doctor 3 interview] [p1: L18-20].

The ward had one infection control link nurse to act as a link between the nurses and the infection control department. A key part of that role was to increase awareness of infection control issues to other nurses on the ward including drawing attention to changes in practice (Dawson, 2003). The link nurse had been inactive in this role for almost two years and no provision for cover had been made.

Nurses commonly found out about changes to infection control practice by chance, rather than in a planned way. Information was filtered in a top down fashion and passed horizontally between team members.

“I accidentally found a new change in procedure. Nobody seems to know the new colour apron changes.” [RN 2 interview] [p1: L17-19].

“A lot of it is Chinese whispers. It’s more or less word and mouth. Cascading information on this ward is not effective.” [RN 4 interview] [p2: L31-32].

“One way or another if something new happens...it goes down the line and you end up finding out. You do eventually get to know what’s going on.” [Auxiliary nurse technician 2 interview] [p7: L28-31].

Another way in which nurses learnt about infection control practice was by observing the actions of a colleague, a form of on-the-job learning or experiential knowledge (Estabrooks *et al.*, 2005). Inexperienced nurses would learn by observing a mentor, a method commonly known as ‘sitting with Nelly’ (Clifford and Thorpe, 2007). One problem with this form of knowledge is that if the person explaining and/or demonstrating had picked up a variation in practice or an out-of-date practice, this may be passed on.

“Nursing training is different now. Before we got into the habit of doing something a certain way and that practice was assessed. A qualified nurse worked with me recently. We were going to take some blood so she got a trolley. It may have been a dirty trolley and she didn’t wipe it before using it. I asked her why she didn’t wipe it. She replied “that is how I was taught.” New batches of nurses do not get any formal assessment. If a nurse has a practice which slips by the net, that nurse may go on to train the next nurse. She will be a role model or mentor for that nurse and will pass

on her bad habits. If there is no formal assessment it will not get picked up.’’ [Ward Manager 3 interview] [p10: L21-31].

Some experienced nurses talked about how they would adapt a procedure to avoid a difficulty they had experienced. There is the potential for adapted methods of practice to be passed onto other nurses as they mainly learnt from each other.

‘‘When you are taking blood, you are supposed to wear gloves. I can’t do that procedure with gloves on...A couple of us have been here a while and you get into bad habits.’’ [RN 17 interview] [p4: L26-31].

Some procedures had become adapted over time and were not written into a protocol. For example, bed cleaning had been introduced on the ward several years ago as a trial with the aim of reducing the level of *Clostridium difficile* infection. Information about how nurses should implement this procedure had been passed on verbally. It included the bed being stripped of bedding and the frame dismantled. The bed frame was to be cleaned with a bleach solution known as actichlor (to kill any spores). The mattress was initially cleaned with actichlor, yet at some point in time later, infection control had announced that actichlor may degrade the mattress, so soap and water was to be used. There was mixed knowledge about this change in practice and variation was observed in the way that bed cleaning was implemented. Some nurses cleaned the mattress and frame with actichlor; some used actichlor on the frame and soapy water on the mattress; whilst others used soapy water only unless the patient had suffered from *Clostridium difficile* infection, then actichlor would be used. The variation in

practice that was observed may continue as practice did not appear to be monitored.

“When I watched someone cleaning the bed the first time, she used soapy water. So when I was asked to clean a bed the next time I used soapy water. No one checks that I have done it right.” [RN 5 interview][p4: L24-26].

Some nurses did not question the evidence of measures they were implementing.

“I think the problem is that people don’t realise the efficacy of them. I don’t. I just go with them blindly. This is what I’ve been told to do and I hope that it works.” [RN 9 interview] [p8: L25-27].

Several doctors suggested that they relied on their previous knowledge or experience of infection control practice, rather than referring to protocols or guidelines.

“I’m not aware of any guidelines. I only know general measures that I need to do, like putting on an apron, isolation, gloves.” [Doctor 10 interview] [p1: L26-27].

“I suppose we don’t actually follow any...I mean there must be hospital guidelines...I had no knowledge about those protocols. But I don’t feel like the treatment of C.diff is lacking.” [Doctor 5 interview] [p5: L 11-13].

Guidance for *C.difficile* infection (Department of Health, 2009a) recommends that metronidazole is the antibiotic that should be used as the first line of defence when treating a patient with moderate *C.difficile* infection. If this is not effective in clearing up the infection then doctors are recommended to switch to using

vancomycin, which is the preferred choice for treating patients with severe infection.

Some doctors suggested that they would use vancomycin as the antibiotic of choice for both moderate and severe infections. As the quotes below illustrate, doctors may make judgements which differ from that stated in the guidelines. They took into account not only the patient's condition, but their past experience of using this antibiotic, its effectiveness, and also consideration of cost.

“After a few years of managing C.diff you will get a feel of whether metronidazole will work or not. If I think this patient is not very well then I will give them vancomycin.” [Doctor 10 interview] [p2: L4-6].

“Metronidazole is the cheaper option. It is the first line of defence on a lot of wards. Here we think if we use a cheaper, less effective option in the form of metronidazole we are putting our patients at more risk compared to other patients. Our patients cannot afford that risk.” [Doctor 6 interview] [p1: 17-21].

The extract below illustrates the series of steps that a doctor may think through when deciding whether to prescribe metronidazole or vancomycin, based on the condition of the patient. This is similar to the “mind lines” described by Gabbay and leMay (2004, 2011).

“If the patient is not ill with C.diff, not every patient with C.diff will be ill with it. An elderly patient will be more at risk...more dehydrated. If there was a fit patient, was not ill, just diarrhoea, it wasn't frequent, no dehydration, not a high white cell count, C-RP was not horrendous, I would give them metronidazole.” [Doctor 10 interview] [p3: L28-31].

Although there was no evidence of nurses using “mind lines” with infection control practice, some nurses did refer to “rules of thumb.”

The Bank nurse arrived for the late shift. She asked the nurse what the procedure was for handwashing during obs. The nurse replied “we do a gel, gel, wash. You don’t need to use gloves. We only use gloves for changing the patient or sterile procedures.” [Field note extract 9.12.12 – observation and informal conversation with RN 9] [L88-89].

Reliance on knowledge that was passed on between colleagues may not be aligned with practices laid down in protocols and guidelines.

There was a computer keyboard on a stand in the ward corridor which had a notice stuck to it ‘remember to gel-gel-wash.’...I asked the nurse about the notice. She said “this rule was stopped about 2 years ago. We had a meeting with the infection control nurse. The old rule ‘gel, gel, wash’ was in then. Infection control said we are not to use that rule anymore. They gave us a small card with some pictures on it of when we should wash our hands and said we should use this rule from now on.” I asked her does she mean the five moments of hand hygiene and she nodded. [Field note extract 21.10.10 - observation and informal conversation with RN 20] [L99-111].

Nurses and doctors used their emotional feelings and intuition to guide certain areas of their infection control practice. This was most evident during practices that involved hand hygiene and cleaning of equipment and the ward environment (See Perceptions of Contamination p.270 - 282). The next section presents the findings about doctors’ and nurses’ perceptions of the protocols and guidelines and how these may assist or hinder their practice.

Protocols And Guidelines: A Benefit Or A Hindrance?

Participants were asked what they thought of protocols and guidelines to gain insight into their understanding of what benefit, if any, these had in practice, to try to uncover the motivation for their use. There was a suggestion in the data that protocols were a necessity to assist ward managers to keep behaviour on track.

“You’ve got to have ‘em. Got to have ‘em...They keep you...I mean, we work closely with infection control and we have to have the protocols because ...when we have a big C.diff outbreak we are all in the mind then, but you slip back. So you have to be, you just have to be picked up all the time. We all need that. We wouldn’t be human if we didn’t.” [Ward Manager 1 interview] [p5: L15-20].

This ‘picking up’ of behaviour to keep it on track was perceived to be undertaken by management stressing the importance of precautionary measures and reminding staff to implement these.

“It seems to have improved a lot [handwashing] this last um...when they have been emphasising it more. Everybody just drums it in to us, you must wash your hands...you must use gel. Years ago we had stricter controls. There didn’t seem to be all this drumming in about washing your hands because automatically you would do it.” [Auxiliary nurse 2 interview] [p2: L15-21].

More attention was being paid to infection control as levels of *Clostridium difficile* infection were rising.

“We used to have monthly infection control meetings on the ward but when the ward was doing well (Clostridium difficile levels were falling) these meetings tended to be phased out. Now that levels are rising, we are trying

to get these meetings going again.’’ [Field note extract 21.10.10 – informal conversation with Infection Control Nurse] [L70-72].

Some doctors argued about the lack of evidence of certain precautionary measures which may explain their resistance to implementing protocols. Many doctors wore watches. During ward rounds consultants wore suits.

‘‘The focus is you shouldn’t be wearing that ring, you shouldn’t be wearing your watch. These things have got no evidence to back them up.’’ [Doctor 2 interview] [p13: 28-29].

Some of the senior doctors spoke about protocols as being Trust enforced policies.

‘‘With the bare below the elbow policy, the thing that gets bounced back from doctors is where’s the evidence? ...The Trust is very keen on it being a common sense policy, although the prima facia evidence isn’t there. It’s a Trust enforced policy so in a way it’s not a question of getting buy-in. Doctors don’t need to be persuaded of the evidence. They need to be told how it is.’’ [Doctor 8 interview] [p1: 22-28].

Nurses talked about ways of working on the ward in terms of ‘rules’ or standards rather than guidelines.

‘‘There’s lots of rules that are half made up... We’ve got rules that govern us in the NHS and rules from NICE. We’ve got rules from the Government...and we’ve got protocols. So it’s kind of like, who’s saying it and is it based on any evidence.’’ [RN 9 interview] [p5: L15-19].

‘‘There’s so many rules...It sometimes detracts from what you’re supposed to be doing rather than the actual infection. Not everybody knows these rules, but I don’t think it’s important as long as you’re taking the proper precautions.’’ [Ward Manager 2 interview] [p1: L9-11].

The importance of infection control protocols being ‘something to be complied with’ was displayed on one of the ward notice boards.

A new Hand Hygiene Protocol was displayed on the notice board with a note saying ‘All staff need to comply with it.’ [Field note extract 7.9.10 - Observation] [L89-90].

Some of the registered nurses said that they would refer to written protocols to protect themselves legally.

“I worry that there may be a come-back type thing, in case I thought I was doing something wrong. I would want to know that I was doing it the right way. So I would use them for that.” [RN 4 interview] [p2: L18-20].

By implementing precautionary measures laid down by protocols, registered nurses perceived they were protecting their professional identity (not being struck off their professional register) (Nursing and Midwifery Council, 2008).

“You’ve got a PIN number which you protect. You lose your PIN, you lose your job and you can’t practice again.” [RN 7 interview] [p1: L22-23].

Protocols were to some extent embedded into ward systems and paperwork used by nurses and doctors. Nurses used care plans, a stool chart for patient diarrhoea and a cleaning schedule. Doctors used stickers to act as a reminder of what needed to be done. To some nurses, writing and implementing patient care plans was a way of showing that they had done things correctly.

The nurse was writing the care plan, laughing and joking with me as she was doing so. She wasn't having to think about it, perhaps she had done 100's of them...I asked what benefit these had. She said they were just covering your backside. [Field note extract 4.10.10 - observation and informal conversation with RN 6] [L26-29].

Care plans were perceived to be useful to assist less experienced nurses with their decision making.

“The risk assessment acts as a kind of reminder for nurse decision making which I find useful.” [Field note extract 4.10.10 – informal conversation with RN 9] [L109-110].

When pre-printed care plans were not available less experienced nurses may struggle to know what action to take.

“Some newer nurses, because it's already printed off, don't know how to write a care plan. They may have never had to write one, they might not know what the outcome is, what you would do to achieve those outcomes. If there's not any pre-printed care plans available, they might not bother to fill one out. If they do, they write a story.” [RN 6 interview][p2: L31-33].

Some nurses mentioned their lack of confidence with precautionary measures.

“Hospitals are not washing uniforms and aprons are not covering surfaces up. If I brush past the bed, there's going to be bacteria on my leg, spores. It's defeatist. With all infection control what's the point of doing hand, gloves? I see that more as PR [public relations] so people think we are doing stuff. If I'm walking around in a dirty uniform, I wash my hands, my uniform is dirty and then I touch my uniform, I've defeated the whole purpose.” [RN 3 interview] [p6: L17-22].

Doctors spoke about precautionary measures being defeatist as contamination was perceived to be all around.

“The gown, it covers the front but you sit down, what’s the point of them? They don’t cover much. The patient files, you bring them into the isolation room, or you touch them with the gloves on, we touch the patient then we touch the file.” [Doctor 1 interview] [p5: L10-13].

“What’s the point of being bare below the elbow when we don’t change the patient curtains for one month?...I think the curtains are a big source, not even just C.diff but any of the infections.” [Doctor 6 interview] [p2: L11-13].

Seeing precautionary measures work may increase confidence with their use. For example, many nurses spoke about the bed cleaning trial that involved a procedure for stripping and cleaning patient beds that had never been written into a protocol. During the trial, nurses had been given frequent feedback by the ward manager confirming that the level of *C.difficile* infection had reduced. Even though the trial had taken place almost two years ago, this appeared to be convincing evidence of the effectiveness of this measure for some nurses.

“With our bed cleaning, that’s evidence based...it shows you our good practice...and it’s working so I know that our practice would be to do that because it’s shown to be an improvement, it’s shown our infection rates plummeted.” [Ward Manager 2 interview] [p3: L20-22].

For other nurses, their continued implementation of the bed cleaning practice, even when they were busy, may have been related to the disgust they witnessed when the beds were first dismantled (See p.273 - 274).

Some doctors spoke about guidelines as being complex documents, whereas the *C.difficile* algorithm was a simplified version of explicit knowledge.

‘‘It’s nice to have a simple way of knowing. Guidelines are so damn waffly...100 pages full of crap which you can put into one paragraph. That’s the thing with the algorithm...you could have C.diff spores do not die from alcohol gel, you have to wash your hands with soap and water.’’
[Doctor 2 interview] [p13: L6-11].

Doctors were provided with a sticker for *C.difficile* to assess the patient’s risk from infection, and one for antibiotic usage, which were attached to the patient notes. These were perceived as useful aids for less experienced doctors’ decision making.

‘‘Junior doctors have seen a limited number of Clostridium difficile patients. Consultants have more experience...The sticker highlights the patient has a problem which needs to be addressed and helps us to reinforce knowledge. It allows us to become more confident in dealing with it..It’s nice to have something black and white, not grey around the edges like a lot of other aspects of medicine.’’ [Doctor 2 interview] [p4: L6-17].

Some experienced doctors perceived the stickers as a way of telling them what they already know.

‘‘I think people feel the antibiotic sticker has come out of the blue...dreamt up by someone in the bath one evening...It’s being seen as another piece of paper, what’s the point of this?’’ [Doctor 8 interview] [p2: L26-32].

‘‘I don’t think I will [almost laughs] start classifying C.diff on that [sticker]. I don’t bother with the [antibiotic] sticker.’’ [Doctor 10 interview] [p4: L22-23].

Use of the stickers was perceived to create extra work for some experienced doctors.

“It’s extra work for no benefit as information is being recorded elsewhere... it’s duplicating effort by putting the stickers on the notes.” [Doctor 8 interview] [p2: L6-9].

“The antibiotic sticker is a nuisance. It takes up two spaces on the drug chart and the chart runs out more frequently. Quite often you can’t find them.” [Doctor 7 interview] [p5: L26-27].

Some of the experienced doctors spoke about protocols (including the antibiotic and *C.difficile* stickers) as being checklist type documents, restricting their decision making.

“Our education is geared to independent thought. Guidelines have come in to the management of things which are very helpful when you’re trying to decide what to do. But it has gone further. We are being almost mandated to follow lists and protocols...It goes against the grain with how we work, how we’ve been brought up to act. I think people baulk against having been educated on one level and then being told to follow a checklist.” [Doctor 8 interview] [p2: L37-47].

There was a suggestion that there were too many protocols, resulting in the feeling of being swamped.

“The protocol for C.diff is probably in amongst the vancomycin protocol and everything else protocol. I mean when there are protocols for everything it gets a bit lost.” [Doctor 7 interview] [p2:L1-2].

Some rules were seen as ‘rules for rules sake’. One example is the colour coding of aprons. White aprons were to be worn for general nursing and blue for caring for patients with an active infection. The intended purpose was to prevent cross contamination.

“As long as you are taking precautions I don’t think it really matters what colour apron you wear...If someone needs a bed pan, I’m not going to not go into their isolation cubicle, if there is no blue apron there. To me that’s just...making my job more difficult. If there’s a white one available I’ll put a white one on.” [Ward Manager 2 interview] [p2: L4-7].

In summary, three categories emerged from the data a) ‘knowing’ about protocols and guidelines b) explicit versus tacit and experiential knowledge and c) perceptions of protocols and guidelines as a benefit and/or hindrance. The next section presents the findings of the research relating to the second research question.

Research Question 2:

What challenges, difficulties or dilemmas are experienced by ward staff with implementing protocols and guidelines in the management of Clostridium difficile infection?

The sections that follow will present the study findings surrounding the second research question. Four themes were identified which were perceived to be influencing infection control protocols and guidelines into practice. These include ambiguity, organisational issues, perceptions of contamination and professional frustrations.

Theme: Ambiguity

Introduction

This section presents the findings for the theme of ambiguity and explains how this influenced the use of infection control protocols and guidelines into practice, based on the second research question. Five categories of ambiguity were identified (See Figure 3.)

Figure 3: Summary Of Theme

Theme	- Ambiguity
Category	- Diagnosis Ambiguity
	- Assessment Ambiguity
	- Barrier Nursing Ambiguity
	- Isolation Ambiguity
	- Communication Ambiguity

Diagnosis Ambiguity: ‘Being On The Safe Side’

Patients may present with symptoms of diarrhoea due to conditions such as a diabetic bowel. Diarrhoea from conditions such as this can smell and look like *Clostridium difficile* infection and this caused ambiguity in relation to clinical diagnosis. A strategy nurses used to deal with their uncertainty was to assume the patient had infection until proven otherwise, by receiving confirmation from the microbiology laboratory. They referred to this as ‘being on the safe side.’

If a patient presented with symptoms of diarrhoea, the nurses would organise for the patient’s stool sample to be sent to the hospital laboratory. Nurses often became suspicious of infection by the smell of diarrhoea, which provided a cue to start barrier nursing the patient. Anticipating infection before it had been confirmed was a precautionary measure that nurses used to prevent the possibility of infection spreading.

‘‘If I see diarrhoea and I send a sample, I’d assume C.diff until I’m wrong. Hopefully I’m wrong, because I’m not hurting anybody....If I have got a cubicle they’d be in there....They shouldn’t be next to another patient if they’ve got diarrhoea.’’ [Ward Manager 1 interview] [p7: L34-37].

‘‘You would know it though...the smell, the looks. You don’t need to wait for the result, you can tell it straight away if it’s C.diff, it’s that strong.’’ [RN 10 interview] [p7: L31-32].

Nurse experience, skill mix and cooperation between nurses influenced whether patients were promptly diagnosed.

‘‘If your staff are not experienced they will not know how to deal with the infection. If they are experienced, they don’t need to wait for anything. The less experienced nurse may not pick it up.’’ [RN 14 interview] [p10: L5-7].

‘‘There are so many times that I’ve said to an N/A [auxiliary nurse] ‘let me help’, but they say no, go and do something with someone who is self caring. I want to know about my patient, I want to look, because I’ve got to write down these things. They don’t care about that.’’ [RN 13 interview] [p15: L1-6].

Other indicators that assisted with diagnosis included age, state of health, history of antibiotic usage, previous infection and use of a nasal gastric tube.

‘‘C.diff is a difficult one because the patients seem to have a lot of chronic states and are immuno-compromised. C.diff seems to be on the back of everyones’ mind and anyone who comes in with diarrhoea is immediately thought of...’’ [Doctor 2 interview] [p1: L12-16].

The patients on the ward probably have more antibiotics than anybody else because they have lines, they are immuno-suppressed and usually have other medical conditions as well. Recurrent infection is possible. They are probably carriers.’’ [Doctor 6 interview] [p1: L29-32].

‘‘If you’ve got diarrhoea, unless there’s another explanation like diabetic bowel and they are on like NG [nasal gastric] feeds, they are going to get loose stools because they are not digesting anything hard.’’ [RN 13 interview] [p8: L9-11].

Nurses did not need to refer to protocols or guidelines to remind themselves of these risk factors, which were repeated often on the ward.

Diagnosis Ambiguity: Re-Testing The Stool Sample

Although nurses may rely on the principle of ‘being on the safe side’ to assist them in knowing when to barrier nurse a patient, ambiguity arose where the stool result was returned as negative for *C.difficile* infection yet the patient continued to have diarrhoea. The algorithm for *Clostridium difficile* taken from the Department of Health guidelines (2009a) recommends repeat sampling at 48 hours if high suspicion of infection remains, but it does not state how many times this should be repeated. Some nurses experienced ambiguity over how many samples should be taken.

‘‘It gets a bit confusing in when do we re-sample?...I think I’d send another sample because sometimes, if they’re on vancomycin, the results come back as negative.’’ [RN 7 interview] [p9: L30-35].

Where a negative result was identified, some nurses perceived the patient to be non-infectious.

‘‘If a patient has got C.diff and they started them on oral vancomycin, that might alter the result. So it might become negative if they are on antibiotics fighting it off. They might not have it but still have the symptoms.’’ [RN 13 interview] [p8: L3-5].

Some nurses relied on the negative result, even if symptoms of diarrhoea were present, as a cue to cease barrier nursing. This caused ambiguity for other nurses.

The auxiliary nurse approached the duty nurse with her concerns. She said ‘‘they have all got diarrhoea in the 9 bedder. We took samples and it has come back as negative, but it smells like C.diff.’’ The nurse informed the auxiliary that if it was C.diff it would have shown up by now and dismissed her concerns...I later asked Doctor 8 about this as the algorithm says if the results are negative repeat in 48 hours. He said that samples should be taken up to 3 times. This should provide long enough for infection to show. If still negative, cultures should be taken. In this case only one stool sample had been taken. [Field note extract 21.1.11 - observation and informal conversation] [p3: L80-87].

Assessment Ambiguity: ‘Clearing’ The Patient

Ambiguity arose in relation to the assessment of *Clostridium difficile* infection, that is, at what point the patient may be considered not to pose a risk to others. Nurses and doctors need to know when a patient is to be regarded as non-infectious so that the patient may be removed from an isolation cubicle and barrier nursing can cease.

According to guidelines (Department of Health, 2009a) paragraph 5.4:

The patient should remain isolated until there has been no diarrhoea (types 5 - 7 on the Bristol Stool Chart) for at least 48 hours, and a formed stool has been achieved (types 1 - 4).

The patient may be moved out of a cubicle at this point and barrier nursing is no longer required. Nurses monitored and recorded the patient's stools using the Bristol Stool Chart, which assisted doctors with their assessment of the patient's condition. Where records were not consistently recorded, doctors may struggle with uncertainty over their assessment of the patient.

‘‘If I had 10 patients with C.diff, 6 patients would have proper stool charts. This is very important. I need to know whether patients are improving or not.’’ [Doctor 10 interview] [p5: L30-31].

The possibility of the patient being a carrier for *C.difficile* infection, once their stools became formed, caused ambiguity for some nurses in terms of the risk of the infection spreading and knowing when to discontinue barrier precautions. A carrier may have formed stools and a positive stool result, because the *C.difficile* bacteria would be present in the gut without causing any symptoms (Gould and McDonald, 2008). Bacteria may be transmitted to other patients via the hands of healthcare workers or the patient or the environment (Riggs *et al.*, 2007; Sunenshine and McDonald, 2006; Weber *et al.*, 2010).

‘I’ve always been informed that if you get a C.diff result it will be positive, even two weeks after the infection has cleared up. They’re gonna keep giving you positive results even if they’ve not got diarrhoea, so where do you draw the line about barrier nursing?’ [RN 3 interview] [p13: L8-10].

Some junior doctors expressed ambiguity about ‘clearing’ the patient and the point at which barrier nursing should cease.

‘Everyone knows the protocols, the controlling aspect of it and the treatment. There’s less awareness of...clearing somebody that is no longer infected. If they stop having diarrhoea, we can assume they no longer have infection. We have had a couple of patients who’ve continued to have diarrhoea though clinically it doesn’t resemble C.diff, nor are they infective any more in terms of their blood tests. We’re still unconvinced about how we say this is no longer infective. We send samples off, but micro say don’t send samples off because they can come back positive, even if they’re not infective. So it gets confusing about whether they need to be isolated or whether we need to take precautions with them...It’s mainly the doctors that are unsure, but I don’t think the nurses know either.’ [Doctor 4 interview] [p1: L12-23].

Experienced doctors were more certain about the course of action that should be taken if the patient was thought to be a carrier.

‘The patient has to have formed stools for 48 hours. If the stool result is positive...it will most likely be positive because of the carrier state...but if no diarrhoea for 2 days we can stop barriering the patient...If the result is positive I don’t care [barrier nursing can cease]. I don’t know why junior doctors would be confused about this...but it comes with experience.’ [Doctor 10 interview] [p8: L13-21].

Some experienced doctors spoke about uncertainty relating to what point doctors should seek assistance from the gastroenterology department where patients continue to have diarrhoea.

“We may be a bit unsure where you should be considering referral to a gastroenterologist. If everybody got referred to gastro then you would be in trouble. There are patients who have resistance to C.diff, who’ve been through the dual [antibiotic] therapy, are on the reducing dose and are still symptomatic. You need to know that’s when you need to be getting help.” [Doctor 7 interview] [p3: L16-19].

Other doctors were confident about what action to take.

“We need 3 samples, ok. If this diarrhoea has been going on and we don’t know what is causing it, if it’s not infective, then we need to refer them to gastro. Get the patient to see the specialist.” [Doctor 10 interview] [p8: L32-33].

Ambiguity was also associated with barrier nursing.

Barrier Nursing Ambiguity

Due to organisational pressures, the nurse-in-charge would sometimes rely on a negative stool result, rather than formed stools for 48 hours, and remove a patient from a cubicle to deal with a practical problem relating to bed management.

“We have pressure from bed management and if they look up on the computer and see the patient is negative, we’ve got to get them out.” [Ward Manager 1 interview] [p9: L10-11].

On one occasion a male patient with *C.difficile* infection had been treated in a cubicle for several weeks. This patient was re-located to a four bed ward to make room for a female patient who did not have an active infection but could not be placed with other males on the ward. Some nurses experienced doubt about

whether to barrier nurse the patient with diarrhoea on the open ward, even though the stool result was negative. Some nurses would barrier nurse as a means of protecting themselves and the patient, whilst other nurses would cease barrier nursing.

“If in doubt I’ll barrier nurse which causes confusion ‘cos if someone comes in, they ask why am I barrier nursing because there’s no reason...I came on today and some nurses haven’t been barrier nursing all night long. Some nurses take it on their own back to check the results. Because there’s not anything positive they won’t barrier nurse. There’s no clear guidelines between everyone...I’m gonna keep barrier nursing until I’m told otherwise.” [RN 3 interview] [p3: L13-23].

“You have your blue apron and your gloves. These need to be by the patient. That’s what’s supposed to happen. It doesn’t always, I’ll be honest. Like I said I’m thinking of the patient and myself. If I’m dealing with that patient, then I’m taking all precautions whether they have it or may have it.” [Auxiliary nurse technician 4 interview] [p1: L20-23].

Although some nurses acknowledged their uncertainty, they said they tolerated ambiguity to get the job done.

“...we are supposed to be reflective and think about things but we don’t. We’re rushed off our feet all day, working 100 miles per hour and we just don’t think about our practice. We are like on automatic pilot just trying to do what’s in front of us.” [Field note extract 1.12.10 – informal conversation with RN 16] [L172-175].

Being busy was given as a reason why nurses often worked on automatic pilot and did not question their uncertainty.

“We need to calm down, take time, you know, that’s part of the job, the biggest part of the job, to stop and think about all the things that we are supposed to be doing.” [RN 10 interview] [p3: L24-25].

A major reason given by nurses for tolerating ambiguity was not feeling able to speak out about it (See p.304). Cubicle allocation was also a source of ambiguity.

Isolation Ambiguity

Due to the limited number of cubicles (there were four in total), nurses talked in terms of an assessment being made as to which patients were allocated to them, with priority being given to the worst patients. There did not appear to be clarity regarding the formula that was used to assist with decision making in relation to cubicle allocation.

“I suppose it depends on...you’d have to risk assess those patients, so that if the one with C.diff was also dying or aggressive or confused or had low immunity...” [RN 9 interview] [p7: L24-26].

“I think they [management] more or less put the worst patients in a cubicle probably...Everything in general probably, sick, poorly...” [Auxiliary nurse 2 interview] [p4: L25-27].

Priority would tend to be given to patients (with or without infection) on an end of life care pathway or to those who were confused, aggressive or noisy. The worst patients may not necessarily mean those infected with a contagious infection, such as *Clostridium difficile*. Cubicle allocation was assumed to be a nursing role, and not something that doctors were involved with.

“If somebody has diarrhoea they will go into a cubicle if one’s available and it will happen day or night whatever nursing shift is on. But that sort of thing I don’t get involved with. The patients I ask to put in a cubicle are the ones who are dying.” [Doctor 8 interview] [p6: L26-30].

Some nurses believed cubicle allocation to be a random process and doubt existed as to whether the ‘right’ patients were being isolated.

“There seems to be no policy that exists. If there is a cubicle free you bung them in but there’s no sort of priority given to who needs it, when and where. It’s up to the nurse individually to process the patient into a cubicle...Sometimes you have got patients that aren’t really appropriate, that don’t really need the cubicle. Even if there is some set hierarchy of what you do, it’s really hit and miss who is in them.” [RN 3 interview] [p1: L9-17].

Some nurses talked in terms of having ‘no choice’ about which patients were isolated.

“...the nurse in charge may have no choice over where the patient is put. This may be decided by the bed coordinator. It can even be a decision made by the consultant or the nurse director...from bed management. There is an MAU [medical admissions unit] due to an emergency crisis, and they tell us where a patient is going and we have no choice in the matter.” [Field note extract 1.12.10 - informal conversation with RN 9] [L114-117].

Spatial and structural constraints may also influence which patients were allocated to a cubicle (See p.236 - 238). The next section presents the findings to illustrate communication ambiguity and how this can constrain the implementation of infection control protocols and guidelines.

Communication Ambiguity

Patients diagnosed with *Clostridium difficile* infection were not always barrier nursed. A common reason why some nurses did not barrier nurse patients appears to be due to issues with communication at handover. This is a process whereby one group of nurses finishing their shift hands over information about patient care to a group of nurses prior to commencement of their shift.

The registered nurse entered the cubicle but did not use apron or gloves. She gave the patient a drink, checked the line and moved the table. I joined the auxiliary nurse who was doing patient observations...The nurse whispered to me "this patient has an active infection." The registered nurse overheard what the nurse had said. She froze and said quietly "C.diff!! Oh my god. I was told at handover and I forgot." During handover I did not hear this nurse being told that the patient had C.diff. The door to the cubicle was wide open, so the notice 'barrier nursing use gloves and apron' was not easily seen. There was no trolley with blue aprons outside the cubicle door, which nurses use as a cue. [Field note extract 2.9.2010 - observation and informal conversation] [L113-123].

As nurses tended to work three 12 hour shifts per week, it is easy for them to be unaware of the ever changing ward circumstances and patient conditions. A nurse coming onto shift may have been off duty the previous day. A nurse may have worked several consecutive days on one side of the ward to ensure continuity of

patient care prior to working on the other side of the ward. Reliable handover at the start of a shift has an important role to play in keeping nurses up to date with what is going on. Handover is not limited to shift starting times. Occasionally nurses may work a shorter shift, for example, 2pm - 7.30pm. Those nurses would have missed the main handover and so are reliant on a one to one handover. Similarly, nurses who are sent from one side of the ward to the opposite side for a few hours during a shift, to assist with staff shortages or imbalances in the workload, may be unfamiliar with the patients. These nurses are relying on one to one handover, which may or may not take place.

An auxiliary nurse technician and an auxiliary nurse are unaware that a patient with C.diff was brought onto the ward several hours ago. The auxiliary nurse technician is unaware as she came onto the shift at 2pm. The auxiliary nurse is unaware as she has just come over to help out from the other side. Both look taken aback when I ask them about the C.diff patient. They both say they hadn't been told. [Field note extract 9.08.10 - observation and informal conversation] [L101-105].

Communication during handover was raised during interviews. The unpredictability of this process may be due to the person doing the handover, implying that some nurses were better at passing on vital information than others. Nurses complained that handover was long, often running an extra 30 minutes into the nurses' own time. The process may also depend on a nurse's ability to remember and pass on all the necessary information.

"Information is handed over during the handover, but I wouldn't say consistently because it's very hit and miss. Sometimes I remember all the vital medical bits, but I can't say I consistently handover barrier nursing myself." [RN 3 interview] [p9: L5-7].

“I ask questions in handover and I miss things. If you are a good nurse you hold your hand up and say I wasn’t listening, I was writing something. Please, please repeat what you just said.” [RN 13 interview] [p14: L7-8].

As ‘barrier nursing’ signage was only displayed outside an isolation cubicle, communication at handover is vitally important for nurses. Nurses relied on handover to alert themselves and others to which patients were being barrier nursed on the open ward. It was raised during a ward meeting that nurses relied too much on the handover process and that they should also be reading the patient notes.

“If porters come for patients they always ask us if the patient is being barriered...You are just relying on handover and on the handover sheets.” [RN 1 interview] [p2:L36-38].

One of the reasons given by some nurses for over reliance on handover is that they did not have enough time to read the patient’s notes.

“We are not supposed to read out all their [patient] history...it’s there, it’s written down [on the handover sheet]...it takes two seconds once you get on the ward to read the notes to see what’s going on. I hear it said so often ‘I haven’t got time to read the notes.’...The 10 minutes they spend chatting in the morning could be spent reading the notes.” [RN 13 interview] [p14: L11-18].

It was implied that nurses may not manage their time well. Nurses may chat as a means of supporting each other as part of their communities of practice (Lave and Wenger, 1991).

Communication ambiguity was also identified between doctor and nurse handover.

“It would save time [if nurses attended the ward round] instead of reading the notes and trying to understand what we are trying to say, which is possibly our fault because we are not communicating properly.” [Doctor 2 interview] [p11: L11-13].

Communication ambiguity has the potential to be detrimental to patient care.

The nurse noticed that the patient in the cubicle had not had her antibiotic. It should have been given at 1pm, but it was now 10pm. I asked why it had been missed. She said the doctor had written the prescription on the drug round and hadn't told the nurse and this happens a lot. [Field note extract 20.1.11 – observation and informal conversation with RN 12] [L153-159].

When a *C.difficile* patient was discharged from a cubicle or bed on the ward, the area would be decontaminated by a process known as a ‘deep clean’ to remove any spores. A department of cleaners outside the ward would undertake this task. Difficulties with communication between nurses and the cleaning department meant that the correct level of cleaning would not always be undertaken.

The nurse organised for the area where the C.diff patient had been on the ward to be deep cleaned. When the cleaner arrived I asked what he was going to do. He said he'd take down the curtains, replace them and wash the square of the floor where the bed had been. I asked if he was going to wash the cills, bed rail, cupboard, table etc? He said he'd only been asked to change the curtains and wash the floor. I explained this to the nurse. She said ‘I told them the patient had C.diff’. I asked who would clean the rails, skirting, cabinet etc, and she said it was the cleaner's job. Then she left. [Field note extract 12.8.10 – observation and informal conversation with Housekeeper 1] [L132-142].

To summarise, five categories of ambiguity were identified. These relate to diagnosis, assessment, barrier nursing, isolation and communication of infection. The next section will present the findings surrounding the theme of organisational issues, based on the second research question.

Theme: Organisational Issues

Introduction

This section will present the findings for the theme of organisational issues and explains how it influences the use of infection control protocols and guidelines into practice, based on the second research question. Four categories of organisational issues were identified (See Figure 4)

Figure 4: Summary Of Theme	
Theme	Organisational Issues
Category	- Spatial And Structural Constraints - Equipment And Resource Constraints - Role Models, Social Norms And ‘‘Fitting In’’ - Control Of Standards

Spatial And Structural Constraints

The layout of the ward and the maintenance of the ward facilities posed difficulties for practice. The findings are summarised under the headings: privacy and dignity and handwashing facilities and toilets.

Privacy And Dignity

Although an important aim of infection control policy is to prevent the spread of infection, practice was constrained by issues of privacy and dignity. Where several patients on the ward were suspected or known to have *Clostridium difficile* infection and the number of cubicles is exceeded, patients were placed on the open ward, rather than cohorted (placed together in a separate bay). During eight months of field work, no incidents were observed where *Clostridium difficile* infected patients were cohorted. This appears to be due to a Government rule.

“We have done that [cohort patients] and we’d do that if...Personally I would do that. But you can’t put them together if you’ve got mixed sexes.” [Ward Manager 2 Interview] [p5: L7-13].

“We’re not allowed to have mixed wards anymore, regardless that C.difficile infection is highly contagious...It’s been clearly stated by the Government. They have banned them.” [RN 3 interview] [p1: L24-24].

“One of the most important things is trying to promote the patient’s dignity...Patients are going to be exposing themselves...You don’t want someone lying naked opposite you of the opposite sex.” [Auxiliary nurse technician 1 interview] [p3: L1-5].

Nurses said that noise, being physically exposed to the opposite sex and being in an embarrassing or sexually threatening situation were issues that they considered when admitting patients onto the ward. Due to the ward design and limited number of cubicles, such issues were often seen to take priority over the need to prevent the spread of infection.

“We’ve got 4 cubicles. Sometimes in those cubicles you’ve got end of life care. We’ve also got patients in them who are noisy.” [Ward Manager 1 interview] [p6: L1-2].

“We don’t have enough cubicles. You could have someone in there who’s on a care pathway [dying], somebody who’s got Clostridium difficile and you could then have somebody who needs a cubicle put onto the open ward because the cubicles are full.” [Ward Manager 2 interview] [p5: L2-4].

Patients with social issues, including those without a healthcare infection, may be admitted to a cubicle, often remaining there for months. One patient with a mental health problem remained there for five months. Structural issues such as hand wash basins and toilets in cubicles were also considered to influence practice.

Handwashing Facilities And Toilets

Handwashing is vitally important to prevent the spread of infection, especially with *Clostridium difficile* as alcohol hand rub is not effective against spores (Jabbar *et al.*, 2010). Hand wash basins and toilets in cubicles were often out of order. Basins in cubicles and smaller wards were often obstructed with zimmer frames and drip stands. Ward staff tended to gravitate towards the sluice room sink to wash their hands, which had become a habit.

“I don’t know what it is. It’s automatic. You forget about them [the sinks] in there [the ward]...I will use the one in the 9 bedder but rarely use the other ones. It’s getting to the sink.” [Auxiliary nurse 5 interview] [p11:L10-13].

Due to the location of the hand wash basin in the sluice room and the limited space, the arm operated taps were inoperable. Mixer taps were not provided and some nurses were observed washing their hands using cold water, as the hot water was perceived to be too hot. Sluice room hand wash basins were sometimes blocked.

“You can’t wash your hands in the sink, it’s blocked. He comes to repair the sluice and we ask him to unblock the sink. He tells you that you have to phone down and get a job reference. It’s crazy. It’s just red tape. You can’t wash your hands!” [Auxiliary nurse technician 1 interview] [p1: L18-20].

Nurses perceived that structural constraints within their environment prevented them from implementing infection control precautions, creating the potential for transmission of infection.

“The cubicle...it’s been closed off for months. There was a sign saying the toilet was out of order...The whole idea of having cubicles is for that purpose.” [Auxiliary nurse technician 1 interview] [p4: L24-28].

“The nurse opens the cubicle door with dirty gloves on [because the toilet is out of order]. The relatives come in and open the same door. Don’t tell me they don’t use their hands to eat crisps, eat sweets. They will have it.” [RN 10 interview] [p7: 20-22].

The harshness of the liquid soap and hand rub were associated with washing hands less often.

“What would encourage me to wash my hands more is nice sinks, nice taps, nice smelling soap, with a moisturiser and a nice gel. Invest on that and the nurses would keep on washing their hands...What do we get after we wash our hands? Dryness on our skin, redness, prickles, so why would people keep on washing their hands?” [RN 10 interview] [p4: L26-34].

The next section will present the findings in relation to equipment and resource constraints.

Equipment And Resource Constraints

One of the constraints which nurses perceived to be influencing their ability to implement infection control precautions was the limited supply of ward equipment.

“Patients don’t always get barrier nursed because we don’t have enough trolleys or enough PPE (personal protective equipment e.g. aprons and gloves).” [RN 13 interview] [p8: L14].

Lack of equipment was perceived as a potential source of cross-infection.

“We constantly lack equipment to stop it spreading.” [Auxiliary nurse 3 interview] [p1: L7-8].

Patients with *Clostridium difficile* infection should ideally have their own equipment, such as commode and blood pressure cuff, to prevent cross-infection. Limited equipment made this difficult.

“It doesn’t matter if they’ve got Clostridium difficile or not. We do their blood pressure using the same cuff because we’ve got few machines. [Ward Manager 2 interview] [p5: L1-2].

Nurses, doctors and phlebotomists were often observed improvising, to cope with equipment constraints and to avoid cross-infection.

“You will see a lot of doctors using a latex glove as a tourniquet. We do this when a patient has an active infection. I tend to tie two gloves together and put a piece of gauze beneath it to prevent it hurting the patient.” [Doctor 3 interview] [p4: L31-33].

Prior to entering a cubicle to take blood from a patient with *Clostridium difficile*, phlebotomists would prepare a foil tray with everything they needed (tape, syringe, bottles, labels) to avoid taking their trolley into an infected area.

The phlebotomist tied two latex gloves together. She explained “it’s to minimise the contamination. Sometimes there is a tourniquet in a cubicle but sometimes there isn’t.” [Field note extract 1.12.10 - observation and informal conversation with Phlebotomist 2] [L18-22].

Nurses were observed improvising with sterile procedures because of the lack of basic equipment such as trays.

The nurse opened a pack of sterile gloves and rested the paper from the packet on the bed, then lay her equipment on the paper on the bed cover. She said “this is what you call improvisation...There aren’t any trays. Hospital staff shouldn’t have to improvise but it is a reality.” [Field note extract 9.12.10 - observation and informal conversation with RN 9] [L52-56].

Nurses were observed having to cope with frequent episodes of equipment break down. Nurses would walk out of a cubicle wearing a blue apron (which signifies that they have been caring for an infected patient) carrying a full commode pan covered with tissue. They would walk out of the ward down a corridor into the adjacent ward to use the sluice, as their sluice was inoperable. At one point this practice was observed for six continuous weeks, and once the sluice was repaired, it broke down the following day. Many nurses perceived themselves as being powerless under the circumstances, often developing their own strategies to minimise the risk of infection spreading.

“That sluice breaks down all the time. You’ve got no choice because you’ve got to dispose of it [faeces]...I try to take precautions by covering it [the pan] when I walk out of the room.” [RN 1 interview] [p3: L22-27].

Nurses were observed on many occasions searching for equipment that worked. Examples include blood pressure machines and tympanic thermometers, the latter being a device which has been shown to reduce infections such as *Clostridium difficile*, as the patient’s temperature is taken from the ear rather than the rectum or the oral cavity (Brooks *et al.*, 1998). This often caused frustration due to time pressures.

‘‘It’s stressful when the equipment isn’t working properly, because you feel that you are getting behind with your work. The qualifieds think you should have done that [task] by now. You can tell the stress behind everyone. The monitors play up and you go and get another one but it’s the same.’’ [Auxiliary nurse 2 interview] [p10: L15-19].

Similarly, nurses had to cope with limited amounts of stock and supplies.

‘‘There have been times when there are so many patients with C.diff that we have run out of incontinence liners which go in the bed [protecting the sheet]. We’ve had to use hand towels to wash their bottoms when we have run out of wipes. Why are we short of stock all the time?’’ [Auxiliary nurse 5 interview] [p8: L6-9].

Limited amounts of stock and other supplies was an issue that nurses coped with.

One night shift, nurses had no hot water. The ward ran out of supplies of the chlorine-containing cleaning agent (actichlor) for approximately six weeks, due to ill-defined responsibilities for ordering stock. Actichlor was needed to decontaminate surfaces and equipment to remove spores, as they are resistant to many surface disinfectants (Weber *et al.*, 2010).

‘‘There’s nobody on the ward with an active infection, so I don’t see any reason why we have to use actichlor...We always clean with actichlor up ‘til now, so the spores are always being removed but at the moment we can’t do it because we haven’t got any. We have to use soap and water.’’ [Field note extract 5.10.10 - informal conversation with Ward Manager 1] [L148-153].

Having to cope with limited supplies of equipment and resource constraints was perceived to be contributing to highly charged emotions (See later section – Professional Frustrations – Struggling, p.283).

The next section will present the findings in relation to role models, social norms and “fitting in”.

Role Models, Social Norms And “Fitting In”

Nurses said that they learned through observing the behaviour of their seniors, and considered the consequences of their actions before deciding whether to adopt similar behaviour.

“You look to certain nurses and you try and match that...Sometimes I’d think I didn’t like how that was done. I didn’t like the results of that situation, or the process to getting to that result. You know you’d reflect on the situation. I wouldn’t want to do that, that way.” [RN 9 interview] [p10: L14-24].

Social Learning Theory proposes that a combination of environmental (social) and psychological factors are required to influence behaviour. The theory outlines three requirements for people to learn and model behaviour including remembering what has been observed, the ability to reproduce the behaviour and motivation to want to adopt the behaviour (Bandura, 1977; Rotter, 1954). Motivation to implement infection control standards can be influenced by aspiring to mentors, senior colleagues or a leader within the group.

“We’ve got some really good nurses on the ward that we can look up to...which are good role models for our junior nurses.” [Auxiliary nurse technician 2 interview] [p10: L26-27].

“I know everybody has their own particular role in caring for the patient, but you do look to see what the doctors are doing or to see what the consultants doing.” [Doctor 8 interview] [p4: L28-30].

Experienced doctors were perceived by some doctors and nurses to be better at implementing certain precautionary measures.

“Some of them are good [at hand hygiene]. The consultants are the best.” [Ward Manager 2 interview] [p6: L20].

“I have only seen one doctor here wash his hands religiously during the ward round. He is a consultant. Today he would not let a junior doctor touch a patient as he had not washed his hands.” [Doctor 3 interview] [p5: L11-14].

“I think more of the consultants are doing it [gowning up and washing hands between patients] better than I’ve seen on other wards. I think it’s setting the example particularly for the junior medical staff. I think it’s starting to drill in the practice that you need to wash your hands between patients.” [Doctor 2 interview] [p2: L2-5].

Several nurses said that ward managers did not always display the correct behaviour.

“At meetings nurses get reminded to follow the protocol...But then you might get somebody on the same level who does the opposite.” [RN 6 interview] [p3: L9-10].

Some inexperienced nurses said they implemented incorrect practice as a way of fitting in with the team.

“The way we were taught to do things in uni differs from how it is done in reality. When I first came here I was adamant that I would say something, but when you are busy and someone is uncomfortable and the staff don’t care how things are done, you end up doing things you know you shouldn’t.” [RN 5 interview] [p5: L17-20].

Junior doctors did not always think of themselves as a role model for their colleagues, nurses, patients and visitors.

“I haven’t really thought about it [being a role model] but I can see the point.” [Doctor 1 interview] [p6: L16].

Inexperienced nurses said they looked to the behaviour of senior nurses as a role model. None of the nurses considered doctors as their role model.

“I wouldn’t consider doctors as a role model. We are so separate, even though we work together. They are so clinical. The only connections we have with those people are clinical issues.” [RN 9 interview] [p10: L26-27].

The behaviour of doctors appeared to be influencing the perception of some nurses.

“I think what’s the point of barrier nursing when people are just going in and out, not washing their hands.” [RN 3 interview] [p5: L4-4].

Being an experienced doctor or nurse may be associated with being more aware of how ones’ behaviour may influence others.

“I found myself doing it better because my juniors are watching me. You feel like a role model for them. If I fail to wear a gown/gloves then I would be giving a bad example. I think the consultant is doing the same thing. By doing that they would be telling us that it is not important. If I am not complying, how can I ask for that?” [Doctor 10 interview] [p10: L29-31].

“As medical professionals we should serve as a model. If patients or relatives don’t see us doing things properly to prevent the spread of infection then they won’t see why they need to do it either.” [RN 10 interview] [p3: L18-20].

Motivation to implement behaviour can be influenced by the consequences of action taken. According to Skinner (1974) people avoid negative consequences, while desiring positive results or effects. If a positive outcome is anticipated, the behaviour is more likely to be adopted or its frequency increased. For example, nurses and doctors may prioritise their decision for failing to implement barrier nursing precautions in relation to some positive benefit, such as saving time.

“Everybody does it [enters a cubicle without gowning up]. Nurses do it more than doctors, because they are fed up with putting aprons on or they may forget something. They come out and go back in, without gowning up...I do the same thing...If I am in a rush...You justify it in your head. You know...If I’m not touching anything. I may just want to ask the patient a very quick question.” [Doctor 10 interview] [p10: L8-17].

Where there are no negative consequences of this behaviour it is likely to be reinforced and therefore repeated (Skinner, 1974).

“I only went in because she was calling me. I can’t see the point [of gowning up]. What harm am I doing going in for a few seconds? I’m not touching anything, just listening to the patient.” [Field note extract 9.10.10 - informal conversation with auxiliary nurse 8] [L154-157].

‘I know it’s not an excuse, but when patients, when you’re ridiculously busy or if I have taken off a gown and I have forgotten the drug chart ...and you just run in and just pick up the drug chart.’ [Doctor 2 interview] [p2: L9-15].

Seeing standards being breached in one area (propping open the cubicle door) may negatively influence an individual’s motivation to implement other isolation precautionary measures (glove and gown use).

‘Are the rooms being closed for C.diff patients? [Says this sarcastically]. Because there’s no point in gowning up before entry...People can go in and out without causing any harm, because we believe that C.diff forms spores in the air. If the rooms are not closed what is the difference if I go in and say are you ok...If the rooms are closed then I will be exposing the spores. So the room should be closed. If not, people will be walking in.’ [Doctor 6 interview] [p3: 12-18].

The ward culture was perceived to be affecting the attitude of other staff coming onto the ward. Observing standards not being implemented may influence their motivation to implement similar behaviour.

‘I popped my head in the cubicle and asked the nurse if the patient had C.diff. She said she didn’t know. She had no apron or gloves on but there was a sign on the door saying that the patient was being barriered. This happens a lot on other wards too. If they’re not doing it, why should we bother?’ [Field note extract 1.12.10 - informal conversation with Phlebotomist] [L29-33].

Visitors may look to doctors and nurses when uncertain of the precautions they should be implementing.

The visitor of the C.diff patient entered the cubicle. The ward manager and three nurses were sitting at the nurses' station...No one said anything to the visitor. There was a sign on the door indicating that the patient was being barriered. As the door was wide open, the sign was not easily seen. The doctor walked into the cubicle, said something to the visitor then walked out. No handwashing, gel, gloves or gown was used. The doctor returned and re-entered the cubicle. When he came out he used the gel outside the door. The visitor followed him and copied his behaviour (used gel to cleanse hands), but appeared unsure what to do. [Field note extract 10.8.10 - observation] [L58-64].

Doctors were perceived as having an important role to play in setting the standard of expected behaviour on the ward.

“I think they should maintain the hygiene controls and still use gown and gloves when they go into a cubicle, because it's important to enforce to everybody else that this patient is barrier nursed and therefore that's what you are doing. A lot of people feel that they're just sticking their head round the door, they're not getting close to the bed, they're not examining the patient. Bugs are not going to leap four foot across the room so there's no need to gown up.” [Doctor 8 interview] [p5: L1-6].

Seeing experienced doctors failing to implement precautions was seen as lack of commitment to standards.

“The newer doctors are better than the older ones, but the women are better than the men. Doctors that are coming out now are keyed up about infection control because of their training. Some of the older ones haven't got much time for it.” [Doctor 3 interview] [p5: L14-16].

Similarly, many nurses perceived that doctors were failing to implement standards because they lacked interest in infection control.

“Doctors are awful. They sit on the beds, have to be reminded to wash their hands, and we have to nag them about everything. They are not interested in infection control.” [Field note extract 2.8.10 - informal conversation with Ward Manager 1] [L70-72].

Doctors may be interested in infection control. The perception of being bombarded may result in infection control being prioritised at a lower level, giving the impression that it is not important (See Feeling Overwhelmed p.294). The next section will present the findings in relation to control of standards.

Control Of Standards

Several nurses and doctors reflected that standards were stricter years ago because the matron was in charge.

“The key way to solve problems is to have one person whose sole job is to come on the ward and make sure everything is done. That’s what the matron used to do and that’s where we fall down...Bring the matrons back...Someone needs to be the over see-er.” [Doctor 2 interview] [p12: L4-11].

Many nurses mentioned that the ward manager was too busy to notice what was going on as she was rarely present.

‘‘It’s all about paperwork now. She [the ward manager] doesn’t realise what is going on out there.’’ [Field note extract 5.10.10 – informal conversation with auxiliary nurse 8] [L121-122].

During an infection control meeting, the practice of nurses using alcohol hand rub on their gloves was raised. A recent audit by an external body which took place on a different ward had identified this practice as being out of date. The ward manager said during the meeting that nurses no longer used hand rub on their gloves and that this practice ceased some time ago. Interview and observation data confirmed that some nurses used hand rub on their gloves frequently.

‘‘I mainly use gel on my gloves during the observations. I go around patient to patient and in between use the gel on the gloves. At the end, if I’m in a bay, I’ll take my gloves and my apron off, wash my hands, get a new apron and gloves and go into another area.’’ [Auxiliary nurse 4 interview]. [p5: L22-28].

Colour coding of aprons may assist nurses identify where protocols were being breached. There was a notice displayed in the ward corridor:

Nursing staff should not be seen walking around ward corridors with a blue apron on as this is a means of spreading infection. [Field note extract 2.9.10 - observation] [L129-130].

Nurses were seen on many occasions walking around wearing a blue apron. This appeared to be accepted practice.

‘‘Where I used to work, if we were cleaning patients we wore white. You couldn’t do any food until you had the right apron on. You’d be told to put

a blue one on. It kind of worked only because people were told to do it.’’
[RN 1 interview] [p4: L13-16].

Lack of enforcement of basic hygiene standards was mentioned by some staff.

‘‘I always joke because it’s the only job where you’ve got to wash your hands before you go to the toilet, rather than just wash them after. And you see nurses not washing their hands before they leave the ward.’’ [RN 4 interview] [p4: L26-28].

Being too busy was mentioned as a reason to support the lack of enforcement of infection control standards.

‘‘I think there’s lots of things as a consultant that you should mention to your juniors and not let slide...hygiene on the ward...filling in drug charts. I think those things need to be enforced. I think often we don’t, because we’re busy.’’ [Doctor 8 interview] [p4: L30-34].

‘‘They know that I’m not a hard person. I’m part of the team. Yes, I lead the team but I am a part of the team. ...I pull on their heart strings a bit. I didn’t shout at them, it’s pointless laying into them. But I expressed my disappointment. You can’t shout at them...I know the pressures. I know they are busy. That’s the way I deal with it.’’ [Ward Manager 3 interview] [p6: L11-16].

Ward managers have a lot of administrative duties to carry out as well as trying to be visible on the ward. Using other nurses to assist with monitoring standards was perceived as being important, although this did not happen on the ward.

“I’m restricted by time...You can’t have eyes in the back of your head. If you haven’t got somebody helping you out you are not going to do it all by yourself...If you have a group of you doing it, you know you just spur each other on..” [Ward Manager 3 interview] [p3: L8-12].

The ward manager was perceived as being powerless to take action when doctors failed to implement infection control precautions.

*“I don’t think I have ever ever seen a doctor going into a barrier nursed room with a gown and a mask on...I have seen Dr *** gowning up but I think that’s because she is a woman with children. It’s really maddening. We have discussed it with our ward manager. She does say something to them but it just goes over their heads. I think they think they are pretty much immune to it.”* [Auxiliary nurse 3 interview] [p3: L1-13].

Getting doctors and ward cleaners to implement ward infection control precautions was a difficulty that was recurrently mentioned by nurse ward managers. The ward was placed at the bottom of the hospital list for compliance with the antibiotic strategy using the antibiotic label, which was part of a primary prevention strategy to control the spread of *C.difficile* infection. Ward managers did not see themselves as being responsible for the doctors’ poor performance, and other ways were considered to deal with the issue.

‘It’s not my responsibility...it’s the doctors. They are the prescribers. One of the consultants had spoken to the team...but the nurses have wondered how we are going to get this up [antibiotic label compliance]. We have thought that the only thing we can do is we won’t give the antibiotic unless the sticker is on the chart. The sticker sometimes is on there but not filled in correctly. There are sneaky ways to try and get the doctors to fill them out.’ [Ward Manager 3 interview] [p10: L1-23].

Punishment was discussed during an infection control ward meeting as doctors were not implementing the ‘bare below the elbow’ policy. The nurse director explained to the consultant that any doctors that do not follow this ‘rule’ would be removed from the ward. The consultant responded by laughing at this suggestion, implying that she did not take this seriously (See also *Staying Silent* p.300). Seeing ward staff failing to implement precautions without negative consequences may result in others perceiving that they can avoid implementing these too.

The nurse sighed when she saw the notes had not been updated for over a week. No bowel movements had been recorded. I asked why these had not been completed. She said ‘some staff fill them out, some don’t including the night staff. You tell them and they still don’t do it. I have reported it but nothing gets done. Somebody must take action against these people. Other staff see them getting away with not doing it and they think they can get away with it too.’ [Field note extract 7.11.10 – observation and informal conversation with RN 15] [L60-64].

Undesirable behaviours can be decreased or extinguished by receiving negative consequences soon after the behaviour has been performed, a process known as operant conditioning (Skinner, 1974). An example of reinforcement could include providing feedback from audits. Nurses and doctors said they did not receive feedback from audits.

“I didn’t know that we’d failed the commode audit to be honest. I’m quite disappointed that we failed.” [Auxiliary nurse technician 2 interview] [p11: L20-21].

Some nurses suggested that lack of feedback was giving rise to uncertainty about their performance.

“We don’t see the numbers coming down. We don’t get any feedback. It may be brought up in a meeting now and again...If you have got 10 people who have come down with it [C.difficile] you think there is something wrong here. What are you doing wrong?” [RN 17 interview] [p9: L22-28].

Although audits were carried out on the ward, the results may not always be fed back to the ward managers.

“I’m nosy and I look [that is how I find out about the audit results] and I go to the clinical governance meetings and things like that..I will say to someone like the nurse director and ask how are we doing... because of my role.” [Ward Manager 1 interview] [p1: L11-14].

Many nurses perceived that *C.difficile* infection was being brought in from outside.

“We had a massive problem with C.diff on this ward and because of what we did [implementation of bed cleaning and de-cluttering] our rate of infection plummeted. We don’t have a massive amount of C.diff on the ward now. The majority...have come in with it. I don’t think there’s a lot that have been contracted from here.” [RN 7 interview] [p5: L1-7].

An infection control meeting took place on the ward mid-way during the field work. The meeting was attended by one ward manager, two nurse directors, one consultant and one infection control nurse. During the meeting it was announced that there had been 24 patients infected with *C.difficile* in the previous three months. Of those, 15 were attributed to outside the hospital and 9 patients contracted *C.difficile* from the ward. Of those patients, 7 had died.

In summary, four categories of organisational issues were identified. These include spatial and structural constraints, equipment and resource constraints, role models, social norms and “fitting in” and control of standards. The next section will present the findings related to perceptions of contamination.

Theme: Perceptions Of Contamination

Introduction

This section will present the findings in relation to the theme of perceptions of contamination and explains how it influences the use of protocols and guidelines into practice, based on the second research question. Four categories were identified (See Figure 5).

Figure 5: Summary Of Theme	
Theme	- Perceptions Of Contamination
Category	- Fear Of Infection - Normalising Infection - “Looking Or Feeling Dirty” - Getting Rid Of “It”

Fear Of Infection

Being infected with *Clostridium difficile* was associated with embarrassment and thoughts of being unclean.

“I feel for the patient because everybody looks at them and thinks they are unclean.” [Ward Manager 1 interview] [p7: L14-15].

“Patients will question “god, is he infected?”...they can smell it.” [Auxiliary nurse technician 1 interview] [p8: L31-32].

Nurses may not use a blue trolley at the end of the patient's bed on the ward to "keep it quiet."

"You don't want anyone else knowing. If a relative's seen that [their family member lying next to an infected patient] they may be up in arms." [RN 6 interview] [p2: L1-3].

"When they see trolleys at the end of the bed, the family kick off. They say they don't want their father/mother in here if that patient has got C.diff or MRSA. They know it because there is a trolley at the end of the bed. Everybody knows what that's there for." [Auxiliary nurse technician 1 interview] [p4: L2-5].

Thoughts of being "unclean" were associated with fear of "getting" infection and of taking "it" home. Females more often mentioned their concerns about getting infection than males. Nurses and doctors who expressed anxiety were concerned for their own health and/or the health of their loved ones.

*"I have seen *** gown up before going into see a patient with an active infection...I think that's because she is a woman with young children. People tend to think about protecting themselves because they want to protect their children. They don't want to take it home."* [Auxiliary nurse 3 interview] [p3: L4-7].

"I'm religious with things like C.diff. I wash everything with soap and water. I double glove too...I'm trying to avoid anybody infectious because I've got a weak immune system. I don't want to be taking things home." [RN 7 interview] [p8: L3-13].

"My partner has got a weakened immune system, I don't want to take anything home...If I take it home he could end up in hospital." [Auxiliary nurse 4 interview] [p2: L4-5].

Thoughts of dread about the prospect of contracting infection or spreading ‘it’ to loved ones was associated with paying attention to precautions or taking extra precautions in the hope of avoiding infection.

“I cleaned that gentleman up [with C.diff infection]. I scrubbed up to here [points to her elbows]. I put gel on...I’ve got paranoia about it.” [Auxiliary nurse technician 4 interview] [p1: L29-31].

“I’m highly obsessive about handwashing between patients and before I leave, because I’ve got a little one at home.” [Doctor 5 interview] [p2: L4-5].

There is a requirement for employers under the Workplace (Health, Safety and Welfare) Regulations, 1992 to provide changing facilities including lockers and showers for employees (Health and Safety Executive, 1992). As changing and showering facilities were not available on the ward, nurses travelled to and from their place of work in their uniform. Some nurses stored their personal belongings in an unlocked cupboard in the ward corridor, whilst others stored them under the desk at the nurses’ station. Outdoor clothing such as cardigans and hoodies were often found lying over chairs at the nurses’ station. Many nurses talked about feeling dirty when they left work and strategies they used to make them feel safe.

“I go home and I don’t let my kids touch me. I go straight in the shower and my clothes go into a 40°C wash...That’s because I’ve got small ones. I say to my kids ‘mummy is really dirty, you can’t come by me’. Then I go in the shower. I never walk my shoes through the house.” [RN 10 interview] [p11: L9-14].

“I take my clothes off as soon as I get in and shower. I do that for any infection...I wash my clothes each day and I’ve even got a separate laundry basket.” [Ward Manager 1 interview] [p3: L30-31].

Seeing patients or experiencing a loved one suffer from healthcare-associated infection may heighten awareness of the consequences.

“I’ve been nursing for twenty years. I’ve seen so much of it that my experiences have brought it on [being more aware].” [Auxiliary nurse technician 4 interview] [p2: L2-3]

“My father died on one of these wards. He contracted C.diff so I know exactly what it feels like. It was horrible to watch my father die like that.” [RN 7 interview] [p8: L13-15].

Being aware of the contamination risk and having confidence in the efficacy of the preventative measures may result in these being relied upon.

“We had a bug on the ward and a couple of nurses got it [diarrhoea and vomiting]. I never got it. If you are aware of things, you shouldn’t pick it up. I know it can’t be helped because it’s on surfaces, if you put your hand down you can easily pick it up, but...I’m always watching for things. I feel I can prevent it.” [Auxiliary nurse technician 4 interview] [p2: L3-8].

“In my nursing career I will be faced with infection but I know what to do to prevent infection. I always hand wash. I am very careful with that and I wash from my elbows.” [RN 2 interview] [p1: 23-25].

Use of gloves and apron may make a person feel less anxious about uncertain risk.

“It [using gloves] makes me feel better. I don’t know how effective it is. I feel like I am doing something.” [Doctor 5 interview] [p6: L17-18].

Lack of confidence with the precautionary measures may influence behaviour.

Some nurses and doctors said they did not feel convinced about the efficacy of the alcohol hand rub, so would use soap and water. Their behaviour was not based on evidence. Rather their actions were initiated from a feeling or intuition that washing with soap and water was a safer method of protection.

“I think it’s better to wash your hands, rather than use the gel. I might be wrong. But I tend to go for the sink more. I feel safer using soap and water.” [Doctor 5 interview] [p7: L8-9].

“I feel that just using the gel is not enough of a barrier [from infection]. They say you can use it in between but I feel cleaner by washing my hands. I don’t rely on the gel. I do use it, but I don’t rely on it.” [Auxiliary nurse technician 4 interview] [p3: L16-19].

Circumventing procedures to protect oneself from infection due to structural constraints may explain why some nurses did not remove their apron and gloves before they left a cubicle, after caring for an infected patient.

“When we have a C.diff patient in the cubicle, we have to give them the bed pan, because the toilet hasn’t worked for months. If you’ve got the bed pan in your hands and you are holding it with your gloves and you open the door to come out, because I’m not taking my gloves off. Infection control says that if you are in an infected area you must take off your PPE before

you come out of the room. How are you going to open that door without touching that handle?’’ [RN 13 interview] [p7: L14-19].

Similarly, failure to remove contaminated aprons and gloves whilst walking around the ward corridors was justified as a self-protection mechanism.

‘I’m not going to not wear gloves and pinney when I’m carrying anything infective. We have got to walk up and down the corridor [with machines] and we have got to protect ourselves...I’m not touching anything without gloves on. I wouldn’t wash anybody’s hair without gloves on.’’ [Auxiliary nurse technician 3 interview] [p5: L21-28].

For some people, disgust was associated with fear of contamination (See ‘‘Looking and Feeling Dirty’’ p.270). Some nurses and doctors would bite their skin or nails, or put their pen in their mouth, whilst others talked about consciously reminding themselves about being hygienic to avoid infection.

‘I don’t want to take it home with me...I’ll go for the tap to wet my finger so that I can open a plastic bag...You have washed your hands and you are going to open a yellow bag and you go like this [licks a finger to open the bag] and then I catch myself doing it. When nobody’s looking I go [grimaces and spits to demonstrate spitting out bugs]. You do it without realising. It’s so easy to do. But then you catch yourself.’’ [Auxiliary nurse technician 1 interview] [p10: L5-13].

Some nurses would eat unwrapped sweets from their pockets or drink from an opened can of soft drink, which they had stored at the nurses’ station. Other nurses were more careful and would wrap their drink bottle in a plastic bag before storing it on the desk, or would avoid eating on the ward.

‘I came in on a night shift and it was manking [the nurses’ station]. There was loads of swine flu and C.diff on the ward...The cubicle doors were open and there was an open box of chocolates lying on the desk [Pulls a face]. So I threw them in the bin.’ [RN 4 interview] [p4: L31-36].

Although some staff mentioned their concerns about the risk of infection, others talked about putting ‘it’ into perspective.

Normalising Infection

Some nurses, doctors and ancillary staff said they did not think about the risk of infection and would go into automatic pilot when faced with a patient with *Clostridium difficile*, in terms of the procedures that needed to be followed. This ‘switching off’ may be a coping mechanism to protect an individual from the perceived fear of danger.

‘It’s concerning because you don’t know what’s being passed on. I switch off to a lot of stuff. I deal with it in terms of doing what I know is necessary, like using gloves and gowns...I don’t even think what could happen to me actually. I think you could become a bit paranoid about it. I do take extra precautions [before caring for a C.diff patient] most definitely...but I don’t think about it.’ [Auxiliary nurse 3 interview] [p6: L4-9].

‘I’m not really concerned about C.diff. We go to outpatients and we could be dealing with an infected patient and not know. You have to put it into perspective. But I think we should be more concerned about ourselves.’ [Field note extract 1.12.10 - informal conversation with Phlebotomist 2] [L67-69].

Where risks are perceived to be chosen or voluntary, any perceived danger may be considered to be more acceptable (Renn, 1992).

“It’s not something we think about [C.diff]. We are just trying to do our job.” [Field note extract 1.12.10 - informal conversation with Phlebotomist 3] [L41-42].

Resentment was felt by some nurses when other nurses refused to accept risk as part of the job.

“I’ve got two young children at home which is worrying you know. But it’s not one of the things that stays on my mind all the time. You know you come to work and you could come into contact with something everyday. That doesn’t worry me. I’m not thinking that patient in there with C.diff I’m not going in there. There are some nurses who say ‘I’m not going in there today’. You can’t do that! It’s your job!” [RN 17 interview] [p4: L13-17].

Common risks may be underestimated if these are familiar (Douglas, 1985).

“The problem is that it [Clostridium difficile] has become so common, it is almost accepted...you are going to get C.diff!...I think it has become so common in the workplace that C.difficile is over looked.” [Doctor 2 interview] [p5: L2-5].

Getting used to infection in the environment may be a contributing factor associated with loss of fear (Slovic *et al.*, 1986).

“When you start in this job you get paranoid. Someone had MRSA...and she coughed all over me, I remember feeling oh my god I’m gonna get MRSA...I don’t think about it now [C.diff] because we are so used to

patients having it. You get so used to working in germs.’’ [Auxiliary nurse 5 interview] [p1: L21-26].

Antibiotic usage and the poor health status of the patient were seen by many doctors as the major contributing factor for the high levels of *Clostridium difficile* infection on the ward.

‘‘It’s chaotic antibiotic usage, where the antibiotics have been changed three or four times in the first few days with no apparent logic. These patients have a lot of medical co-morbidities. They’ve got multi sites of possible infection and they’re generally quite elderly and frail which is characteristic of C.diff across the board.’’ [Doctor 8 interview] [p7: L4-12].

Doctors were seen to weigh up the risk of *Clostridium difficile* infection as an inevitable part of the patient’s treatment. Rational Choice Theory proposes that individuals will balance the costs against the benefits when deciding on the best option (Scott, 2000).

‘‘There are patients we look at and think you’re gonna need antibiotics but you’re gonna get C.diff [laughs as if it’s inevitable yet ironic], but you’re gonna have to have the antibiotics anyway. Like everything we do it’s like risk - benefit.’’ [Doctor 8 interview] [p7: L14-16].

Many nurses perceived infection to be an outcome of the patient’s treatment rather than due to an act or omission by ward staff during the patient’s care. For nurses, toleration of risk was associated with the perception that antibiotics cause *Clostridium difficile* infection.

‘How many times have you had antibiotics and had a bad stomach? That’s how they get it. Everybody carries it. It’s caused from antibiotics and yeah you can infect people but most people get it anyway because of the antibiotics they are on. It’s not necessarily because it’s been spread.’ [Auxiliary nurse 5 interview] [p2: L4-6].

‘C.diff I’m not overly concerned about it...I’m very much focused on the fact that it is antibiotic caused than spread around.’ [RN 3 interview] [p4: L9-15].

Recurrence of infection is seen in 33% -75% of patients that have been treated for *C.difficile* diarrhoea (Barbut *et al.*, 2000; Johnson, 2009; Kyne *et al.*, 2001; Poutanen and Simor, 2004). The need to protect those patients from spores is just as great as those patients who have never suffered from the infection. Some nurses perceived repeat infection as inevitable.

‘They tell me the patient has had C.diff before so it’s not surprising if the patient contracts it again.’ [RN 5 interview] [p4: L9-10].

Time frame can be an important source of bias, such as the degree of delay between behaviour and the onset of consequences (Fischhoff *et al.*, 2000). The ‘immediacy effect’ will be an important factor in judging risk. For example, the consequences of a physical risk such as falling from a height would be immediate and possibly fatal and easier for individuals to visualise, than a biological risk where the effects are often delayed. Being able to demonstrate the effects of one’s actions and how this relates to infection was perceived to be important.

‘If we are having an off day and Mrs Jones ends up getting Clostridium difficile because we haven’t washed our hands, and she’s quite weak

anyway, she could die. You wonder why that isn't enough to make people do the right thing...Maybe that's how things could be improved, by...being able to demonstrate how your hands on someone can be the pathway to severe ill health...that if you took your patient without washing your hands, you might kill them." [RN 9 interview] [p3: L5-14].

Seeing that one's acts or omissions may be associated with the onset of infection may be difficult to perceive as spores and bacteria are microscopic and pathways of infection not visible to the naked eye.

"People feel that what they do, it doesn't make a blind bit of difference ...and because it is invisible they can't see what is going on." [Doctor 2 interview] [p7: L1-4].

Infections such as MRSA and *Clostridium difficile* were thought only to affect immuno-compromised elderly patients taking antibiotics. The risk of infection was perceived to be distant, as ward staff were relatively young and in good health.

"Maybe I'm just being fool hardy but um..C.diff affects predominantly people that are on antibiotics, people that are immune suppressed...I'm not worried." [Doctor 6 interview] [p4: L24-29].

"I'm not overly concerned about it. Like I am C.diff [carrier]....The doctors have talked to me about it and said that it's pretty much unheard of for healthcare workers to get C.diff unless they're immuno suppressed." [RN 3 interview] [p4: L9-11].

"C.diff? Well I'm not on any antibiotics, so I'm very low risk for something like that, so if I get it it'd be near impossible. But still when you've been looking after a patient who has been literally exploding with diarrhoea you do think when you get home, if you've got a bit of a funny tummy, you think

oh god. If you actually think about it..it's silly because it is not probable that you are going to catch these types of infections.” [RN 9 interview] [p3: L1-5].

Staying healthy was perceived to reduce fear of the carrier state.

“You can become a carrier [of C.diff] but...if you do things like healthy living, you know like taking a probiotic, then you can get rid of the carrier stage.” [Doctor 6 interview] [p4: L31-33].

Being able to appreciate the consequences of infection was perceived to be important.

“A lot of nurses don't realise that 31% of people who contract C.diff actually die. That's more than MRSA, it's more than pneumonia...They don't realise that C.diff is actually a bad thing to get.” [Doctor 2 interview] [p6: L11-16].

Lack of personal experience of the consequences of the infection may reinforce these perceptions.

“I haven't got any concerns about catching C.diff, because I am not immunocompromised. I could pick up the spores and would probably not develop the...I have never had diarrhoea related illness from work, ever.” [Doctor 7 interview] [p1: L33-35].

Time frame and appreciation of the consequences may explain why many nurses and doctors said they feared blood borne viruses (such as HIV or Hepatitis) and norovirus more than the risk of contracting infections like *Clostridium difficile* or

MRSA. These infections were perceived to be more risky as the consequences were perceived to be more immediate.

“The thing I’m really concerned about is looking after hepatitis and HIV patients...I try not to treat them differently but if I’m honest I think I do.” [RN 3 interview] [p4: 11-15].

“The only thing that goes about in your head is needle pricks...Touch wood it’s never happened to me. But I have seen it happen...It’s stressful.” [Auxiliary nurse 5 interview] [p1: L26-34].

“The only time you worry is when the Norovirus is about...We’re all gonna be infected.” [Ward Manager 2 interview] [p2: L11-13].

“Whether I’ll get MRSA one day? If I get MRSA I am worried. Not today but I am worried about it in 60 years from now.” [Doctor 6 interview] [p4: L24-29].

Many nurses and doctors used alcohol hand rub with infected patients. Washing hands with soap and water has been found to be more effective at reducing spores than using hand rub (Jabbar *et al.*, 2010; Oughton *et al.*, 2009; Weber *et al.*, 2010) as spores are resistant to the alcohol (Gerding *et al.*, 2008). Over reliance with the use of the hand rub may develop because of the perceived benefits such as speed of use or lack of awareness of its effectiveness.

“If I don’t have time I would just use the gel. If I have time I do both [gel and wash with soap and water]. If I don’t have time and I am not as concerned, you know it wasn’t a barriered patient then I would just go for the gel.” [Doctor 5 interview] [p6: L1-3].

“Some people get a bit lax on using the gel thinking that’s a solution...I think you can sometimes rely on that too much.” [Auxiliary nurse technician 4 interview] [p2: L18-21].

“A lot of people think that you can use the alcohol wipes, or the alcohol gel and it will go away, but it doesn’t work like that. It’s more the action of washing your hands to get the spores off. But I think C.diff, it’s very important and I think it’s over looked” [Doctor 2 interview] [p5: L2-5].

Loss of fear or toleration of *C.difficile* infection was viewed by some staff as a lack of concern for safety, that is, infection was accepted rather than being seen as something which can be prevented.

“I don’t see it’s a top priority here [managing Clostridium difficile]...The only time I ever hear it brought up is when someone’s been found to be C.diff positive and it doesn’t seem to be a big deal...No one seems concerned about it. They see it as inevitable, that they are in hospital, they’re not very well and they are gonna get C.diff.” [RN 5 interview] [p1: L4-7 and 21-24].

The next section will present the third category under the theme of perceptions of contamination.

“Looking Or Feeling Dirty”

Some doctors, nurses and ancillary staff were observed washing their hands after, rather than before, patient care. The practice may be driven by a need to remove stickiness, sweat or visible soiling, such as blood or faeces.

“I wash my hands [after removal of gloves]. They sweat. I can feel them sweating.” [Auxiliary nurse technician 4 interview] [p2: L23-24].

“I wash my hands after using the gel about 5 times. By then my hands become sticky so I wash them.” [Doctor 3 interview] [p4: L12-14].

Whereas blood or faeces are easily seen, bacteria and spores are invisible. The removal of germs may relieve anxiety from the perceived threat of danger from uncertain contamination, which may cause infection.

“I don’t know what I’ve touched. I don’t know what’s on my hands. If you see poo or blood on your hands you are going to do something about it...It makes me feel better than I’m doing all I can.” [Auxiliary nurse technician 4 interview] [p2: L1-8].

Some nurses made associations between the smell of *C.difficile* diarrhoea and the feeling of being unclean.

“You know you could have one patient who’s got diarrhoea on the ward, you also gel your hands even though you’ve just been standing there, because you feel it’s around you.” [RN 4 interview] [p10: L9-11].

Some nurses made associations with patient behaviour and disgust.

“Patients spit in the sinks and clean their teeth in the sinks [grimaces]. Especially the men, they clear catarrh and phlegm and it goes down the sink. I can’t physically wash my hands in them.” [Ward Manager 1 interview] [p4: L29-33].

Nurses often recoiled from behaviour which they perceived was morally wrong, due to strong emotions of disgust, such as the thought of putting a patient into a dirty bed or onto a dirty commode.

“When you put the patient on the commode you will clean the commode automatically. You won’t leave the commode there dirty...I couldn’t think that any one wouldn’t clean it!” [RN 10 interview] [p12: L4-8].

Strong reactions were expressed by some nurses when they witnessed other ward staff failing to gown up prior to entering a cubicle with a *C.difficile* patient or using dirty equipment with patients.

“Look at her! Look at the bank nurse! Its people like that that are spreading infection.” [Auxiliary nurse 5 interview] [p6: L152-155].

“I couldn’t believe it...I’d come in on a night shift...I went to remove the BPcuff from a patient that had been left on for several hours. When I undid it, inside was full of blood, dried blood. It wasn’t his blood!” [RN 14 interview] [p5: L28-32].

Nurses spoke about their perceptions of dirtiness and disgust in relation to the ward structure and ward cleaning.

“The [fabric] chairs...they are disgusting. They can’t be cleaned. This is another mode of transmission.” [RN 10 interview] [p10: 35-36].

“If Nightingale comes in here and sees this she would have a fit...We are supposed to be clean...People think that if you live in the UK it will be a

higher standard. Third world countries never get this. Look at the floor. It's stinking!' [RN 10 interview] [p13: L3-5].

“Under the beds are supposed to be cleaned every three months...We get C.diff at least once a week. The floor should be deep cleaned. All the curtains should be changed regularly. The ward should be fumigated.” [RN 13 interview] [p13: L6-8].

Some nurses talked about having an ordered ward, which is consistent with the explanation by Douglas (1966) about dirt avoidance as a process of tidying up.

“I like to come in and start with the cleaning...I like it clean. I can't be doing with dirty bins and things like that...But it depends what you have got time to do.” [Auxiliary nurse 5 interview] [p4: L10-12].

Due to time constraints ward cleaning did not always get done. However, no matter how busy nurses were, even when there was a shortage of staff, bed dismantling and cleaning was consistently undertaken. This practice may be deeply ingrained due to the nurses' ability to recall the disgust they witnessed (vomit, blood and faeces) when they initially dismantled the beds during a trial to reduce *C.difficile* on the ward.

Both nurses said that when they first started to dismantle the beds the mattresses were in an awful state, stained with faeces and urine. They said it was disgusting. At the start of the trial it took the nurses ages to clean a bed (over 30 mins) but now they can do it quickly in 10 mins. They now refuse beds from other wards. [Field note extract 5.8.10 - informal conversation with RN 18] [L88-91].

“When we started to dismantle the beds they were really bad. Not to look at face value...they looked clean. But when we started to dismantle them

you could see how dirty they were. Would you want a relative of yours lying in a bed that hasn't been cleaned properly?" [Auxiliary nurse technician 2 interview] [p1: L12-14].

Where visible cues of contamination were not apparent, nurses would not necessarily clean equipment as required by protocol. For example, commodes should be dismantled and cleaned after every use. Nurses did not always do this where they could not see visible faeces.

"I have only wiped over them tonight because I know I have done them the last two nights. To me they are clean." [Auxiliary nurse 5 interview] [p4: L26-28].

The ward failed an audit because the commodes had not been dismantled before cleaning.

"The infection control nurse was up here the other week. There was a commode that had some...some poo on it, and she showed me and I did say "aw, aw I'm awful sorry about that." I took it apart and I cleaned it in front of her. At face value you look at something and it looks spotless. You dismantle something and you can see it gets into all the nooks and crannies. She'd taken the seat off the commode and there was a bit [faeces] underneath." [Auxiliary nurse technician 2 interview] [p12: L1-8].

The lack of a visible cue may explain why nurses would shake the sheets and blankets during bed making. Some nurses may be able to visualise the image of spores, bacteria and skin flakes shaken into the air.

"Other nurses drive me mad because they shake the bedding. If I see someone shaking the blankets I'll go 'don't!' [shouts loudly]...If you shake

something it's going to be put into the air. I fold the corners into the middle of the bed, which is how I was taught. They have to be insane.” [RN 7 interview] [p4: L13-19].

Some nurses made associations with dirtiness and the type of equipment being used and this influenced their hand hygiene behaviour.

“Whoever has touched the sluice would have gloves on, so you assume it's bound to be dirty. I wonder whether I touch the sharps boxes to close the lid and don't wash my hands afterwards. Yeah I probably do.” [RN 4 interview] [p14: L2-5].

Doctors did not clean their stethoscopes between each patient. Cleaning was undertaken depending on the look of the patient and their association with dirtiness.

“This is gonna sound disgusting, but I clean it [stethoscope] when I use it on a patient...who doesn't seem very hygienic or who has a lot of skin flakes or on areas that don't look clean.” [Doctor 1 interview] [p1: L26-28].

Confirmation of infection may be sufficient motivation for doctors to clean their stethoscope.

“If I see a patient who I know has had an infection I clean it [stethoscope]. I make it really clean after.” [Doctor 1 interview] [p1: L30-32].

The sight of skin flakes or thoughts of infection/contagion may be associated with the concept of impurity and of “being unclean”, giving rise to feelings of disgust.

The drive to clean one's stethoscope or implement hand hygiene may be an unconscious act to make the self feel clean.

Nurses and doctors would prioritise their glove use depending on the task. For example, unsterile gloves would be worn for tasks perceived to be dirty and sterile gloves used for clean procedures.

“You should use gloves in the boxes [unsterile] for clearing away things or doing hygiene for the patient. If you're touching a patient with a wound or looking at a line, you should use sterile gloves.” [Doctor 3 interview] [p3: L1-4].

“You have to wear gloves for procedures like bodily fluid. You have to! There are so many infections.” [RN 17 interview] [p4: L28-29].

“[Gloves should be worn] if making the bed or handling catheter bags... We would only use the unsterile ones if you were being asked to help out in the treatment room. OK there's times when you have to do something quick and there's no time to get gloves, like in an emergency.” [Auxiliary nurse 5 interview] [p2: L32-33].

Handwashing practices were influenced by the “dirtiness” of the task. Where the patient did not urinate or empty their bowels, the patient's hands or the nurse's hands would not always be washed.

“If the patient gets up from the commode and they haven't done anything, I haven't done it [offered to wash their hands]. In theory you should still wash their hands even if they haven't wiped themselves. And we are supposed to offer hand hygiene to every patient.” [RN 1 interview] [p2: L24-28].

Whilst some nurses considered the patient as “dirty”, they did not consider the environment to be as contaminated and this influenced their hand hygiene practice.

“I feel there would be more infection on a patient, rather than if you just pressed the buzzer or touched a surface. I would never just gel if I have touched a patient [I would hand wash]. I wouldn’t feel clean...But if I touched a buzzer I would just gel my hands.” [Auxiliary nurse 5 interview] [p9: L4-10].

Nurses would often become distracted whilst implementing a sterile technique by machine alarms sounding. They would turn off the sounder, and continue with their task without thinking that they may have introduced contamination into the procedure or the patient. Whilst some nurses said they did not think about the environment as a source of contamination, they were aware of contamination from their own hands.

RN 16 put on a clean pair of gloves and attended to the C.diff patient who is on the open ward. She carries out various tasks at the bed side wearing a pair of unsterile gloves. She touches the patient notes, curtains, bed, table. She goes into the sluice room [wearing the same gloves] then comes back and counts out tablets on the windowsill. She crushes the tablets with a tablet crusher, pats the powder with the tip of her glove then feeds it to the patient in a drink...I asked the nurse why she did not change her gloves. She said that by wearing gloves she was protecting the patient from any germs on her hands and did not think her gloves were dirty. [Field note extract 30.11.10 - observation and informal conversation] [L83-93].

Some nurses did not wash their hands before or after they had placed tablets into a patient’s mouth. Similar to activities such as shaking hands, this was not considered to be a dirty task. Spores could be introduced into the patient’s mouth,

especially if the nurse was a carrier, or had previously touched the environment, equipment or patient files.

“Every time we go to a different patient, regardless of whether they’ve got an infection, we’ve been told by infection control that we should wash our hands. I don’t. I think that’s ridiculous...ridiculous! I think that’s acutely unrealistic, because they are clean. If you were touching somebody in the street, you wouldn’t use hand gel. I would be washing my hands all the time.” [Ward Manager 2 interview] [p6: L6-11].

Although some nurses considered any contact with a patient as a dirty task, handwashing may not be undertaken in full view of the patient for fear of causing offence.

“If somebody touches your hands, you go to wash them and I think, oh my god that’s insulting...but its automatic. If I touch a patient in any shape or form, I wash my hands...We had a patient complain once that none of us were washing our hands but they didn’t follow us into the sluice and I had to explain.” [Ward Manager 1 interview] [p4: L24-25]

Some nurses perceived the lack of patient hand hygiene as a potential source of contamination that attention should be paid to.

“If a patient is bed bound, it’s up to us to make sure that their hands are clean. We haven’t got enough time to do it...But they have been in bed all night. Their hands have been everywhere and no one takes any notice.” [RN 17 interview] [p7: L23-25].

Where patients were unable to care for themselves, a visible cue such as faeces influenced whether nurses washed their hands. Use of the commode also acted as a cue.

“If they have been on a commode we give them wipes to wipe over their hands. If they have been in bed we don’t, but it depends how much mess they are in.” [Auxiliary nurse 5 interview] [p2: L25-27].

Nurses talked about get rid of dirt and spores which is presented in the next section.

Getting Rid Of ‘‘It’’

Cues such as faeces, blood or known infection would act as a reminder for some nurses to decontaminate equipment or surfaces with a bleach solution (acticlор).

“If there is blood on the frame you should use acticlор.” [RN 17 interview] [p7: L34].

“If they didn’t have an infection then you would use the wipes but you’d use actichlor on everything if they’ve got C.diff, because you would want to get rid of it.” [Auxiliary nurse technician 2 interview] [p6: L10-12].

Variation in practice was observed with nurses during the bed cleaning process. Some would follow the procedure using actichlor and cold water (1,000 parts per litre). Other nurses were observed washing the mattress, bed frame and patient furniture with soapy water. Some nurses said they found the use of bleach

reassuring. It was associated with a feeling of cleanness and a way of getting rid of germs.

“I clean everything with actichlor because I like the smell of bleach. It makes me feel that it’s clean. I will pour it down the sluice, in the sinks...I use it everywhere. Can you imagine the state of the bin lids so I wipe these over with it.” [Auxiliary nurse 5 interview] [p4: L 32-37].

Some nurses were observed adding detergent to the actichlor solution during commode cleaning. One of the ward cleaners was observed doing the same thing when decontaminating a cubicle after a patient with *Clostridium difficile* infection had been moved to the ward. Adding detergent may reduce the effectiveness of the cleaning process and allow the persistence of *C.difficile* spores in the environment (Wilcox and Fawley, 2000; Wilcox *et al.*, 2003). A nice smell and the reassurance of seeing bubbles in the water were common reasons for deviating from protocol.

“I’ve added a bit of G/D [general detergent] to the actichlor solution when I was the [isolation] cubicle. There’s nothing worse than the patient having to smell this stuff [bleach smell] especially when eating food.” [Field note extract 3.11.10 - observation and informal conversation with Housekeeper 2] [L96-97].

“I think it’s psychological. Some people like to have bubbles in the water. You feel as though it’s gonna be cleaner. The actichlor is very strong so some nurses add detergent to make it smell nice. I think probably they think it’s an extra cleaning product that can only make things better.” [Auxiliary nurse 3 interview][p1: L28-34].

Nurses and cleaners were frequently observed making up the disinfectant but often this was not being done to the correct concentration (one actichlor tablet per litre of cold water). Failure to make the chemical up to the required concentration may reduce its effectiveness against spores (Wilcox and Fawley, 2000; Wilcox *et al.*, 2003). Some of the doctors mentioned the cleaning process as being inadequate.

“People get disheartened. They feel that what they do, it doesn’t make a blind bit of difference and because it is invisible they can’t see what is going on. The cleaning measures involved in sterilisation of hospital beds or the floors when someone has contracted C.diff it is almost always inadequate. The bleach strength isn’t strong enough.” [Doctor 2 interview] [p8: L1-5].

Posters were displayed in each sluice room as a reminder of how to make up the disinfectant. The following paragraph is taken from field notes during a commode audit. The infection control nurse questioned nurses as to how they would make up the chemical. One of the reasons why the ward failed the audit is because nurses did not confirm they would make up the disinfectant as defined by protocol. Intuition tended to guide behaviour as to what felt safe.

“I would use that solution [pointing to the actichlor]...I’d stick two tablets in there and fill it up to the line” [the litre mark on the jug]. The infection control nurse asked “why do you use two tablets?” The nurse replied “because I like the smell of bleach. I think it smells nice.” [Field note extract 12.8.10 – observation and informal conversation with Housekeeper 1] [L126-131].

“I use the sani cloths, a bit of the detergent and a bit of soapy water. I add a bit of detergent to make it smell nice.” The infection control nurse asked did she ever use the actichlor tablets and if so how many did she use? The nurse said she did not know about using actichlor (she has been qualified almost a year). [Field note extract 25.10.10 - observation and informal conversation during a commode audit] [L53-56].

In summary four categories were identified from the data in relation to the theme perceptions of contamination. These include fear of infection, normalisation of infection, perceptions of dirtiness and getting rid of ‘it’. The next section will present the findings surround the theme of professional frustrations, which is the final theme based on the second research question.

Theme: Professional Frustrations

Introduction

Ward staff identified feelings of frustration as a consequence of not being able to act according to their beliefs. This chapter presents the theme of professional frustrations and explains how it influenced the implementation of infection control protocols and guidelines into practice, based on the second research question. Three categories were identified (See Figure 6).

Figure 6: Summary Of Theme	
Theme	- Professional Frustrations
Category	- Struggling To Meet Obligations - ‘Nurses Are Not Cleaners’ - Feeling Overwhelmed

Struggling To Meet Obligations

Ward staff referred to their efforts at preventing and managing healthcare-associated infections, such as *Clostridium difficile*, as a struggle.

‘We are battling it...working hard and I think we are gaining good ground. I think we are working hard and battling and fighting and winning.’ [Ward Manager 1 interview] [p1: L6-7].

“They [nurses] struggle with side rooms. Other wards try and move them to another ward. Here they can’t move them...they need specialist treatment.” [Doctor 3 interview] [p1: L24-27].

“A lot of wards have a strict rule ‘we don’t have patients with C.diff’. We accept anyone. But it doesn’t seem to be acknowledged that we have an extremely high C.diff rate.” [RN 3 interview] [p1: L30-32].

Where cubicles were full, nurses had to barrier nurse patients at the bedside. Some nurses perceived that cohorting patients or placing them in a cubicle would be a better way of managing the spread of infection.

“If you’ve got more than two patients and you can’t get them into a cubicle, then you should put the patients together into the 4 bedder [cohort them].” [Auxiliary nurse 1 interview] [p1: 17-19].

Cohorting would not take place as it often involved mixing the sexes. Many nurses felt angry and uncomfortable with having to barrier nurse patients at the bedside.

“Putting a patient in the corner of the 8 bedder with the curtain around them and a barrier trolley at the foot of the bed is not ok in terms of controlling infection. We’ve got to do it! I think they [other nurses] feel dreadful and it’s not good for the patient.” [Ward Manager 1 interview] [p7: L9-13].

“It’s a joke! It’s embarrassing for the patient. It’s humiliating for the patient. It’s unpleasant for the other patients. There is no dignity involved. It’s just not acceptable but it’s happening.” [RN 14 interview] [p4: L35-37].

Nurses and doctors recurrently spoke about trying to do their best under the circumstances.

“There are so few cubicles...that is always a nightmare because ideally you want to isolate everyone but physically you just can’t. They do have a trolley at the end of their bed, and we try our best to maintain the standards. But...there’s so many people coming in and out...it’s nigh on impossible to regulate it if you have it on an open ward.” [Doctor 7 interview] [p1: L10-15].

Emotions such as anger, discomfort and powerlessness are feelings that nurses spoke about as their perceived ability to care for patients was constrained by the system. Emotions such as these have been identified in the literature as a form of distress (Royal College of Nursing, 2008; Zuzelo, 2007). For example, nurses often had to cope with equipment breakdown and limited supplies (See Equipment and resource constraints, p. 240). Trying to care for patients in these circumstances had an impact upon nurses emotionally, especially where patients’ dignity was seen to be affected.

“One of the patients was sitting in a dirty bed for over an hour because we didn’t have enough incontinent sheets. We didn’t have any sheets!” [Ward Manager 1 interview] [p2: L21-23].

“Over Christmas and a couple of weeks afterwards it was awful wiping bums with sheets and paper knickers. Using hand gel to wash patients because we had no soap. We had no wipes, no inco [incontinence] pads, no bedding, no aprons. We begged borrowed and stole...You shouldn’t have to clean patients’ bottoms with pillow cases or paper knickers. There was just nothing here. Everybody was struggling.” [RN 4 interview] [p9: 1-8].

Lack of support and staffing constraints caused feelings of anger and resentment, often due to the unfairness of the situation.

“When they [management] walked off the ward because it’s the end of their shift and left us like that, knowing how it was [over the Christmas period], that’s not acceptable...off they went knowing we were so short staffed.” [RN 14 interview] [p1: L16-22].

“What we do is fire fight. We have had loads of people off on the sick...so we have constantly been working short. Morale is low, so you’re not really going to achieve a lot.” [RN 7 interview] [p6: L6-7].

The frustrations that nurses experienced were perceived to be contributing to a lowered sense of self-worth and loss of enthusiasm.

“You work really hard but how many times a day do I apologise to people for not having what they need...simple things. I didn’t do all this training to be a part of this.” [RN 14 interview] [p5: L24-26].

“You kind of get jaded because there’s so much wrong.” [RN 4 interview] [p1: L29].

Nurses often spoke of feeling powerless about implementing practices which they felt they should not have to tolerate. Feeling powerless and discouraged was perceived to be associated with lowered motivation.

“We are being forced to do some of these things. I think nurses become complacent because we are working under these conditions.” [RN 7 interview] [p9: L14-15].

Some nurses said they were not reflective in their practice because of the pressure they were under.

“We are supposed to be reflective and think about our practice but we don’t. We’re rushed off our feet. We’re on automatic pilot just trying to do what’s in front of us...I know that some days I am not doing things right and that makes me feel bad. I care about my patients.” [Field note extract 1.12.10 - informal conversation with RN 16] [172-175].

Trying to meet their obligations with organisational constraints was blamed for short cuts in practice and errors being made.

“We are all trying to deal with the poor resources and work in the fast lane trying to do all these different things and we are making mistakes. Perhaps what we should do is slow down and do the job carefully and properly instead of rushing. Management would then see the real problem, that we can’t do what we are expected to do with the time constraints and poor staff resources.” [Field note extract 1.12.10 - informal conversation with RN 9] [L177-180].

Nurses talked about their frustrations of trying to balance the responsibility of caring for patients and ward cleaning. Inadequate time, heavy work pressure, lack of staff and inadequate skill mix were common reasons given to explain why cleaning may not always get done.

“If we don’t have time to clean we pass it onto the night staff. You’ve just got to keep passing it on. Oh [sighs] I don’t know, it’s hard. It’s hard.” [RN 17 interview] [p8: L21-22].

“The commodes are so hard [sighs]. I clean the bits that I know are dirty, but how on earth would you have time to strip it apart? You just can’t. It’s

an awful state of affairs. It would never stand up in court, 'I didn't have time'. But you simply haven't.' [RN 4 interview] [p7: L1-4].

'I wouldn't have bothered [cleaning] tonight because we don't have an N/A [nursing auxiliary] and it's the N/A's that do it. It should be our job too, but then I've got notes to write, IV's to do, turns to do...' [RN 13 interview] [p15: L31-34].

“Nurses Are Not Cleaners”

Despite the staffing constraints, many nurses recurrently commented that difficulties with cleaning may be overcome if nurses worked better as a team.

'We pull together to do the work even though we are short...But when you have got the ones that are in the clique and they are all on, it doesn't work. I have always been a team player, but I find it very difficult to be a team player on this ward.' [RN 14 interview] [p4: L5-15].

'If everybody pulled their weight you might be able to get the cleaning done on days when you are short staffed...But there are some people that will clean and some that won't. There are certain nurses who think it's above them.' [Auxiliary nurse 3 interview] [p7: L9-13].

Although some qualified nurses accepted that cleaning the patient was part of being a nurse, cleaning the ward environment was not perceived to form part of the nurses' role.

'Nurses do the cleaning but they don't have the time. They are supposed to be caring for people. Why then do we train for all those years for all that knowledge if they want us to clean? I wanted to do a nursing job, not a cleaning job...otherwise I would have applied for a cleaning job.' [RN 2 interview] [p4: L1-5].

The ward failed a commode audit during the field work. Many nurses expressed their frustration at the lack of teamwork.

“The frustrating thing is, [sighs] god this sounds terrible, but I could sit there cleaning commodes until I am blue in the face and the next person won’t bother cleaning it and you get marked down.” [RN 4 interview] [p7: L24-26].

Nurses are required to provide evidence that ward cleaning duties have been discharged, by completing a cleaning schedule. During the early field work, nurses used a white board in the sluice room. Across the top of the board, the day of the week was listed and tasks were written down the left hand side. Nurses ticked off the tasks and the board was wiped off each week. Months later a comprehensive cleaning schedule was produced. Nurses were required to sign their initials and for the first time a documented copy of ward cleaning was recorded and filed.

Some nurses perceived that the new cleaning schedule ensured that all grades of nurse contributed towards cleaning.

“We have noticed that there are qualified signatures on that cleaning rota now rather than just N/A’s, which is good. People can’t hide from it [cleaning] anymore.” [Auxiliary nurse 3 interview] [p7: L18-20].

Many nurses were frustrated about having to use the schedule.

‘It’s taking up even more of your time. You were doing all those things anyway. We used to have a tick thing. Now they need to see what we have been doing.’ [RN 1 interview] [p6: L8-10].

Observing the schedule being used incorrectly may explain why many nurses perceived no value in using it.

‘It’s stupid because people that can’t be bothered to do it [cleaning] will fill it in anyway. What’s the point of having it? I mean I haven’t filled it in tonight. I haven’t filled it in the last two nights...but I have cleaned the things I am supposed to clean.’ [Auxiliary nurse 5 interview] [p11: L19-21].

One of the ward managers spoke of her frustration about nurses who would complete the schedule without cleaning being done.

‘I observed people ticking, putting their names to it but not doing it...People we’re sort of, ‘I’ve done that, done that, done that.’ But they’re not doing it...But what else can you do?.’ [Ward Manager 1 interview] [p10: L19-22].

Cynicism was expressed by nurses about the purpose of the schedule.

‘I think it looks good for PR [public relations...so that we show we’re doing it. Giving things a thorough wash makes it look good for inspection but is it going to stop the spores that aren’t visible.’ [RN 3 interview] [p12: L10-16].

Use of the cleaning schedule created conflict between nurses.

“People don’t like this cleaning folder...The older generation say ‘I’m not doing that!’ You think ‘just do it! Don’t argue’. But they do argue ‘I’m not signing that book’. I say ‘have you done it?’ They say ‘yes, I’ve done it’. I say ‘If you’ve done it, just sign the book.’ Oh the arguments.” [RN 17 interview] [p8: L26-30].

Nurses often crossed a line through the whole days cleaning tasks and wrote ‘no time to clean’. Many nurses felt angry and frustrated at trying to cope with cleaning, whilst dealing with other perceived constraints. Prioritising their workload was a strategy nurses used to meet their obligations. Nurses recurrently spoke of patient care coming before cleaning.

“When we’re busy can we find time to clean commodes? No. If someone needs our attention and the commode has to be cleaned, we focus on our priorities.” [RN 3 interview] [p9: L33-34].

“I prioritise the cleaning that needs to be done. [The nurse pointed to the jobs listed on the schedule. These are not essential so these wouldn’t get cleaned [cardiac monitors, drip stands, oxygen]. I would concentrate on the tasks that need to be done around patients’ bedside such as the cabinets, the tables. Patient care comes first.” [Field note extract 28.1.11 - informal conversation with RN 11] [L28-33].

Green tape was sometimes wrapped around the seat of the commode to indicate that the equipment had been cleaned. Often the tape was not used.

“There is no green tape on the ones there today because...we haven’t cleaned them. They probably haven’t been cleaned because we haven’t stopped.” [Ward Manager 1 interview] [p11: L20-23].

Nurses were frequently concerned about the quality and safety of care that they were providing for patients, due to the low numbers of nurses covering a shift and inadequate skill mix.

“The skill mix is [today] crap!...When it’s like this patient care goes out the window.” [Field note extract 7.11.10 – informal conversation with RN 15] [L55-56].

“There is only myself and one qualified to cover 19 patients. It’s unsafe here today. When things are like this...safety goes out the window.” [Field note extract 25.1.11 – informal conversation with RN 13] [L80-83].

Nurses struggled between providing optimum patient care and ensuring the safety of patients.

“You can’t have excellent patient care and have high standards to protect the patient at the same time under the conditions that we work...Patients need care and I’m going to give them that care to the best of my ability. But there’s a balance between doing things right and caring for the patient. Patient care will always win!” [Field note extract 1.12.10 - informal conversation with RN 16] [L188-195].

Struggling with organisational constraints contributed to the perception that the organisation was not committed to the safety of patients or staff.

“They don’t care about us anymore. They [management] don’t support us. It’s all about money. They’ve lost sight of what’s important and that’s patient care...I feel awful that I can’t give the care that I know I should be giving.” [Field note extract 19.12.10 - informal conversation with RN 19] [L126-129].

Where nurses were short staffed, ward cleaning may be compromised.

“We are short staffed today, I’m quite content not to be doing all these cleaning tasks, as long as my patients are safe and everything is done.” [RN 3 interview] [p12: L21-22].

“It’s been so busy on the ward...what’s more important? They are both equally as important ‘cos obviously you have got to put a patient on a clean commode...but to me it’s not as important as my patients as it is for me to be going around cleaning. My patients are more important.” [Auxiliary nurse technician 2 interview] [p11: L15-20].

Where nurses do not have time to clean equipment or surfaces, the level of *Clostridium infection* spores may increase in the environment, increasing the potential for infection (Weber *et al.*, 2010). Rising infection levels create more work for nurses as patients become sicker, stay in hospital longer and recurrence of infection is possible (Gould and McDonald, 2008; Sunenshine and McDonald, 2006). Participants were asked about this during interviews.

“Patient care comes first but cleaning has to be done, but it’s hard to do all of it. There are days when there’s not enough of you. Commodes need to be cleaned, patient lockers must be cleaned, tables...I can see the flip side of that. If you don’t clean those commodes there’s a chance people are going to catch C.diff. Then you’re going to be even busier [laughs as if it is ironic] because they’re gonna be ill”. [RN 7 interview] [p6: L24-28].

Many nurses and doctors talked of feeling overwhelmed by the pressure on the ward. These findings are present in the next section.

Feeling Overwhelmed

Nurses recurrently spoke of feeling overwhelmed, often due to staff shortages, lack of time and of being under pressure due to a high workload, which was used to explain why gaps in practice occur.

“You’ve seen how chaotic it has been...things can get skipped because of that.” [Auxiliary nurse technician 4 interview] [p2: L28-28].

“It’s ok for them to give us more procedures, policies, new ways of working...you have to do this, you have to do that, you have to tickle the patient. The one thing they won’t give us is extra staff and that’s the one thing we need.” [Field note extract 1.12.10 - informal conversation with RN 9] [L227-229].

The feeling of being bombarded was often perceived due to the messages that were being sent out by the Trust. Over a six month period numerous changes and initiatives were rolled out. In relation to infection control this included new waste bin colours, a new colour coding scheme for aprons, new signage for isolation cubicles, a new antibiotic policy with an antibiotic label, a label for *Clostridium difficile* (aimed at improving identification of patients with infection).

“There are just so many things up there [notice board] that you get a bit swamped. You feel a bit bombarded. It’s very much a feeling on the ward that if you try to improve something then you’re on a crusade. Everyone sort of humours you for a while and then it’ll go back to the status quo.” [RN 3 interview] [p9: L26-30].

Nurses were finding it difficult to keep up with the pressure of the constant changes to their work. This was perceived to be one of the factors that was contributing to the wide variation in practices on the ward, as nurses were either unaware of the new rule changes or finding it difficult to remember what to do.

“I don’t think all staff are doing what they are supposed to, to the correct level. There is much variation in practice. Staff don’t want the pressure, they want their work to be easier. They don’t want work practices changing all the time. They want some constancy. All the time infection control bring in something new.” [RN 2 interview] [p1: L3-5].

Nurses did not always see the purpose of some of the initiatives and tools that were being disseminated.

“These initiatives help them and you can’t get that through to them. What they see is extra work. Its extra work for a while, then it’s supposed to decrease your work. They can’t see that.” [Ward Manager 1 interview] [p12: L2-4].

Doctors were feeling swamped. They were required to use the antibiotic labels and the labels for *Clostridium difficile* infection and were feeling frustrated with the different forms of paperwork.

“We receive a lot of information about different aspects of patient care and it’s just one more piece of paper that you are being asked to complete. Everything is changing at the same time and I think that’s made it quite hard.” [Doctor 8 interview] [p2: L18-21].

As doctors were bombarded with information, infection control may become trivialised and subsequently prioritised at the bottom of their list.

“People are bombarded with information. I think with consultants as they are doing more important things, some of the other more basic things [like infection control] can seem insignificant.” [Doctor 2 interview] [p13: L12-14].

Nurses and doctors often spoke of feeling frustrated with the different targets they were expected to achieve.

“Infection control is just one area. It’s an important thing, but there are other things, like the saving lives campaign and pressure sores and giving priority to discharge dates. We have to improve on this...improve on that, we have to improve on pressure sores, we have to improve on infection control.” [Ward Manager 2 interview] [p7: L14-18].

“You’re bat is C.diff...Our bat is C.diff, MRSA, line infections. We cannot target one particular organism. This is only one infection we are talking about.” [Doctor 6 interview] [p6: L34-37].

Nurses perceived that they were being given too much responsibility for infection control.

“Infection control is put onto the nurses. If they want us to sort out infection control they should give us the proper staff...They [infection control] want us to remind other staff such as doctors and physios to wash their hands. That is putting additional pressure on us...Nurses are not super ladies or super men.” [RN 2 interview] [p3: L1-5].

“I tell the nurses what I want them to do...the physios tell the nurses...the pharmacists tell the nurses...dieticians tell the nurses. I think we are asking them too much. The amount of work they do and people are sitting in rooms generating all these guidelines... We don’t have enough people to deliver the service.” [Doctor 10 interview] [p8: L4-8].

Feeling bombarded may explain why the sentence ‘it’s not my job’ was often reiterated by nurses and cleaners on the ward, which was seen to be creating a fragmented cleaning process. For example, nurses and housekeeping staff recurrently said it was not their responsibility to clean the telephone or replace the headset for the television after they had thoroughly cleaned a patient bed.

“It is not our job to change them. They have got people to come around and do that. It’s the same as the telly. It’s the responsibility of Patientline [service provider].” [RN 1 interview] [p7: L1-3].

The idea that infection control was ‘everybody’s business’ was recognised as a barrier to practice.

“You are always going to get some people saying “it’s not my job”. When it’s everybody’s responsibility, if you are busy, there may be the tendency to think that somebody else will do it.” [Ward Manager 1 interview] [p10: L32-34].

As a result of the perceived pressure, the high expectations and the conditions under which ward staff are working, many nurses spoke of their anxiety and fear of being blamed.

In summary, three categories of professional frustrations emerged. These include struggling to meet obligations, 'nurses are not cleaners' and feeling overwhelmed. The next section presents the findings relating to the third and final research question.

Research Question 3:

What happens if difficulties are experienced as protocols and guidelines are being implemented?

Theme: Dealing With Difficulties

This chapter presents the theme of dealing with difficulties and explains how it may influence the implementation of infection control protocols and guidelines into practice, based on the third research question. The findings for this theme are presented under three categories (See Figure 7).

Figure 7 : Summary Of Theme

Theme	- Dealing With Difficulties
Category	- Staying Silent
	- Protecting Yourself From Blame
	- ‘‘Nothing Gets Done!’’

Staying Silent

Some nurses said that they would speak out to other nurses as a way of raising awareness of a procedural error.

“Somebody might see you do something wrong and they might say to you ‘it’s not that you are doing it wrong but you know the way that you’ve been told to do it previously’ and they might say to you ‘do you realise now that you are not supposed to be doing it like that, you’re supposed to be doing it like this?’” [Auxiliary nurse technician 2 interview] [p7: 32-34].

Raising issues in a sensitive way was perceived to be important for some nurses when speaking out.

“You have got to be quite tactful with some people. You are only trying to help them but...you have to be cautious because they take it as criticism. They will go off in a huff and I think look it wasn’t meant as a criticism. I’m sure it’s better for somebody like me to tell them than have somebody pull them up. Nobody is below making mistakes.” [Auxiliary nurse technician 1 interview] [p3: L7-12].

“It wouldn’t bother me you know if somebody said ‘you shouldn’t be doing it this way, you should be doing it like that’. It’s what they have been taught. But there are people whose personalities are stronger than mine and it doesn’t matter how junior they are or how senior they are, they can actually over power me. They are telling you how to do your job.” [RN 17 interview] [p4: L2-4].

Some nurses said they would speak out to doctors if they had any concerns about infection control, regardless of professional hierarchy.

“The nurse is the patient’s advocate and whether you’re qualified or unqualified, regardless of who you are, you are told, if you see somebody doing something that’s not right then you are well within your rights to tell them. Regardless of whether it’s a surgeon and you’re an auxiliary.” [Auxiliary nurse technician 2 interview] [p5: L3-6].

Nurses and doctors are required to implement a bare below the elbow policy whilst working on the ward, which means no clothing or jewellery except a wedding band below the elbow.

“The ward manager told me and a few of the other junior doctors off during the ward round for wearing watches. She said I’m telling you lot but I’m not gonna say anything to the consultant because of who he is.” [Doctor 3 interview] [p5: L5-8].

Nurses that said they felt comfortable raising issues were wary of speaking out to certain doctors for fear of reprisal.

*“I do speak up, but that’s only because of the nature of who I am...I’m not afraid to speak up to the consultants...it’s just a person. The only consultant I feel slightly uncomfortable with is *** because of his attitude.”* [RN 4 interview] [p12: L3-8].

*“I’d say something to them [the consultants] I would to anyone except ***. He is the only one that I wouldn’t. I’d be wary of him. I think it’s easier for a more experienced nurse, once you get to know them. Some have been brought down a peg or two.”* [RN 6 interview] [p7: L5-12].

Some of the doctors implied that they felt threatened at the prospect of their behaviour being questioned by someone who was not at the same level professionally, perhaps for fear of loss of respect.

“People use the phrase culture change a lot. It’s a bit irritating but I think that is what’s needed. We spend an awful lot of our day being the one who makes the decisions, the one who leads the care of the patient, the one who deals with the difficult situations and to have that role and that responsibility and then have somebody who perhaps we perceive as much less experienced come up and say ‘you didn’t wash your hands’ you know they’re gonna get slapped.” [Doctor 8 interview] [p3: L7-12].

Professional hierarchy was a factor influencing doctors’ perceived ability to speak out to their peers about decisions that were made.

“If I think metronidazole is what is needed, I do it. But if the consultant says it must be vancomycin then I’d go for vancomycin. I don’t challenge my consultant [laughs]. Because they have more experience than myself.” [Doctor 10 interview] [p3: L14-17].

Professional boundaries between doctors and nurses was perceived as a barrier to speaking out.

“Stereotypically, doctors and nurses are separate. Even if you did have a good working relationship there is that invisible barrier of the fact that you are on different teams. It is organic to the culture here...We are just so separate, even though we work together. We provide care, they provide treatment and medicine.” [RN 9 interview] [p11: L20-24].

“It’s a problem and a shame that medical and nursing staff don’t interact more on a day to day basis...I think it is historical and everyone’s rushed off their feet.” [Doctor 2 interview] [p9: L32-36].

It was suggested that nurses may not speak out to doctors as a mark of respect for their role.

“I think there is a bit of a barrier because we have been trained for different roles...I know people will say that there’s the safety net in the process and all these things are here to protect you. But at the end of the day, you need somebody who’s going to make the decisions and say this is in the patient’s best interest and this is what we’re all going to do and that’s generally the consultant. So I think there is perhaps a little bit of a barrier, a bit of a respect for what has to be done.” [Doctor 8 interview] [p3: 26-34].

This separateness between the roles of nurses and doctors may hinder curiosity and questioning of practice.

“There’s not much interchanging of information [between doctors and nurses]. We don’t really get involved with what they do...We accept they know what they are doing. I think there’s always been the idea that our roles are quite different and therefore we tend to focus on our own role.” [Doctor 4 interview] [p4: L17-29].

Attributes such as self-confidence and experience were identified as factors that may influence whether nurses felt able to speak out.

*“***** is an inexperienced nurse and hasn’t got the confidence to say to someone you, shouldn’t do it like this, this is how we do it now.”* [RN 10 interview] [p3: 1-3].

“Doctors go in and come out and don’t wash their hands. Some nurses will say something, some won’t. Some doctors, if you say please wash your hands, they will just ignore you. Again different grades of doctors or the nurse. I don’t think they deliberately ignore them, but I think the nurse has been a bit timid in asking, or she’s not been heard.” [RN 3 interview] [p5: L18-23].

Age and ward bullying were also mentioned as factors that may influence nurses' ability to speak out.

“They [younger qualified nurses] don't feel able to speak out. When you're 20 odd, its life experience isn't it. You don't say things to people...It's a bit different for me because I'm a bit long in the tooth. I don't take nonsense and I'm quite happy to stand my ground. I don't go along with it and I wouldn't do it, because I wouldn't want my children treated like that. But I see it and I hear of it.” [RN 7 interview] [p2: 2-6].

“I do not feel able to voice my concerns because of the clique...I have never spoken frankly to anybody on the ward like this. You talk to someone in the clique and word gets round. There is a big bully system here.” [RN 14 interview] [p5: 15-20].

Nurses may not feel able to challenge decisions that are made on the ward, because they do not feel listened to. An example is confronting the bed coordinator when a patient with *Clostridium difficile* is moved out of an isolation cubicle to make room for uninfected patient (See also Barrier Nursing Ambiguity p. 227 - 229).

“If I was looking after him [C.diff patient] I wouldn't have taken him out of there. His stools were not formed. Until he gets formed stools he needs to remain in the cubicle....the patient is still capable of transmitting it. If bed management tell me to take that patient out because we need the bed I'll fight for it... Junior nurses don't feel able to do this. We are supposed to be listening to our junior staff and seeing what their points are. What's happening here is that the juniors here don't have anything to say to their seniors.” [RN 10 interview] [p9: L7-14 and 28-29].

“We are the lowest of the low...If a senior nurse is telling you [that a patient has to be moved out of a cubicle] there isn't much that you can do about it. You can voice your opinions and you can give clinical reasons to justify what you are saying, but nothing will be done.” [RN 13 interview] [p9: L6-9].

Some nurses said that they did not feel supported and this influenced whether they felt able to report issues.

“Some nurses have taken their issues to management and the management just laughed it back at them.” [RN 10 interview] [p14: L31-32].

“I don’t bother anymore, as I’ll be labelled as a trouble maker. It’s not worth it. I just keep my head down.” [Field note extract 2.11.10 - informal conversation with auxiliary nurse technician 3] [L56-57].

Some nurses said that they would not speak out to visitors who entered an isolation cubicle without gowning up because they did not feel supported by the Trust to enforce the infection control policy to visitors.

“I was dealing with a visitor of a patient in the cubicle who refused to wear aprons and gloves. The infection control nurse came up and told us that she was within her rights not to wear protective clothing...When you hear that we can’t enforce visitors to wear gloves and gowns, well I’m sorry, whilst they are on hospital premises they should be adhering to hospital rules. If a patient is going to chemotherapy, they have to adhere to the COSHH [control of substances hazardous to health] regulations. If you have got an infection policy in place, people should be made to adhere to it. It’s bizarre!” [Auxiliary nurse technician 1 interview] [p9: L35-39].

As a result of difficulties not being dealt with, nurses talked about how they would devise their own strategies, often circumventing protocols, to deal with problems.

“I’ve got dry eczema prone hands, so washing them all the time makes them sore...So I’ll wear two pairs [gloves] to avoid washing them as often.” [Ward Manager 2 interview] [p6: 15-17].

This was reflected with nurses feeling powerlessness, as if nothing could be done when difficulties arose. Nurses talked about having to ‘get on with it’.

“My hands feel so sore and dry because I am washing them all the time and using the gel...It must be the alcohol, but you’ve just got to get on with it.” [RN 4 interview] [p10: L33-36].

A major reason given by nurses for tolerating procedural ambiguity was not feeling able to speak out about it.

“There are so many things wrong that we don’t feel that there is any point speaking out or trying to deal with these issues. Why bother? It’s like them and us. They dictate what is happening and we just try to do what they tell us to do. We know it’s not going to be put right, as we haven’t got the resources.” [Field note extract 1.12.10 - informal conversation with RN16] [L238-241].

Behaving in the same way [working around procedures] was given as a reason by some doctors for not speaking out to nurses relating to ‘work arounds’.

“Nurses enter an isolation cubicle without apron and gloves more than doctors, because they are fed up with putting aprons on or they may forget something. They come out and go back in, without gowning up. I wouldn’t say anything to the nurse, because they know. Why should I tell them? Because I do the same thing..if I’m in a rush.” [Doctor 10 interview] [p10: L14-15].

Phlebotomists mentioned not feeling able to speak out on the ward, where they observed non-compliance with infection control procedures, as they did not feel listened to.

‘I consider myself a visitor to the ward. The management of the ward is down to the nurses. Phlebotomists have a high level of patient contact and move around from ward to ward. Whenever there is an infection phlebotomists get the blame. We don’t feel able to speak out on the ward. Staff don’t listen to us, it goes over their head.’ [Field note extract 1.12.10 - informal conversation with phlebotomist 2] [L34-36].

Incident forms were being used by the phlebotomy department to give staff a voice, where individuals lacked confidence to speak out.

‘Incident forms are more powerful than verbal complaints. If we’ve got the incident form in we can say this is what’s happening...that’s a little bit of power behind us. It boosts phlebotomists to think actually I can say something. I am allowed to say something. It has sort of raised the issue.’ [Phlebotomist 3 interview] [p5: L1-5].

A workplace culture that supports speaking out was identified as an important factor.

‘I think there are nurses up here, even though they are experienced, still don’t feel able to speak out because I think there’s a culture of...which I think needs to be broken down if they want to make a difference.’ [RN 10 interview] [p3: L3-6].

A sense of the hospitals’ values about speaking out was experienced during a study day, organised for all infection control link nurses and attended by the Chief Executive of the Trust. Consent was sought from the infection control department and the nurse director to observe and take notes during this meeting. Prior to commencement of the meeting the infection control nurse encouraged attendees to ask the Chief Executive questions after he had addressed them, which they did, raising their concerns about infection control conditions on the ward. During the

meeting it was stressed that the new link nurse practitioner was to be held accountable for the role, and was required to enforce ward infection control standards, for example, speaking out to any doctor entering the ward who was failing to comply with the bare below the elbow policy. Link nurses were advised to request the doctor to leave the ward unless he/she implemented the standard. One link nurse voiced her concerns and said that she did not feel able to speak out to a consultant. The nurse was told that she was in the wrong role, which sends out a strong message to other link nurses who are afraid to speak out. At the end of the session, once the Chief Executive had left, the infection control nurse told the group how disappointed she was because they had asked negative rather than positive questions.

A workplace culture that supports staff to think about practice in different ways and encourages suggestions for improvement was mentioned during the interviews.

“If I did approach any of my consultants with an idea about how to improve practice, I think they would be receptive, but surprised. It’s not something that is encouraged, mainly because they have not thought about it in that way, as opposed to being discouraged.” [Doctor 4 interview] [p5: L1-5].

The next section will present the findings in relation to blame.

Protecting Yourself From Blame

Nurses may speak out to protect themselves from the fear of litigation. One newly qualified nurse was observed speaking out to a lower grade experienced nurse for failing to sign off a patient checklist.

“She is newly qualified and she has been taught how to do it. She wants to stick to that way of doing things. She is thinking about the legal side of it. She has got to cover her own back.” [RN 17 interview] [p5: L10-12].

Many nurses felt blamed as a profession for the rise in *Clostridium difficile* and mentioned they were frequently being put in circumstances where they could be spreading infection through no fault of their own.

“They [C.difficile patients] are put amongst other patients and it makes a mockery of things. They are keeping on about having the same sex wards but you shouldn’t be having infectious wards either...yet it’s always portrayed as poor nurse/doctor hygiene, they are not washing their hands. We are getting blamed for it...When you are washing patients with J cloths and pillow cases, oh that’s different then. You just become numb with it. You think, what is the point?...If they [management] don’t care then why should I?” [Auxiliary nurse technician 1 interview] [p9: L1-8].

Blame was frequently mentioned during informal conversations and interviews.

“The blame is not put on any particular grade of staff. It’s everybody’s, everyone’s responsibility you know and everyone’s to blame for it, if something goes...if something’s not up to scratch.” [Auxiliary nurse technician 2 interview] [p12: L1-3].

The infection control link nurse said that when things go wrong, responsibility for sorting out infection control problems were passed to her.

“They accuse you and say you should be doing it and I think hang on now I’ll look into it for you. That does put you off doing it [being a link nurse]. It really does.” [RN 17 interview] [p3: L30-21].

Several nurses mentioned that they would not wish to put themselves forward for the link nurse role.

“If you’d asked me to be a link nurse there’s no way would I take on that role because it’s too much responsibility.” [Field note extract 1.10.10 - informal conversation with RN16] [L140-142].

“They are setting us up for failure...They are giving us all these extra jobs to do, these extra tasks, but they are not giving us the extra resources to be able to do it. If I took on the role of link nurse practitioner I would feel disappointed.” [Field note extract 1.12.10 - informal conversation with RN9] [L142-144].

Accountability for infection control was associated with blame.

“When you mention the word responsibility you include the word blame. That’s the kind of ethos of the way the NHS works. The more responsibility you take on, the more blame you’re gonna get thrown at you.” [RN 3 interview] [p12: L2-5].

Nurses talked about their anxiety from fear of being blamed as a result of not being able to provide the expected level of care.

“You go home and you don’t stop worrying. You go through your head and think did I do that...I go home and I’m frightened. I think about my work and worry have I hurt someone today.” [RN 14 interview] [p2: L6-8].

“You can actually go outside the door upset if you know you have not been doing your patient care properly...How can we make things better when we are working under conditions like this?” [RN 17 interview] [p5: L18-20].

Qualified nurses spoke of their fear of being blamed if things went wrong on their shift and worried about losing their ‘PIN’ (being struck off their professional register) (Nursing and Midwifery Council, 2008). Nurses perceived their ‘PIN’ as part of their identity and something to be protected.

“People are worried as the conditions we are working under, if anything happens, we could lose our PIN. I know how bad this is and how concerned people are about it. At least 5 people I know are looking for another job. Morale is low.” [RN 7 interview] [p7: L9-13].

Last Friday evening, the N/A phoned in sick so we were one member of staff down. I was in charge being the most senior [qualified two years]. I was responsible for 19 patients. I have lost many nights sleep over this. If something happened I could lose my job. [Field note extract 25.1.11 - informal conversation with RN 13] [L84-91]

Many of the nurses felt unsupported should things go wrong.

“We are working extremely hard, but we’ve got no one to back us up. If anything goes wrong we are on our own.” [RN 14 interview] [p5: L10-11].

When difficulties arose on the ward, nurses were encouraged to complete an incident form where patient care was being compromised.

“We need to fill out an incident form for the C.diff patient in the cubicle. She had been buzzing and was bed bound so there was nothing she could do to help herself. She was left lying in her sick for approx 10 minutes as we were too busy to attend her. This is completely unacceptable. Every time we have this tonight, every time we can’t deal with a patient we need to fill out an incident form.” [Field note extract 9.12.10 - observation and informal conversation with RN 12] [L36-42].

During one night shift a patient with *C.difficile* infection located in one of the cubicles was continually buzzing and calling out for the nurses. The cries of this patient could be clearly heard from the corridor. *‘Dear god will somebody please help me...This is insane. How can you leave me like this?’*

“Every 10 minutes she wants me to change her and that’s understandable but I just haven’t got the time to keep going to her. She is so big and when she does have explosive diarrhoea she feels horrible, but she is left sitting in diarrhoea.” [Field note extract 9.12.10 - observation and informal conversation with RN 9] [L139-143].

Some nurses completed incident forms where there were no isolation cubicles available.

“If there is no cubicle for a C.diff patient or suspected patient, I put in an incident form. I do this to cover myself in case the infection control nurse thinks it’s my fault.” [Field note extract 7.11.10 - informal conversation] [L28-29].

Nurses were encouraged to complete incident forms for issues such as lack of staff, stock or other resources which impacted patient care.

“Last night one of the patients was sitting in a dirty bed for over an hour because we didn’t have enough inco [incontinent] sheets...She [the nurse] didn’t fill an incident form in. She just didn’t think. So I’ve told her she has to because we haven’t got enough sheets.” [Ward Manager 1 interview] [p2: L21-26].

Nurses were encouraged by ward managers during ward meetings to use incident forms as a means of protection from blame and to keep records to protect themselves.

If you are ever working short you should fill in an incident form. But don’t just say patient care was compromised. Put down the reasons for this, for example, checklist could not be completed. That will cover you. [Field note extract 24.1.11 – observation of a ward meeting] [L80-82].

“As long as you keep the record...I write things down in the house. I’ve got things from 10 years ago to back me up, in case anything goes wrong.” [Ward Manager 1 interview] [p2: L33-35].

Completed forms were given to the ward manager for review so that corrective action could be added. Forms were then delivered to the nursing director for review before being sent to an administrative department where these were coded and added to a central database. This forms part of a government agenda to learn from experience and prevent harm to patients (National Patient Safety Agency, 2006). There was a tendency for nurses to use these forms as a mechanism to

report adverse patient safety events without consideration of the underlying cause(s).

“If there’s a problem, I tell them to put incident reports in...Some of them just fill out the form. They are being told now to put why patient care is being compromised. You have to put the reason, not just say patient care is compromised.” [Ward Manager 1 interview] [p2: L20-21].

The findings for the final category under this theme will be presented in the next section.

“Nothing Gets Done!”

One of the factors influencing hospital staff to raise their infection control difficulties on the ward was the perception that their concerns were taken seriously. If they believe that nothing is done when issues are raised, they may be less likely to raise further issues.

“I do speak up, but that’s only because of the nature of who I am. But at the same time I feel what’s the point [of raising issues]? I’m knocking my head against the wall half the time.” [RN 4 interview] [p12: L4-6].

The incident reporting system was perceived as being a pointless paper exercise.

“When you’re being told to write incident forms for things that you were writing incident forms for two years ago, you kind of think I don’t need this anymore.” [RN 7 interview] [p1: L12-14].

“It’s dangerous when you haven’t got enough staff...patient care suffers. Who is going to do anything? It’s been reported. We have filled incident forms in but what is being done? We don’t know what happens to the forms. They go into the ward managers office and we don’t know what happens to them.” [Auxiliary nurse 5 interview] [p9: L31-33].

Defective equipment would typically get put back with working equipment and the nurse would shout across the ward to tell other nurses that the item was ‘out of order’. Messages were written on white boards: *When equipment is defective, don’t just put it back, report it!*

A typical example of failing to report defective equipment relates to the alcohol hand rub dispensers fitted to the wall outside the entrance to ward bays. On some of the dispensers, the dispensing mechanism was defective. Nurses were observed pressing a by-pass switch beneath the dispenser to receive the hand rub. Some nurses said they should report the problem but had not done so. Doctors, physiotherapists and visitors were observed trying to press the defective dispensers to activate the hand rub, but nothing happened, giving the impression that the dispensers were empty. Where doctors and ancillary staff were observed not raising the issue, it was discussed during interviews.

“I have said it once. I found it irritating...I thought they were just permanently empty.” [Doctor 5 interview] [p6: L26-32].

Incident forms were perceived by some staff as a way of dealing with contextual difficulties.

“Even the guy that comes around in the morning to collect them [the incident forms] is not happy. He said to solve anything now we just have to fill out incident forms.” [Auxiliary nurse 5 interview] [p11: L3-5].

Nurses were failing to see that incident forms were helping to make the workplace safer for patients.

“We have raised concerns, but what’s the point of raising issues? This is where complacency starts coming in. People couldn’t give two hoots you know. You put incident forms in. I sometimes wonder if these are getting

purposely lost or shredded, because nothing seems to be happening with them.” [Auxiliary nurse technician 1 interview] [p8: L7-11].

Nurses and phlebotomists complained that using incident forms was a lengthy process, which may discourage use of this system.

“We use the incident form to report non-compliance with practice but we don’t always do it. The form is time consuming.” [Field note extract 1.12.10 - informal conversation with Phlebotomist 2] [L37-38].

“We’ve told health and safety about the length of the form and they said they will make it shorter and easier to access.” [Field note extract 1.12.10 - informal conversation with Phlebotomist 1] [L65-66].

Many nurses perceived that reporting difficulties relating to their own health and safety were not being taken seriously.

“These soaps...take the skin off your fingers...People have complained...but what’s been done? Nothing...What could she [the ward manager] do? It’s a Trust wide thing. She would probably say it’s out of my hands.” [Auxiliary nurse 5 interview][p9: L11-15].

“I voiced my concerns to a senior nurse the other day and told her how busy the ward was and how stressful it is. She said if you don’t like the stress of nursing and you can’t cope get out...I thought thanks! Why do you think we don’t report things.” [RN 13 interview] [p9: L18-22].

Many nurses felt reluctant to inform the ward manager of their difficulties, for example with staffing levels or difficulties with sore hands, because it was

perceived that she was powerless to take action to improve things. Nurses spoke about putting up with their difficulties.

Some of the ward managers spoke of a fatalistic view towards ensuring that nurses formally report their concerns.

“They don’t get any feedback [from the incident reporting system] but they’ve still got to fill them in....Fill them in and you could say I’ve done it...but you can’t make them do it [complete incident forms]. Nothing is gonna get done because nobody puts incident forms in. They throw them in the bin.” [Ward Manager 1 interview][p3: L14-26].

In summary, three categories were identified from the data in relation to the theme of dealing with difficulties on the ward. These include a) staying silent b) protecting yourself from blame and c) ‘‘nothing gets done’’. The next chapter will present a discussion of the study findings.

Chapter Five

Discussion and Conclusions

Chapter Five: Discussion and Conclusions

Introduction

This chapter discusses the key findings of this study, in relation to three research questions, which are summarised below.

1. How are infection control protocols and guidelines perceived and used on the hospital ward to manage the risk from *Clostridium difficile* infection?
2. What challenges, difficulties or dilemmas are experienced by ward staff with implementing protocols and guidelines in the management of *Clostridium difficile* infection?
3. What happens if difficulties are experienced?

A single case study methodology (Yin, 2009) was used with one acute NHS hospital ward as a means of answering the research questions. An adapted version of the theoretical framework of behavioural change developed by Michie *et al.* (2005) was used to guide the collection of data and help provide understanding of

the factors influencing the implementation of infection control protocols and guidelines. The discussion that follows will focus on each research question in turn, using the key findings presented in the previous chapters. The relevance and usefulness of Michie *et al's* (2005) framework in relation to these research questions will also be discussed. The chapter will end by discussing the conclusions, the empirical and conceptual contribution of this work, the study limitations and recommendations for future research, policy, practice and education.

Research Question 1

How are infection control protocols and guidelines perceived and used on the hospital ward to manage the risk from Clostridium difficile infection?

Detachment, Lack Of Ownership And Lack Of Accountability

The first research question sought to provide insight into how protocols and guidelines were being used on the ward to manage *Clostridium difficile* infection. The findings illustrate a lack of familiarity and awareness about protocols and guidelines and how to access these documents. Organisational barriers to 'knowing' about protocols include lack of computer skills to navigate the intranet where electronic copies of protocols were stored, lack of perceived time to read due to ward busyness and lack of ward funds to support reading, as supernumerary days were no longer provided. Some nurses spoke about protocols and guidelines

being '*more for the managers*' to assist them with ward audits. Some ward managers signified a lack of importance placed on these documents as a source of knowledge, suggesting that the infection control nurse would keep them up to date with policy changes. In general, there seemed to be a detachment from protocols as a way of informing infection control practice.

The finding that nurses and doctors appeared to be detached from protocols is consistent with other studies. For example, Yagasaki and Komatsu (2011) carried out focus groups with nurses to understand how their experiences affected the implementation of oncology care guidelines. They reported that nurses were detached from guidelines because of difficulties with accessing these documents and applying the knowledge into their practice, perceptions that guidelines were 'not their business' and lack of time to read. Rycroft-Malone *et al.* (2009) reported that some nurses may have distanced themselves from using protocols because these documents were perceived as being remote, impersonal and therefore lacked authority. In the current study, protocols were perceived as being unrealistic because these did not take into account the contextual difficulties that nurses and doctors faced in the realities of their practice. Some nurses said that protocols were imposed on them and they had no opportunity to become involved with their development. They made the suggestion that being involved with the development of protocols may motivate nurses to use these more in their day to day practice.

Overall the data suggests a considerable amount of ‘not knowing’ about infection control protocols and guidelines.

According to Reason’s (1997, 2000) model of accident causation, protocols and guidelines ideally form one layer of an organisation’s safety defences, providing clear instructions on how to operate safely. Failure to ‘know’ about protocols and guidelines therefore creates the potential for a hole or a weakness in these defences. Healthcare professionals and other healthcare workers have a professional responsibility under the Health and Social Care Act (2008) for the prevention and control of healthcare-associated infections, which includes the use of infection control protocols as part of the treatment and care of patients (Department of Health, 2009b). The employer has a responsibility to communicate the policies laid down in protocols and to educate and train employees about how to prevent infection (Department of Health, 2009b). The study findings highlight several perceived system constraints with communication and training which are discussed below. However, nurses and doctors also have a responsibility to prevent patients from contracting infection under their Professional Code of Conduct (General Medical Council, 2009; Nursing and Midwifery Council, 2008). Healthcare professionals and other healthcare workers therefore have, to some extent, a responsibility for making themselves aware of protocols and guidelines, because they are accountable for preventing infection (Department of Health, 2009b).

Detachment, lack of ownership and lack of accountability are barriers that were identified in this study that may influence the use of protocols and guidelines. These could be placed in the behavioural framework developed by Michie *et al.* (2005) as sub-constructs under the domain of ‘social/professional role and identity’ (See Appendix 11). These factors may be considered to influence the professional obligation of healthcare professionals and other healthcare workers to ‘know’ about protocols and guidelines. Modifying protocols and guidelines to ‘fit’ a particular context and to meet the specific needs of the end user may improve acceptance and adherence (Harrison *et al.*, 2010; Van Gemert-Pijnen *et al.*, 2005; Verhoeven *et al.*, 2009). Actively involving healthcare professionals in the adaptation of protocols has been shown to encourage ownership (Verhoeven *et al.*, 2009, 2010).

Organisational And Socio-Cultural Influences To ‘Knowing’ About Protocols

In the current study, the lack of ‘knowing’ about protocols and guidelines was perceived by many nurses and doctors to be due to problems with communication. This includes how information was disseminated relating to training courses, inductions and meetings where information about protocols may be imparted, and the perceived lack of time to attend these. Although protocols and guidelines were displayed on notice boards, these were seen as being overloaded with information which may have discouraged their use.

Communication has been identified as a 'system' characteristic in several 'system' models and frameworks (Brasel *et al.*, 2000; Carayon *et al.*, 2006; Reason, 2000; Vincent *et al.*, 1998) and an organisational factor which has the potential to contribute to patient harm (Leonard *et al.* 2004) due to unreliable delivery of care (Bion *et al.* 2010). Communication has been identified as an important factor that may influence an organisation's safety culture (Flin *et al.*, 2006; Guldenmund, 2000). Communication could be argued to be part of the broad construct of 'organisational climate' which Michie *et al.* (2005) list in their framework under the domain of 'social influences.' Due to the perceived importance of communication in this study, it has been identified as a key barrier to 'knowing' about protocols and guidelines.

One important social factor that seemed to influence the use of protocols and guidelines by nurses on the ward, was the perception that it was unacceptable to be seen sitting around the nurses' station for any length of time to access the computer, for fear of being labelled lazy, when other priorities, such as cleaning, needed to be done. According to the Nurse Director, the drawing of nurses around the nurses' station was likened to 'bees around a honey pot' and encouraged nurses to chat when they should be doing 'nurses' work.' The perception of nurses sitting around 'the honey pot' was perceived by the Trust as giving a negative image to patients and their visitors. As a result, the practice of nurses sitting at the nurses' station to write up patient notes was actively discouraged by the ward manager. Instead, nurses were told to write up patient

notes at the bedside. This did not make sense to nurses and was used to explain why protocols were not being accessed.

Discouragement to sit at the nurses' station for any length of time to read or write seemed to have become a cultural norm. This could be placed in the behavioural framework developed by Michie *et al.* (2005) under the domain of 'social influence.' If nurses are to be held responsible under the Health and Social Care Act (2008) for using protocols as an important way of preventing and controlling healthcare-associated infection (Department of Health, 2009b), working in a climate which discourages nurses to spend time at the nurses' station, the only place they can access up to date protocols, creates a major barrier to their use.

Reliance On Tacit And Experiential Knowledge

A key category that emerged from the data demonstrates how nurses and doctors were using tacit and experiential knowledge to inform their infection control practice on the ward. This type of knowledge is associated with skills and 'know how' and often considered to be hidden or inaccessible (Cook and Brown, 1999). Examples include common sense, 'rules of thumb' and 'mind lines' (Gabbay and leMay, 2004, 2011). They also used their senses (smell, sight), intuition and emotions to guide their behaviour which is discussed in a later section (See p.365). The findings highlight that nurses and doctors were making sense of their infection control practice by taking into account difficulties they faced within the

local context and this influenced the way that knowledge was being applied. The behavioural change framework developed by Michie *et al.* (2005) does not seem to take account of tacit knowledge, or the mechanisms by which it is formed and used. How and why tacit and experiential knowledge were being used and how this may have influenced the use of explicit knowledge laid down in protocols and guidelines is discussed in the next sections.

Familiarity

The findings illustrate that despite the availability of protocols and guidelines, infection control was perceived by many nurses and some doctors as ‘common sense.’ Estabrooks *et al.* (2005) classified common sense knowledge as *a priori* knowledge, in addition to knowledge that nurses learnt from nursing school, prior experience and personal belief. One possible explanation as to why nurses and doctors in the current study saw infection control as common sense was that patients with *C.difficile* infection were encountered on a frequent basis and barrier nursing precautions were commonly practiced. Nurses and doctors may not have felt the need to refer to written documents, as ‘knowing’ how to barrier nurse patients, care for and/or treat patients with infection had become internalised due to the repetitive nature of the task, which increased confidence in what needed to be done. This finding is consistent with other studies (Flynn and Sinclair, 2005; O’Cathain *et al.*, 2004).

O’Cathain *et al.* (2004) suggested that nurses in their study, who were operating an NHS Direct service, used a decision support tool to provide advice about self-care less over time as the protocol knowledge became assimilated into the nurses’ own knowledge. Flynn and Sinclair (2005) found that nurses carrying out endotracheal tube suctioning would gradually refer to the relevant protocols less over time as they gained in experience of implementing their contents. In the current study, some registered nurses said they would use protocols to update their knowledge if faced with an unfamiliar infection, but not for *C.difficile* infection as this was a persistent infection on the ward with which they were used to dealing. This finding fits with the Skill Acquisition Model of Dreyfus and Dreyfus (1986) which depicts progression of learning through five levels from Novice to Expert.

Michie *et al.* (2005) identify routine, habit and/or automatic behaviours as examples of constructs under the domain labelled ‘nature of the behaviour’ which may influence the use of protocols and guidelines into practice. An important finding from the current study provides familiarity/unfamiliarity as an example of a sub-construct which may be placed in Michie *et al’s* (2005) framework under the domain labelled ‘nature of the behaviour’ (See Appendix 11). The study findings suggest that familiarity acted as a barrier to the use of protocols and guidelines into practice whilst unfamiliarity may have been an enabler. This also links with ‘confidence’ with one’s own ability to perform a task and is linked with Bandura’s (1977, 1986) context-specific concept of self-efficacy.

Confidence

In the current study, some of the junior doctors perceived the antibiotic and *C.difficile* stickers (which were an embedded form of the *C.difficile* protocol) useful because these helped to reinforce knowledge and increased their confidence with remembering important steps in a procedure. Several registered nurses said they would refer to written protocols where they felt uncertain about changes to practice following their return to work after a break. In these situations, by bringing themselves up to date with new ways of working, this gave nurses confidence to know they were doing things ‘the right way’ and is related to fear of blame (See p. 338). Similar findings have been reported elsewhere (Manias *et al.*, 2005; O’Leary and Mhaolru’naigh, 2012; Rycroft-Malone *et al.*, 2010).

O’Leary and Mhaolru’naigh (2012) used semi-structured interviews with vignettes using Wilson’s (1999) problem solving model to understand how nurses informed decisions they made in their practice. Their data indicates that nurses making routine decisions about patient care had a lower level of uncertainty with decision making, as nurses were familiar with their practice. They claimed that nurses accessed external sources such as protocols and guidelines to assist with non-routine decisions where there was a higher level of uncertainty and a lower level of familiarity with the task. In the current study, although staff said that protocols would be referred to where uncertainty existed, nurses and doctors were not observed referring to protocols or guidelines during the entire period of the study.

Manias *et al.* (2005) reported that protocols provided less experienced nurses with reassurance that they were managing patients' medications in the correct way and this assisted with increasing confidence as part of learning. They reported an increased dependence on protocols in the cardiology wards because nurse ward managers encouraged nurses to access protocols more than those working in the other wards. In the current study, nurses and doctors did not seem to be encouraged to refer to protocols, which may have been a factor influencing their use. Instead of referring to protocols, there was a reliance on using colleagues as an information resource.

Ways Of 'Knowing'

The way in which nurses and doctors informed their infection control practice was similar to the 'communities of practice' (CoPs) described by Lave and Wenger (1991), who described the process as an informal way that information is shared by people with the same expertise within a group, as a means of learning from each other. Rather than relying on written protocols or guidelines, many nurses and some doctors said they would be more likely to ask a colleague for advice where they felt uncertain about their decision making. This finding is consistent with other studies (Estabrooks *et al.*, 2005; Flynn and Sinclair, 2005; O'Leary and Mhaolru'naigh, 2012; Rycroft Malone *et al.*, 2009), possibly because this is the dominant way that people commonly learn (Eraut, 2000, 2004).

The findings from the current study highlight some difficulties with how information was being shared. Firstly, many nurses perceived that the process of cascading information was slow and it depended on chance whether they were made aware of a change in practice. Secondly, tacit and experiential knowledge about practices that were being shared may not be aligned with practices laid down in codified documents such as protocols, yet these could be passed on to other members of staff. For example, during informal conversations some experienced nurses spoke about how they would adapt a procedural task which could be passed onto a junior nurse as nurses learned mainly by observing, a form of on-the-job training commonly known as ‘sitting next to Nelly’ (Clifford and Thorpe, 2007) or experiential learning (Estabrooks *et al.*, 2005). During an interview, one of the ward managers was concerned that practices that nurses learned from each other that were not aligned with those laid down in protocols may not be identified and corrected. Some of the less experienced registered nurses said that their infection control practices were not being monitored to ensure they were doing the right thing which perhaps implies a lack of supervision.

Whilst nurses talked in terms of ‘rules of thumb’ (an example being when to use non-sterile/sterile gloves), some doctors talked about ways of decision making that were similar to the “mind lines” described by Gabbay and leMay (2004, 2011) (See p.70 for an explanation of mind lines). For example, some doctors spoke about why they would decide to use the antibiotic vancomycin over metronidazole. The former is defined in the Department of Health (2009a)

guidelines as being the first line of defence for patients with severe *C.difficile* infection only. The Department of Health (2009a) recommend the use of metronidazole as the first line of defence for moderate infection because it is a cheaper option and because there is concern for the overuse of vancomycin which may result in vancomycin-resistant enterococci. During the management of a patient with *C.difficile* infection, some doctors said they took into account not only the patient's condition, but their past experience of using metronidazole and its effectiveness. They were using their experience and preference when making their decision. This may not be aligned with the recommendations laid out in the guidelines (Department of Health, 2009a). Sometimes it may be appropriate not to follow guidelines for a particular patient, so long as rationale is clearly documented.

Reflection On Explicit, Tacit And Experiential Knowledge

Some nurses said that they would 'go blindly' with ways of working that they were being asked to implement, implying that they were not reflecting on their practice. This potentially could include ways of working informed by explicit, codified knowledge (protocols or guidelines) as well as tacit and experiential knowledge. In the current study, nurses mainly learnt and/or updated their knowledge about infection control practice from their colleagues.

O’Leary and Mhaolru’naigh (2012) argue that if nurses rely too heavily on experience of colleagues as a source of information, there is a risk that practices that contradict with current evidence may be accepted without questioning. This knowledge may not necessarily equate to safe practice (Rycroft-Malone *et al.*, 2009) yet can be introduced into work processes. In the current study it is argued that if nurses and doctors accept their infection control practice without reflecting on what they were being asked to do, learning may not take place (Kuiper and Pesut, 2004; Nicolini and Meznar, 1995) and practices that contradict current evidence may persist.

The framework developed by Michie *et al.* (2005) does not identify self-reflection, but it does specify ‘self-monitoring’ by the individual as a construct under the domain ‘behavioural regulation.’ Why reflection may not always take place is discussed in a later section (See p.393). The terms that Michie *et al.* (2005) use in their framework are not defined, therefore it is difficult to know whether the authors intended self-monitoring to include self-reflection. The dictionary definition of monitor is defined as “*to observe or record (the activity or performance of)*” (Collins English Dictionary and Thesaurus, 2000, p.764). Kuiper (1999) developed a reflective self-regulated learning model for nurses, in which self-monitoring included the sub-processes of self-observation, self-reaction and self-judgement. In this model self-monitoring links to a separate process in which self-evaluation and self-correction takes place. In this model, self-evaluation is a key component of reflection in which re-evaluation of

assumptions takes place (Kuiper and Pesut, 2004). The model therefore implies that reflection is a separate process to self-monitoring.

In the current study, acceptance of infection control practice informed by colleagues has the potential to harm the safety of patients if this practice is not aligned with best practice reflected in, for example, a protocol or guideline. Reflection is identified as an important construct that is missing from Michie *et al.*'s (2005) framework which may assist with self-regulation of behaviour.

Mental Short-Cuts

The framework developed by Michie *et al.* (2005) does not seem to take account of how different sources of knowledge, such as knowledge in practice (tacit knowledge) and experiential knowledge are used, such as situated learning (Lave and Wenger, 1991). However it does take account of how people remember procedures in terms of mental models or 'short cuts'. The findings from the current study, for example, 'rules of thumb' and 'mind lines' could be placed as sub-constructs under 'schemas and mindsets' which Michie *et al.* (2005) place in their behavioural framework under the domain labelled 'knowledge' (See Appendix 11). Some nurses described examples of the former method, whilst some doctors referred to the latter. Both are examples of mental short cuts not necessarily linked to a protocol or guideline, yet were informal ways of remembering procedure and a form of sense-making (Kothari *et al.*, 2011).

‘Seeing Things Work’

Despite the suggestion that some nurses and doctors may not question their infection control practice (See p.332), some did question the evidence of precautionary measures during interviews and informal conversations and mentioned their lack of confidence with them. For example, barrier nursing patients on the open ward, use of gowns, handwashing and being ‘bare below the elbow’ were often perceived as being ‘defeatist’ measures. ‘Seeing’ something work was convincing for many nurses as evidence. For example, with their bed cleaning practice many nurses spoke about how this had reduced the ward level of *C.difficile* infection. Bed cleaning had never been written into a protocol. Nurses had received feedback about *C.difficile* infection rates from the ward manager during the trial, however this feedback had ceased over a year ago. Many nurses spoke about how their bed cleaning practice had ‘worked’ and the *C.difficile* infection rate on the ward had plummeted. ‘Seeing things work’ appeared to be convincing evidence for nurses to have confidence that this practice should continue.

‘Seeing things work’ is identified in the current study as an important sub-construct that could be placed in Michie *et al’s* (2005) behavioural framework under the domain of ‘beliefs about consequences’ (See Appendix 11). An alternative explanation for why nurses always cleaned the beds, even when they were busy or short staffed, is that when they first started the bed cleaning trial, they witnessed the state of the mattresses which evoked an emotional response

due to disgust. It is possible that the vivid memory of the state of the mattresses (evoked memories of disgust) was acting as a powerful cue (See p.374).

Different Perspectives Of Protocol And Guideline Use

The data from this study illustrate the different perspectives of using protocols and guidelines in practice. These were different for nurse ward managers, nurses and doctors.

Nurse Managers' Perspective: Protocols Keep Behaviour 'On Track'

The study findings suggest that protocols assisted ward managers with keeping nurses' behaviour on track and aligned with standard practice. It was implied that this was a staged process, whereby the 'picking up' of behaviour occurred following an outbreak of *C.difficile* infection, in the form of reminders by ward managers. During this phase, ward managers focussed on 'drumming' standards into nurses by reiterating their importance. Once behaviour was back 'on track' the emphasis on reminders about practice waned allowing behaviour to 'slip back' out of alignment as attention was diverted elsewhere, until the next 'episode' of infection where attention was refocused. In doing so, any variations that develop with infection control practice can become neglected as managers' attention is focussed on other more pressing organisational priorities.

The way that protocols were being used by ward managers is summed up in Perin's (1992) depiction of the gradual erosion of an organisation's safety defences in the case of the 'unrocked boat'. In this example the protective shields (the slices of cheese within Reason's (2000) 'Swiss cheese' model) are 'bypassed' and the situation is allowed to persist until some catastrophe happens.

In the current study, although protocols were perceived as being a useful tool for ward managers to realign any gaps between ideal and actual infection control practice, this appeared to be a reactive process which may explain why so much variation in practice was observed on the ward. The reactive use of protocols is therefore an important finding in the current study. It is suggested that reactive reminders about the use of protocols could be placed in Michie *et al's* (2005) framework as a sub-construct under the construct 'feedback', which lies under the domain of 'behavioural regulation.' Reactive reminders such as ward managers verbally telling nurses to wash their hands may have been a barrier to the continuous implementation of standard precautions, because of their spasmodic nature.

Naikoba and Hayward (2001) systematically reviewed 21 hand hygiene intervention studies published before the year 2000. The reviewers concluded that multifaceted approaches promoted hand hygiene compliance more effectively than approaches involving a single type of intervention. They reported that

reminders and continuous feedback on performance were the most useful strategy identified.

Nurses' Perspective: Protocols Provide Protection from Blame

Many registered nurses referred to the standards laid down in protocols as 'rules' rather than guidelines. Manias and Street (2000) found that nurses accepted written policies and protocols as these helped to legitimise their knowledge, whilst doctors placed little value on them. Rycroft-Malone *et al.* (2008) reported that protocols were viewed as a 'nurses' thing.' In the current study, for many registered nurses there was an acceptance of 'rules' as part of their practice and a general willingness to adhere to protocols. One of the main reasons why nurses may have accepted protocols was to protect themselves from the threat of legal action.

Rycroft Malone *et al.* (2010) suggest that standardised care approaches may offer nurses a 'safety net' from the fear of litigation, may be used to support decision making where behaviour in practice is being questioned and to provide a 'back up' in case things went wrong. In the current study, by following 'rules', registered nurses saw this as a means of protecting their professional registration, which forms part of their identity. Nurses said they worked hard to achieve their status and their nursing qualification and they did not want to lose this so by following standards laid down in protocols, registered nurses reassured themselves that they were 'doing things the right way.' This suggests that nurses

were concerned about being blamed. This finding about how registered nurses related to protocols differs from concerns in the literature that nurses resist protocols as these stifle autonomy, choice and professionalism (Ilott *et al.*, 2006; Larsen, 2005). Although some authors have reported that protocols have assisted nurses with independence in their practice (Manias *et al.*, 2005), there was no suggestion that infection control protocols provided nurses autonomy over their practice in the current study. Potentially, nurses could have been acting autonomously because they did not have to rely on doctors for diagnosing infection, however, no one mentioned this.

Doctors' Perspective: Protocols Stifle Autonomy

Embedded forms of the protocol (the antibiotic and *C.difficile* stickers) may have assisted some junior doctors to practice independently because it allowed them to be more confident in their treatment of patients with *C.difficile* infection. Whilst less experienced doctors seemed more accepting of protocols and their embedded forms, more experienced doctors seemed to resist them. For example, more experienced doctors perceived the antibiotic and *C.difficile* stickers to be a nuisance, creating more work for themselves, duplicating their efforts and reaffirming what they already knew.

In the current study, protocols were perceived as undermining more experienced doctors' professionalism and freedom with decision making. Resistance to

protocols as a means of standardising behaviour may have been a strategy they used to maintain their professional identity and autonomy over their decision making within their practice. This finding is consistent with other studies. Parker and Lawton (2000) suggested that following protocols and guidelines is a perceived threat to professional autonomy. Other authors have suggested that doctors may not follow protocols as a means of protecting their professional independence (McDonald *et al.*, 2005; Tanenbaum 1994). This presents an obvious tension between using protocols and embedded tools to standardise practice, providing defences to prevent patient harm, and allowing healthcare professionals to maintain their professionalism.

Summary

Legislation such as the Health and Social Care Act (2008) and an evidence based approach to healthcare place emphasis on the use of explicit authoritative knowledge laid down in protocols and guidelines with the aim of standardising care (Rycroft-Malone *et al.*, 2010). The findings from this study illustrate the emphasis that nurses and doctors placed on tacit and experiential knowledge. Whilst explicit knowledge is a tool of 'knowing', how knowledge is used in practice and how people make sense of knowledge within the local context are also important. The interplay between knowledge and 'knowing' has been defined by Cook and Brown (1999) as a *generative dance*. Recognising, supporting and harnessing this *generative dance* between explicit knowledge and

tacit and experiential 'knowing' is essential (Cook and Brown, 1999) if we are to better understand and improve how protocols and guidelines are used in practice.

Although the behavioural framework developed by Michie *et al.* (2005) recognises explicit knowledge laid down in protocols and guidelines, it does not seem to take account of tacit or experiential knowledge learned through communities of practice (Lave and Wenger, 1991) or consider the process of self-reflection as part of learning. Social constructivist theories and models that have been developed relating to experiential learning (Lave and Wenger, 1991) and learning through reflection within the workplace (Eraut, 2000; 2004; Kuiper and Pesut, 2004) are useful to extend our understanding of how protocols and guidelines are being used. The next section discusses the study findings in relation to research question 2.

Research Question 2

What challenges, difficulties or dilemmas are experienced by ward staff with implementing protocols and guidelines in the management of Clostridium difficile infection?

Four themes were identified from the study findings which contain important underlying factors that hospital staff perceived may influence the use of protocols and guidelines aimed at preventing *Clostridium difficile* infection on the ward. These themes include ambiguity, organisational issues, perceptions of dirtiness and professional frustrations. The sections that follow will discuss each of these themes, in turn, using the key findings from this study, and relate these to the second research question and the behavioural change framework developed by Michie *et al.* (2005).

Theme: Ambiguity

The study findings suggest that much ambiguity existed in the minds of staff on the ward as patients suspected or known to have contracted *Clostridium difficile* infection were being diagnosed, treated and cared for. Gurses *et al.* (2008) defined ambiguity as ‘‘uncertainty or vagueness that may prevent the system from achieving its purpose’’ (p.353). In the current study the purpose relates to the implementation of protocols and guidelines to prevent and control the spread of

Clostridium difficile infection. The findings suggest that ambiguity acted as both a barrier and enabler in relation to the implementation of standards and recommendations laid down in protocols and guidelines. As a barrier, ambiguity had the potential to negatively influence the management of *Clostridium difficile* infection. For example, the findings illustrate how ambiguity may result in patient diagnosis and treatment being delayed and barrier nursing, hand hygiene and cleaning not being undertaken at appropriate times. Lack of containment of *Clostridium difficile* infection may result in the possibility of cross-contamination and spread of this infection (Walker *et al.*, 2012) as the organisation's defences become weakened.

Ambiguity could be added to the behavioural framework developed by Michie *et al.* (2005) as an important sub-construct under the construct of decision making, which Michie *et al.* (2005) classify under the domain of 'decision processes' (See Appendix 11). The following sections discuss some of the areas where ambiguity influenced decision processes and strategies nurses and doctors used to cope with their uncertainty.

Ambiguity was identified from the study findings in relation to diagnosis of *C.difficile* infection, as nurses said it could be confused with other conditions such as a 'diabetic bowel.' To deal with their uncertainty nurses would assume *C.difficile* infection until proven otherwise and initiate barrier precautions to 'be on the safe side' to protect themselves, the patient and prevent infection

spreading. Rather than referring to protocols or guidelines, nurses talked in terms of having a gut feeling about knowing whether the patient had *C.difficile* infection. Their sense of smell was a cue to organise for the patient's stool sample to be sent to the hospital laboratory and commencement of barrier nursing precautions. Prompt diagnosis of patients was said to be dependent on the nurse's experience. Rycroft-Malone *et al.* (2009) identified that some nurses in their study relied on 'instinct' to know what to do, which came with experience. The findings from the current study illustrate how intuition guided nurses' behaviour. In this example, ambiguity acted as an enabler by assisting with the implementation of infection control protocol.

Importance Of Cooperation, Patient History And Communication

In the current study, prompt diagnosis depended on cooperation between registered nurses and auxiliary nurses to confirm their suspicion about infection and arrange for the patient's stool sample to be tested. It also depended upon knowledge of the patient's history and risk factors for infection (for example, past infection and antibiotic usage). The findings highlight that difficulties with communication during the handover process, nursing shift patterns, lack of continuous patient care and a reliance on use of the handover sheet, sometimes meant that nurses were not always aware that a patient was diagnosed or suspected of having *C.difficile* infection. In these circumstances, barrier nursing precautions may not always be undertaken, providing the potential for cross-infection to occur (Walker *et al.*, 2012).

The study findings highlight difficulties with communication as a major source of ambiguity. Because nurses were often too busy to attend the ward round, this created difficulties with communication between nurses and doctors, and sometimes resulted in some patients not being given their dose of antibiotics on time. Communication ambiguity was also identified between nurses and housekeeping staff which sometimes resulted in cubicles and bed areas on the ward not being disinfected to the specified method after a patient with *C.difficile* infection had been discharged or allocated a different bed.

Ineffective communication between nurse-to-nurse and between nurse-to-other professionals or other departments has been identified in the literature as an important barrier in relation to handover of patient information (Scott *et al.* 2012). Difficulties with communication were discussed in an earlier section in relation to awareness and use of protocols and guidelines as an information resource (See p.324). These findings provide evidence to suggest that communication ambiguity can act as a barrier to the implementation of protocols and guidelines.

Making Sense Of Explicit Knowledge From Protocols

Although the precautionary principle ('being on the safe side') that nurses were implementing appeared to be working well as a strategy to cope with their uncertainty, difficulties arose on the return of the laboratory result if the patient was confirmed as being negative for *C.difficile* infection yet the patient had

symptoms of diarrhoea. Whilst some nurses said they would stop testing if one negative result was received, other nurses said they were uncertain and may stop testing if the second stool result was returned as negative. Doctors often said that up to three attempts at sampling should be made which they considered from past experience long enough for the infection to be detected. Observational data of one registered nurse confirmed that after the first negative result was received, she refused to organise for further stool samples to be taken, despite concerns being raised by an auxiliary nurse that the patient had diarrhoea which smelled like *C.difficile*.

The guidelines covering diagnosis of *C.difficile* infection that were in place during the field work (Department of Health, 2009a) recommend that further samples be taken at 24 hours where the result was negative and a high suspicion remained that the patient had infection. In the above example the registered nurse did not have any doubt about the patient's diagnosis, although her decision caused doubt for other nurses as to the patient's diagnosis and whether to continue barrier nursing precautions. The nurse's decision was based on her perception that the antibiotics the patient had previously been given were '*fighting off the bugs.*' The nurse was aware of the guideline that further samples may need to be taken (Department of Health, 2009a), which illustrates that being aware of explicit (codified) knowledge is not always enough to ensure the measures are put into practice.

The nurse had therefore made sense of the negative stool result in terms of the patient was no longer infective and no further tests were considered necessary. This tacit knowledge has the potential to be passed onto other nurses and verified and accepted through communities of practice (Rycroft-Malone *et al.*, 2004). It highlights the importance of taking nurses' perceptions into account when strategies are used to close the gap between ideal and actual infection control practice. Speed of diagnosis and early use of barrier nursing precautions is essential to prevent the spread of *C.difficile* infection (Kilpatrick *et al.*, 2008).

Difficulties Blending Different Forms of Knowledge

There may be times where explicit knowledge from protocols is not aligned with other sources of knowledge, such as professional knowledge and knowledge in practice. For example, ambiguity arose for nurses and doctors at the stage where a patient with *C.difficile* infection was found to have formed stools. Some nurses and doctors said they were unsure about whether they needed to continue barrier nursing precautions, as they were aware of the possibility that the patient may be a 'carrier', that is their stools may be positive if analysed. Rates of asymptomatic carriage have been reported in the literature to be between 20-50% in patients within long term health facilities (Williams and Spencer, 2009).

The Department of Health guidelines (2009a) recommend use of the 48 hour rule which suggests that barrier nursing can cease once the patient has formed stools for 48 hours. These guidelines suggest that the patient no longer poses a risk to others, as long as they wash their hands thoroughly after using the toilet. Having this explicit knowledge still caused ambiguity for some nurses and doctors. For example, nurses spoke about information (professional knowledge) they had received from the infection control nurse whilst some doctors reiterated information they had received from the microbiology department. There was dissonance between professional knowledge, that patients can continue to excrete spores for several weeks after diarrhoea has diminished, and the knowledge contained within infection protocols and guidelines which recommended that barrier nursing precautions may be removed.

Although nurses and doctors did not mention research evidence to support their concern, some evidence does exist to support it. A study by Riggs *et al.* (2007) reported that carriers have the potential to contribute significantly to the transmission of *C.difficile* infection by shedding spores into the environment. A recent study by Walker *et al.* (2012) reported that no more than 25% of cases of *C.difficile* infection could be linked to a symptomatic enzyme-immunoassay-positive patient. The authors suggest that the remaining 75% of unexplained transmission raises concerns about other routes not captured in their study, including false negative symptomatic patients and asymptomatic carriers (patients, relatives and staff).

Kilpatrick, Prieto and Wigglesworth (2008) reported that no studies had been conducted describing the actions of taking a patient out of isolation, and concluded that this could present challenges to practice. To my knowledge, the current study is the first one to identify the challenges that nurses and doctors experience with the implementation of Government guidelines (Department of Health, 2009a) recommending when isolation and barrier nursing precautions may be removed and the ambiguity associated with this process. The findings from this study suggest that nurses' and doctors' awareness of explicit knowledge contained within protocols and guidelines may not necessarily be implemented where their beliefs are not aligned with this knowledge. Some nurses said they would continue to barrier nurse to 'be on the safe side' as this made sense to them and alleviated their anxiety surrounding uncertainty.

Summary

The findings suggest that ambiguity acted as both a barrier and enabler to the implementation of infection control protocols and guidelines. Ambiguity as a barrier has the potential to negatively influence the management of *C.difficile* infection by creating holes in the organisations' defences. This may result in the delay of a patient's diagnosis, treatment and barrier nursing care and has the potential to result in lack of containment of healthcare-associated infection.

The findings illustrate that nurses and doctors drew on their tacit and experiential knowledge to support their decision making. Examples include professional knowledge, practice ‘know how’, clinical experience, personal preferences, intuition and information from the local context, which was communicated via methods such as handover. Difficulties with ‘blending’ these different types of knowledge or ‘know how’ were highlighted, which is important when trying to close the intention-behaviour gap (Cranley *et al.*, 2009; Kothari *et al.*, 2011; Rycroft-Malone *et al.*, 2004). The next section discusses the findings surrounding the theme of organisational issues.

Theme: Organisational Issues

The theme of organisational issues contains factors that were assisting and hindering the use of protocols and guidelines into practice. This section discusses some of the key findings from this theme.

Privacy And Dignity Versus Infection Control

Spatial and structural constraints were identified by ward staff as a major barrier to the implementation of infection control practice. Nurses and doctors frequently spoke about the difficulties with not having enough cubicles to isolate patients with *C.difficile* infection. As patients with infection were commonly placed on the open ward, nurses and doctors often spoke about their inability to contain the infection and prevent it from spreading, as staff, equipment, patients and visitors frequently moved in and out of the area (See p.285). Isolation of patients with suspected or known infection is a requirement of the hospital's infection control protocol and a key recommendation of government guidelines (Department of Health, 2009a). However, since the Department of Health published the Patient's Charter in 1996, there has been greater emphasis on single-sex accommodation (Odell, 2009), which has been identified as an important factor to providing dignified care (Royal College of Nursing, 2008). Mounting pressure from the public and the media culminated with the UK government mandating the elimination of mixed sex wards as a priority (Department of Health, 2007b, 2009c). Objectives laid down in the Health and Social Care Act 2008 (Regulated

Activities) Regulations 2010 (Department of Health, 2010), requires NHS hospitals in the UK to ensure that patients and staff are protected from the risk of infection whilst protecting patients' privacy and dignity (Department of Health, 2009b). Findings from the current study suggest that nurses experienced tension in trying to meet these two objectives, due to spatial and structural constraints on the ward.

Although the lack of isolation cubicles has been reported as a key barrier to the prevention of healthcare-associated infection, few studies were identified that illustrated how cubicles were used in practice. Damji *et al.* (2005) and Barlow *et al.* (2002) investigated the usage of isolation cubicles and reported that approximately half the patients (44.1% and 55.1% respectively) admitted to cubicles presented no risk of infection transmission. These studies do not explain why cubicles were allocated inappropriately. The findings from the current study illustrate that cubicles were often occupied by patients without infection, and infected patients were often placed on the open ward.

In the current study, nurses said that several issues were taken into account when patients were allocated to a cubicle, in addition to whether the patient was known or suspected to have contracted *C.difficile* infection. This included whether the patient was on an end of life care pathway (dying patients), noise, social and mental health issues, being physically exposed to the opposite sex and being in an embarrassing or sexually threatening situation. Where these issues were

perceived to disrupt the privacy and dignity of the patient or other patients, the patient was often placed in a cubicle, even if infection was absent. This sometimes meant that a patient with *C.difficile* infection placed in isolation would be removed from a cubicle to make room for a patient that did not have an infection. Often this happened to meet a government 'rule' on single gender wards. The patient with infection would then be barrier nursed at the bedside on the open ward. The findings illustrate that the wellbeing of patients was a major concern that nurses considered when allocating cubicles, and infection was one of a range of factors that had to be considered.

Mixed sex wards have been reported as having a detrimental effect on a patient's recovery (British Medical Association, 2011). Government guidelines for the prevention and control of *C.difficile* infection: *How to deal with the problem* (Department of Health, 2009a) focus on the containment of infection rather than considering the emotional and social wellbeing of the patient (Madeo and Boyack, 2010) yet these issues are laid down as objectives within legislation (Department of Health, 2009b). In practice, nurses often had to choose between protecting patients' privacy and dignity and infection control, and this was a balancing act.

Cohorting patients, that is placing all of the infected patients into a separate ward, is the recognised strategy to deal with the lack of isolation cubicles whilst containing the spread of *C.difficile* infection (Department of Health, 2009a). The current study findings illustrate that cohorting infected patients never happened

during eight months of field work. Barlow *et al.* (2002) reported that only 35% of patients, who were deemed to carry a risk of infection transmission were placed in open bays (cohorted) when cubicles were unavailable. Doherty *et al.* (2007) reported that 32% of MRSA patients were not isolated or placed in a cohort, yet these studies do not explain why these gaps in practice occurred. In the current study, nurses explained that they often avoided cohorting patients as often this meant that different sexes of patients would be mixed together, which would contravene an important government ‘rule.’

The study findings explain why some nurses said there was no ward policy for the allocation of cubicles, and this caused ambiguity with isolation of patients (See p.230). There was a policy but processing patients into an isolation cubicle appeared not to follow this policy. The study findings illustrate that allocating patients to a cubicle was a juggling act, as ward managers and senior nurses struggled to cope with competing priorities (preventing infection whilst meeting a ‘rule’ for single-sex wards) and other contextual difficulties (ward structural and design constraints) of which protocols did not take account.

Yagasaki and Komatsu (2011) identified goal congruence in their study. According to the authors, goal congruence means that important organisational goals are shared by all, as an important precondition to the successful implementation of guidelines. In the current study, there was disparity in relation to the goal of isolation and cohorting of patients. One way of dealing with this

issue would be to allow nurses to make local protocols specific to the context. Conflicts between ideal and actual practice could then be brought to light and agreement made about the best way to deal with them.

Modelling Behaviour And Commitment To Infection Control

The study findings suggest that nurses and doctors modelled their behaviour by learning from their peers. Nurses mentioned looking to the behaviour of their mentors, senior nurses or nurse managers, whilst junior doctors mentioned observing the behaviour of their registrar or consultant. Phlebotomy staff said that they considered themselves a visitor to the ward and looked to the behaviour of ward staff, as an example of the behaviour they should follow. Social Learning Theory (Bandura, 1977) proposes that people learn not only through experience, but by observing the behaviour of others. Lymer *et al.* (2003) refers to nurses fitting in with the behaviour and/or the attitudes of their peers as ‘socialisation’ into infection control.

Pessoa-Silva *et al.* (2005) reported that intention to comply with behaviour was associated with a positive perception of how superiors valued the behaviour. In the current study, where a junior nurse or doctor perceived that his or her peers did not value a particular behaviour (for example because they did not implement the behaviour themselves), their own commitment to the implementation of the behaviour could be eroded. One of the junior nurses said that when she worked

with senior nurses who were implementing a practice which was not 'correct' practice (did not meet the ideal standard taught during her nursing degree), she found herself copying their behaviour because of lack of time, to meet the patient's needs and because she perceived other nurses did not care how things were being done. Observing standard infection control precautions not being implemented was perceived as a lack of commitment to infection control practice and an important factor that may influence the implementation of protocols and guidelines, for nurses, doctors and ancillary staff.

Increasing commitment to safety has been found to have a positive effect on the implementation of protocols in some studies. Larson *et al.* (2000) attempted to increase protocol compliance by gaining the commitment of senior administrative and clinical staff to visibly support and promote handwashing. The authors reported a significant increase in handwashing compliance that was sustained over a 14-month period. It is argued that by increasing the commitment of senior nurses and doctors to adhere to the implementation of standard precautions and best practice recommendations this may have the potential to positively influence infection control practice and patient care using a similar intervention.

Although observing others failing to implement infection control precautions may have been perceived as a lack of commitment to infection control and to the safety of patients, the study findings suggest that this may not necessarily be the case. The findings provide evidence to suggest that non-implementation of certain

precautions occurred because of an individual's assessment of risk and beliefs related to the outcome of their behaviour. For example, some doctors and nurses justified their lack of use of gloves and gown prior to entering an isolation cubicle because of the perceived level of risk associated with the task. Some nurses and doctors said that they considered it acceptable to enter an isolation cubicle without gowning up if the only activity was to talk to the patient rather than undertake a caring or treatment task, or to collect patient notes which they had mistakenly left in the room. Some doctors suggested that gowning up prior to entering a cubicle was a defeatist measure, because nurses were not ensuring that the cubicle doors were kept shut, rendering barrier nursing ineffective.

Wakefield *et al.* (2010) used a cultural survey using the Theory of Planned Behaviour to explore the factors influencing nurses, doctors and allied health professionals involvement with patient safety behaviours. The authors reported that the observed behaviour of peers and beliefs about the value of those behaviours in improving patient safety (belief in the safety outcome) were important motivators influencing safety related behaviours of all healthcare workers. In the current study, time was often weighed against the risk. For example, if the task was perceived to be quick (asking the patient in an isolation cubicle a quick question or to collect something) the risk was perceived to be lessened. If some of the barrier control measures to protect against infection were not seen to be implemented (closing the cubicle door), this lessened the importance of implementing other barrier controls (wearing gloves and gown into the cubicle). Senior nurses and doctors may have been committed to their

infection control practice yet not realised the impact their behaviour was having on others, when they decided not to implement safety precautions (Watson and Myers, 2001).

The findings suggest that some of the experienced doctors perceived themselves as being a role model for junior doctors. Being a role model was associated with time in a role, having responsibility for a team and being aware of being observed by one's team members. Pessoa-Silva *et al.* (2005) suggest that when opinion leaders become aware of their influential power, they are more compliant and their commitment may have a positive impact on healthcare workers' perceptions and intention to comply with the behaviour.

Some junior doctors said they did not think of themselves as a role model for their colleagues, nurses, patients or visitors. Pittet *et al.* (2004) reported that only 44% of doctors surveyed in their study considered themselves a role model for their colleagues, and this was independently associated with adherence with hand hygiene independent of system constraints. In the current study, nurses said they did not consider doctors as their role model, despite a suggestion in the literature that doctors act as a role model for nurses (Whitby *et al.*, 2006). One reason to explain this disparity is that nurses and doctors considered their professions to be very separate (See p.302 - 303). This may be historical, nevertheless it may be a contributing factor to the fragmentation of infection control practices on the ward (See later discussion p.389).

Regulation Of Infection Control Practice

Some nurses and doctors perceived that infection control standards were stricter when matrons used to be in charge of running hospital wards. In the literature, matrons were upheld as the linchpin of standards (Department of Health, 2004a) and symbolised as an authority figure, someone who would enforce order and ensure ward standards were maintained (Washer and Joffe, 2006).

The findings in the current study suggest that there were perceived difficulties with the way that infection control standards were being maintained on the ward. For example, some nurses and doctors said that the ward manager was responsible for ensuring that protocols were implemented yet it was perceived that the ward manager was too busy 'doing paperwork' to know what was going on around the ward, which perhaps implies the importance of manager visibility. Observational data confirmed that the ward manager was unaware that some nurses were continuing to use alcohol hand rub on their gloves. This was an out dated practice, no longer thought to be effective. Observational and interview data illustrate that some nurses continued to use alcohol hand rub on their gloves.

Nurses were also observed walking around wearing blue aprons despite notices warning against this practice. Data from interviews and informal conversations support the observational data that there were no perceived consequences for this. Rather it was seen as accepted practice and therefore a cultural norm.

The study findings highlight the difficulties that the ward manager faced with trying to maintain a visible presence, as she juggled with her responsibilities and organisational constraints such as lack of time. She suggested that maintaining infection control standards could not be achieved alone and that a team approach was needed, by using other nurses as '*spies*' to monitor that standards were being met. Although this did not currently happen it was a strategy that the ward manager was considering implementing to assist with improving infection control standards on the ward.

The ward manager also talked about the difficulty with trying to ensure that doctors and ward cleaners adhered to infection control practice. She said she was not accountable for their behaviour and so had to deal with the perceived lack of authority in other ways. She used the low compliance rate for the antibiotic sticker as an example of ward infection control standards falling. Rather than dictating standards to doctors, the ward manager would encourage nurses to cajole and negotiate with doctors to try to achieve the desired outcome (in this case getting doctors to complete the antibiotic sticker).

Koteyoko and Nerlich (2008) reported that senior nurses were keen to dissociate themselves from their title of 'authority figure' and preferred to see their role as a link person restricted by organisational and financial constraints. This differs from the image portrayed by the Health Service Circular 2001/010 of a modern

matron who is a highly visible, authority figure that is in-charge of standards (Department of Health, 2001c).

Monitoring Behaviour At Boundaries

Lack of organisational control of behaviour at boundaries is an important finding in the current study and a barrier to the use of protocols and guidelines (as discussed below). According to Rasmussen (1997), organisations need to focus on improving awareness of clear boundaries in practice.

“Rather by striving to control behaviours by fighting deviations from a particular pre-planned path, the focus should be on the control of behaviour by making the boundaries explicit and known and by giving opportunities to develop coping skills at boundaries.” (Rasmussen, 1997, p. 191).

In the current study, boundaries can be described as the point at which ideal practice defined by a protocol differs to practice that is implemented in reality. Monitoring and recording deviations in practice may assist with the process of controlling behaviour at boundaries by the organisation, so that additional steps can be implemented, where necessary, to prevent a recurrence (Health and Safety Executive, 1997). One example of where nurses were recording deviations at boundaries, often to protect themselves from blame, is the use of incident forms (See p.399). Not all deviations from ideal practice may be monitored, documented and/or reported and the reasons for this are discussed in a later section (See p.393 - 399).

According to Manias and Street (2000), observation of practice in the form of the nursing gaze is an important form of self-regulation which nurses can use to determine deviations from practice and to single out nurses who do not conform to ways of working. In the current study, some nurses said that where they observed another nurse implementing a practice that did not seem right, they would bring it to the nurses' attention, whilst other nurses said they perceived there was no point in doing so because of fear of consequences (See *Staying Silent* p.300). There may be various reasons for variations in practice not being detected (See later discussion – *Learning From Common Workflow Problems* p.395). Failure of ward staff to raise variations with practice, either with each other or with their manager, may result in undesired ways of working not being corrected, and therefore persisting over time. One way of improving awareness at boundaries is to encourage self-reflection.

Prieto and Macleod-Clark (2005) provided a mentoring role to support nurses with the implementation of infection control guidelines, where nurses were encouraged to question and reflect on practice, which resulted in positive changes to the way that protocols were being implemented. This could be a useful strategy to use with nurses and doctors on the ward.

Although the behavioural framework developed by Michie *et al.* (2005) identifies self-monitoring of behaviour by the individual, it does not identify monitoring of behaviour at boundaries by the organisation. One way of an organisation

monitoring behaviour at boundaries is to audit practice. In the current study, commode audits and hand hygiene audits were often undertaken. Nurses and doctors said they were not receiving feedback from these audits, neither were they receiving any feedback about the level of *C.difficile* infection on the ward. Audit and feedback is important to make people aware of their performance and has been shown to be effective with some studies (Jamtvedt *et al.*, 2006). Lack of feedback may be associated with the underestimation of risk of *C.difficile* infection and therefore contributing to the normalisation of infection for some individuals (See p.255). Other factors contributing to the normalisation of infection can be found on p.263 - 270.

Within the United States, cameras have been installed to monitor how ward staff are implementing certain infection control practices, such as handwashing, in an attempt to reduce healthcare-associated infections (Campbell, 2012). These were used with positive reinforcement (rather than negative reinforcement) (Skinner, 1974). Where expected behaviour did not meet the required standard, staff received one-to-one mentoring. Positive reinforcement in the form of being told about the percentage target rate of compliance achieved for hand hygiene each day was provided on a visual display. It is reported that this intervention has encouraged motivation to implement handwashing, has encouraged competition between wards and cameras are to be installed in some NHS hospitals within the UK as part of a larger pilot study of infection control (Campbell, 2012).

Summary

The study findings surrounding the theme of organisational issues highlight three concerns that nurses and doctors perceived to be hindering the implementation of infection control protocols and guidelines into practice. Firstly, the findings illustrate the difficulties that nurses experienced in trying to meet competing government objectives. Their decision making relating to the isolation and cohorting of patients was hindered by structural and design constraints in terms of ward layout, issues of privacy and dignity and a Government 'rule' concerning single gender wards. Secondly, the findings illustrate the importance of role models and how this may influence perceptions of commitment to infection control. Where an individual perceived that their peers did not value a particular behaviour (because they did not implement the behaviour themselves), this had the potential to erode their own commitment to the implementation of the behaviour. Thirdly, some nurses and doctors perceived that there were no consequences for failing to implement standard precautions. The study findings highlight that boundaries need to be made explicit and encouragement given to develop the opportunity to develop coping skills at boundaries, such as reflection on practice. The next section discusses the findings surrounding the theme of perceptions of contamination.

Theme: Perceptions Of Contamination

This section discusses some of the key findings from the study surrounding the theme of perceptions of contamination and contains factors that were assisting and hindering the use of protocols and guidelines into practice, based on the second research question.

Fear Of Infection

The study findings suggests that for some people *Clostridium difficile* infection was associated with “being unclean” and there was stigma attached to it. The germs which cause the infection were perceived as a danger for some ward staff and associated with dread. According to Rachman (2004) fear of contamination will arise if the individual interprets the contamination as a source of danger to their physical or mental health or it is perceived as a threat to others. The findings in the current study suggest that for some nurses and doctors, thoughts of being “unclean” were associated with fear of “getting infection” and of taking “it” home. This positively assisted their adherence to standard precautions. Strategies used to reduce their fear included paying attention to precautions or taking extra precautions, such as double gloving or washing up to their elbows, in the hope of avoiding infection.

Self-Control

Heightened awareness (seeing the consequences of infection) and confidence in the precautionary measures (remaining well whilst other staff became ill) was perceived to positively influence adherence to infection control practice for some nurses and doctors. These factors appeared to be associated with an increased sense of self-control. Lack of confidence with precautionary measures meant that some nurses and doctors would wash their hands with soap and water rather than rely on the use of the hand rub. This alleviated their anxiety and made them feel safer, as they were not convinced about the effectiveness of the hand rub as a means of protection from healthcare infection. These examples illustrate how intuition and past behaviour guided the implementation of infection control precautions. For some people, their belief about their own ability to control their risk from infection reduced their anxiety. This is sometimes referred to as an internal locus of control (McLaughlin and Walsh, 2011).

‘Working Around’ Protocols As A Means Of Reducing Fear

Although the study findings suggest that fear of infection positively influenced adherence to precautions for some staff, there is evidence to suggest that it had a negative influence in some situations. Some nurses avoided using the barrier nursing trolley at the foot of the patient’s bed on the open ward in an attempt to keep the infection quiet, in order to reduce fear and anxiety in other patients and visitors who were present in the same area. In this example, standard precautions were being ‘worked around’ to reduce fear in others.

Standard precautions would sometimes be circumvented because of contamination fears. For example, some nurses would not remove their contaminated gloves and apron before exiting an isolation cubicle. They perceived that they needed to protect themselves as they carried infected waste to the sluice room. By working around the protocol, this reduced nurses' anxiety about the infection risk. By fully adhering to the infection control protocol, it was perceived that 'impractical rules' were sometimes putting nurses at risk of contracting infection.

Morrow *et al.* (2011) reported that implementation of infection precautions can sometimes be used as a means of self-protection from infection and as a result, this can lead to poor infection control practice. The findings from the current study suggest that infection control precautions were sometimes being 'worked around' due to contextual difficulties, as a means of self-protection and as a means of protecting others from fear, anxiety and/or embarrassment. This provides an example of how the social construction of knowledge acted as a barrier to the implementation of standard precautions laid down in protocols and guidelines.

Normalising Infection

Whilst some ward staff said they feared *C.difficile* infection, the study findings suggest that some nurses, doctors and ancillary staff would "switch off" from the infection risk, possibly as a coping mechanism to prevent them being fearful.

Loss of fear may be a factor associated with the normalisation of infection for some ward staff. According to Rachman (2004) we learn not to fear, yet lack of fear may result in holes developing in the safety defences of an organisation (Reason, 1998), for example, by failing to fully implement protocols or guidelines, such as hand hygiene. Adams (1995) suggests that anxiety is dependent on an individual's subjective assessment of danger. Little is known about how hospital staff perceive the risk from healthcare-associated infection.

Three studies were identified in the healthcare literature investigating the perception of risk of hospital staff with MRSA (Gill *et al.*, 2006; Kouabenan and Dubois, 2007; Morrow *et al.*, 2011) and one with hand hygiene (McLaughlin and Walsh, 2011). One ethnographic study of four hospital wards explored understanding of how staff identify, classify and account for patient safety risks (Dixon-Woods *et al.*, 2009). While the current study did not set out to explore perceptions of risk, findings which emerged extend our understanding in an area which seems under researched.

Under-Estimating The Risk From *C.difficile* Infection

Some nurses and phlebotomists mentioned accepting the potential risk to themselves of contracting a healthcare-associated infection, as hospitals were inherently risky places to work. According to Renn (1992), risks that are chosen may be perceived as more being acceptable. In the current study, the perceived

risk of infection may have been under-estimated for some nurses as it was a risk that they had accepted when they became a hospital employee. An alternative explanation is that the risk may have become familiar.

Some nurses talked about being paranoid about the risk of MRSA and *C.difficile* infection when they first started on the ward, but over time they ‘switched off’ to the risk as they were used to encountering it in their every day practice. Therefore common familiar risks appeared to be associated with loss of fear for some individuals. Nurses and doctors also spoke about the risk to patients of contracting *C.difficile* infection, which was perceived as being an inevitable part of the patients’ treatment. In this sense, it was perceived as being a known risk.

According to Slovic *et al.* (1986), known risks may be more acceptable than unknown risks. Use of antibiotics was viewed by doctors as a risk factor for *Clostridium difficile* infection, consistent with the medical literature (Gould and McDonald, 2008; Poutanen and Simor, 2004). Some doctors perceived the risk of contracting *C.difficile* infection as a relative improvement compared with the option that the patient may die if antibiotics were withheld. Infection was therefore perceived as an inevitable outcome of the patient’s treatment. According to Kahneman *et al.* (1982), where the risk is thought to be the best alternative amongst other choices, the absolute risk may be perceived to be reduced.

In comparison, some nurses perceived *C.difficile* infection to be caused by antibiotics rather than it being a risk factor for infection. *C.difficile* infection, including recurrent bouts of re-infection, was perceived as an inevitable part of the patients' treatment and dependant on chance, rather than something that may be contracted due to an act or omission of a nurse's or doctor's behaviour. Johnson (2009) reported that re-infection with a new strain of *Clostridium difficile*, rather than relapse from a recurrent strain occurs in 33% -75% of cases, suggesting that the need to protect those patients from spores is just as great as other patients. This may be difficult to achieve where some nurses and/or doctors perceived they had very little control over the prevention of *C.difficile* infection.

The immediacy of the consequences was identified as a factor influencing the underestimation of risk, in the current study. For some nurses and doctors, *C.difficile* infection was perceived to affect predominantly elderly, immunocompromised individuals. The risk was perceived to be a distant one and not an immediate risk for relatively young, healthy ward staff. This may explain why risks such as blood borne infection and Norovirus were perceived as more threatening for some nurses and doctors than *C.difficile* infection, as their effects were more immediate.

Kouabenan and Dubois (2007) reported that hospital staff perceived the risk of contracting MRSA as less serious than risks from hepatitis C, AIDS and tuberculosis. Weinstein (1980) termed this optimistic bias, which means a

tendency to view oneself as invulnerable, and less likely than others to experience negative events. In the current study, some hospital staff perceived themselves less likely than patients to contract *C.difficile* infection, possibly because they under-estimated the risk because of the reasons already described.

Nicol *et al.* (2009) used the Theory of Planned Behaviour in a qualitative study and reported that vivid experience was perceived to have been a powerful motivating factor influencing hand hygiene behaviour. In the current study, some nurses recalled how the use of ultraviolet light in the form of a glow lamp from their training had acted as a powerful visual reminder for their handwashing practice. Ultraviolet light may be a useful tool to assist with improving hand hygiene and ward cleaning.

In summary, some nurses and doctors appeared to underestimate their own risk of contracting *C.difficile* infection, and in regards to the patient, *C.difficile* infection was sometimes perceived to be an inevitable part of the patient's treatment. This may provide support to explain why the risk of the infection may become "normalised" for some nurses and doctors, and not always seen as something that can be prevented. This may have influenced their implementation of best practice recommendations laid down in infection control protocols and guidelines.

The Influence Of Physical And Emotional Cues

The study findings suggest that the threat of contamination was perceived to be greater when the task was perceived to be dirty, and this influenced implementation of the precautionary measures, as a means of getting rid of “it” (the infection). This may explain why some doctors, nurses and ancillary staff were observed washing their hands only after, rather than before, patient care. This supports the findings from a small number of other qualitative studies relating to infection control (Erasmus *et al.*, 2009; Whitby *et al.*, 2006).

According to Rachman (2004), being in contact with something or someone that is perceived to be contaminated can give rise to emotions of fear, dirtiness and disgust. In the current study cues such as smell, sight or touch often evoked these feelings and resulted in an attempt to remove the contaminant often through cleaning.

To organise the contamination cues that were identified within the current study into some kind of taxonomy, the work of other authors in relation to taint was drawn upon. Hughes (1951) defined dirty work as “*tasks that are physically, socially or morally tainted*” (p.319). In a review of research on dirty work, Ashforth and Kreiner (1999) elaborated on each form of taint. They classified physical taint to work involving death, effluent, waste or noxious/dangerous conditions. Social taint was related to work involving contact with people who

are stigmatised. Moral taint was related to work regarded as sinful, dubious, deceptive, intrusive, confrontational methods or defying norms. The author explained that “dirtiness” is a social construction, which is not inherent in the work itself or the workers but is implied by people based on subjective standards of cleanliness and purity. This classification was applied to the study findings in terms of perceived disgust.

In the current study, some nurses and doctors associated disgust at physical taint (seeing blood, faeces, urine, vomit, unhygienic patients, skin flakes, saliva, mucus) relating to a task or activity. It has been reported that even in the absence of visible dirt, disgust-evoking qualities of the object can trigger a specific behaviour (Porzig-Drummond *et al.*, 2009). In the current study, just the thought of disgust associated with physical taint (patients spitting in the hand wash basin) influenced behaviour, and resulted in avoidance of the use of ward sinks for some nurses, instead opting to use the sluice room sink. Similarly, imagined germs could evoke disgust and influence behaviour (folding the bed sheets rather than shaking them). An example of disgust perceived due to social taint includes the stigma associated with infected patients. Whereas moral taint was perceived by observing individuals failing to gown up prior to entering a cubicle where a *C.difficile* patient was being nursed, seeing someone failing to wash their hands, or the thought of using dirty equipment with patients.

Some of the cues identified in the current study are consistent with disgust eliciting cues from other non-healthcare studies and are related in their ability to transmit disease (Oaten *et al.*, 2009) and elicit a behavioural response (Curtis *et al.*, 2004; Curtis *et al.*, 2011; Curtis and Biran, 2001). The study findings expand this knowledge by providing many examples of disgust perceived by healthcare staff working on a hospital ward and how this influenced their infection control practice.

The study findings suggest that the need to feel clean was a motivation for hygiene behaviour and a factor influencing the implementation of infection control precautions. According to Douglas (1966), societies need to be able to organise their environment to function effectively. She suggests that dirt avoidance is a process of tidying up, and substances or practices that challenge assumptions of order become “matter out of place”, are classified as dirt and discarded. In the current study, nurses and doctors suggested that if something looked clean, no action may be perceived to be required. It was only when nurses witnessed faeces after dismantling the commode during an audit that they appreciated the “dirtiness” of this equipment. Evoked memories of disgust (moral taint) may explain why nurses would religiously dismantle and clean the bed following a patient discharge, no matter how busy or short staffed they were. They often said they could not imagine putting a patient into a dirty bed following the disgust they witnessed in the early days of the bed cleaning trial.

The study findings suggest that lack of a cue to their physical senses, such as sight or smell (blood, faeces, vomit, flaky skin, dirt, spores) or lack of association of a cue with disgust, may explain why some nurses and doctors were observed behaving in ways which may permit the cross-transmission of spores and bacteria in the environment. For example, some nurses made associations between patients' bedding and spores and felt angry when they saw other nurses shaking sheets into the air. Perhaps some nurses have not made this association through lack of education or they are making sense of knowledge in different ways to other people. Some nurses made associations between the type of equipment and dirtiness or disgust and were observed washing their hands after touching the sluice yet not the lid of the sharps bin, as the latter was perceived to be clean. Lack of such cues or associations may explain why doctors decontaminated their stethoscope inconsistently between patients. Lack of a cue is a factor that appeared to influence how tasks were prioritised.

Prioritising The 'Dirtiness' Of A Task

The ward environment was considered by some nurses to be less of an infection risk because it was perceived to be less contaminated than a patient. This may explain why some nurses would touch the environment and then touch the patient, without first washing their hands, but would wash their hands after patient care. These findings are consistent with the findings reported by McLaughlin and Walsh (2011). They reported that healthcare workers assigned a lower risk to touching surfaces compared with touching patients' skin, however they attributed

this to be due to differences in knowledge level and internal health locus of control (how much control a person believes they have over their own health). In the current study, the findings indicate that motivational cues played an important role in the prioritisation of the 'dirtiness' of a task.

In the current study, perceptions of the dirtiness of a task, such as dealing with faeces, often influenced whether gloves would be worn. Where tasks were perceived as being "clean" such as taking a blood pressure reading, many nurses would not wear gloves. During observations, nurses would wash their hands after removing gloves that had been in contact with urine or faeces. Where the patient had not passed any bodily fluids, nurses' handwashing was not observed to be instigated. Cues such as faeces and urine were prompts that reminded nurses to wash patients' hands. Where these cues were absent, some nurses said that handwashing did not take place, consistent with field observations.

Some nurses in the current study spoke about the lack of patient hand hygiene as a potential source of contamination, especially bed-bound patients. There is a lack of studies in the healthcare literature relating to patient handwashing, as the emphasis has been on the handwashing practices of the healthcare worker, yet the former is an important reservoir for infection (Banfield and Kerr, 2005; Burnett *et al.*, 2008). In the current study, although some nurses said they were concerned about the lack of patient hand hygiene, nurses were rarely observed washing

patients' hands other than when they gave bed-bound patients their morning wash, which usually happened after their breakfast.

Snow *et al.* (2006) suggested in their study that the threat of hand contamination after patient toileting tasks may have been considered to have a higher priority than a task where gloves were not soiled after inserting a line into a patient's vein. The findings from the current study support these findings and suggest that it may be the outcome of the task (visible soiling) which is important, rather than the task itself, with a visibly dirty outcome or a task that is associated with being dirty having a higher priority than a cleaner one.

In a survey by Harris *et al.* (2000) 74% of healthcare workers admitted to washing their hands more often when patients had diarrhoea yet only 26% said they would wash their hands more frequently when giving patients antibiotics. Harris *et al.* (2000) made the assumption that the latter was associated as a "clean" task. The findings from the current study provide support to their suggestion. In the current study, some nurses said they associated any patient contact as a dirty task, which would prompt them to wash their hands before and after patient care. Other nurses suggested that they would prioritise caring tasks into clean and dirty. For example, for some nurses, placing tablets into a patient's mouth via their unwashed hands was perceived to be acceptable, even when knowing the "rule" that their hands should be washed before and after giving medication. In this

example, giving medication was associated to other social activities such as shaking hands and perceived to be a “clean” activity.

The findings from this study have implications for *The Guidelines for Handwashing in Healthcare* (World Health Organisation, 2009). These guidelines recommend five situations, based on evidence, when hands should be washed. This includes before touching a patient, before a clean/aseptic procedure, after touching bodily fluids, after touching a patient, and after touching the patient’s environment (World Health Organisation, 2009). Understanding the importance of motivational cues with how clean and dirty tasks are being prioritised may be useful with interventions to increase the use of protocols and guidelines into practice.

Voss and Widmer (1997) used a mathematical model to calculate what compliance with handwashing guidelines would actually mean. They reported that in a 14-bed intensive care unit, with 12 staff each working eight hour shifts, it would take 16 hours, or two full-time nurses a day, to achieve 100% compliance with handwashing. Therefore, 100% compliance with handwashing guidelines may be unrealistic to achieve in practice, as this may cause adverse skin reactions (Kampf and Loffler, 2003).

Inherent Versus Elective Tasks

According to Whitby *et al.* (2006) hands are washed mainly as a self-protective mechanism, when ever hands are visibly soiled, believed to be soiled or “emotionally dirty” (such as after touching a patient’s groin). The authors suggest that stimuli that elicit discomfort or disgust would be the motivating factor driving handwashing behaviour. The authors suggest that where hands are washed unconsciously to remove stickiness or visible dirt, the practice is known as inherent hand hygiene. Removal of the contaminant removes polluting feelings of disgust. Where the practice is discretionary, for example handwashing that would take place after holding a patient’s hand, taking a blood pressure reading or after touching an inanimate object in the patient’s environment, the authors propose this is a form of elective hand hygiene. The current study findings expand on the findings by Whitby *et al.* (2006) by providing evidence that this pattern of inherent and elective hygiene may also apply to other activities such as decontaminating patient equipment and/or the ward environment, patient feeding/giving medication and nurses washing patients’ hands.

Allegranzi and Pittet (2009) reported that elective hand hygiene is more likely to be omitted by busy ward staff because such activities are related to social interactions such as handshaking. The findings in the current study suggest that hand shaking may not invoke associations with germs or dirt in some ward staff yet it may in others. Neither may tasks such as feeding patients their medication, yet spores may be transferred to the patient’s mouth if the nurse fails to hand wash

before putting tablets onto the patient's tongue, either because the nurse may be a carrier (Riggs *et al.*, 2007) or due to transmission of spores from the environment (Smith *et al.*, 2012).

Fear, feeling unclean and disgust could be placed in Michie *et al.*'s (2005) behavioural framework as important constructs under the domain of 'emotion' as factors influencing the use of protocols and guidelines in to practice (See Appendix 11). Michie *et al.*'s (2005) framework has only been used once with guidelines aimed at preventing healthcare-associated infection in hospitals. Dyson *et al.* (2011) used it with a qualitative study to explore the implementation of hand hygiene practice in three NHS hospitals and used interviews (n=25), 3 focus groups (n=21) and questionnaires (n=65, 37% response rate). The authors reported that when emotion was identified it was mainly as a lever to good hand hygiene, rather than a barrier to practice. The authors identified pride and regret as two important emotional factors driving hand hygiene, which were not identified in the current study. The authors also report that much less frequently emotion was seen as a barrier, for example, stress, burnout or feeling demoralised.

There are several possible reasons why the findings from the study by Dyson *et al.* (2011) differ from the findings relating to emotion from the current study. Firstly, the context may have been different (for example, improved resources, better working conditions, more support provided). Secondly, observations were not undertaken by Dyson *et al.* (2011) therefore self-reported bias may explain why

emotion was perceived as having a more positive influence. The findings from the current study extend the work of Dyson *et al.* (2011) because rather than applying Michie *et al's* (2005) framework to purely hand hygiene behaviour, the current study applied the framework to a wide range of infection control activities.

Summary

The findings provide many examples of where emotion was acting as both a barrier and lever to infection control practice. Some staff were anxious about preventing infection and some seemed to be more accepting of the consequences, which may have influenced their implementation of best practice recommendations laid down in protocols. The influence of intuition in relation to physical and emotional cues played an important role in the way that infection control precautions were put into practice and clean and dirty tasks were prioritised. Emotion was identified in the current study as an important finding contained within the theme professional frustrations, which is discussed in the next section.

Theme: Professional Frustrations

This section discusses some of the key findings from the study surrounding the theme of professional frustrations. It is a complex theme, bound up with negative emotions, as patient care and infection control practice was perceived to be constrained by organisational and socio-cultural influences.

The Influence Of Negative Emotional States

Emotion was identified within the theme of professional frustrations as nurses struggled to balance their caring role and prevent infection whilst working with structural and resource constraints. Emotions such as anger and unfairness were factors that nurses often talked about as they witnessed patients with *C.difficile* infection being nursed on the open ward because of a lack of isolation cubicles. Many nurses and doctors said that preventing infection was almost impossible to regulate whilst patients with *C.difficile* infection were mixed in with other patients on the open ward. Patients with *Clostridium difficile* infection should ideally have their own equipment, such as commode and blood pressure cuff, to prevent cross-infection. The reality was that nurses regularly shared equipment between infected and non-infected patients and had to cope with limited supplies.

Kalisch *et al.* (2011) used a survey within 10 hospitals with nursing staff (n=4086) (59.8% response rate) across a range of ward types to investigate the frequency and underlying reasons for nursing missed care. Their findings reported

inadequate staffing as the most cited reason for nursing missed care (93.1% across the 10 hospitals) followed by material resources (89.6%). The most common reasons cited for material resources were lack of availability of medication (88.6%), lack of availability of supplies/equipment (85.2%) and supplies/equipment not functioning properly (78%). Findings from the current study suggest that short-cuts to practice or improvisations were made and sometimes steps in a procedure were missed due to organisational constraints, and this was perceived by staff as a way of coping under harsh circumstances.

Ways Of Coping

Nurses found ways of coping with resource constraints. Incontinence liners would not be placed over sheets to prevent soiling and hand rub not replenished at the end of patients beds where stock was not readily available, as nurses often said they did not have the time to search for supplies. They sometimes used paper knickers and liquid hand detergent to wash patients' bodies where no supplies were available and ripped up bed sheets were sometimes used as towels to dry patients. These factors were perceived as contributing to the undignified care of patients and an underlying factor linked to low nurse morale, as nurses' expectations about the way that patients should be cared for were not being met.

Difficulties with handwashing on the ward were to some extent perceived to be due to lack of maintenance of facilities within cubicles. Cheng *et al.* (2010) suggested that hand hygiene tends to be more fully implemented when patients reside in a cubicle, as the door serves as a reminder to perform all necessary infection control measures. The current study findings illustrate that nurses often perceived that they were forced into ‘working around’ infection control protocols, such as handwashing and disposal of waste, as cubicle facilities were not maintained in good working order. Deviations to standard protocol were sometimes perceived as being unavoidable due to wider organisational forces over which nurses had no control.

A sentence that nurses often reiterated was “*its unsafe here today,*” reflecting their perception that patient care was being compromised, often due to staff shortages or inappropriate skill mix. During one night shift, a patient with *C.difficile* infection was left to lie in her own vomit for over ten minutes as nurses were tied up with other patients and unable to respond to the patient’s calls for assistance. Incidences such as this had an emotional impact on nurses and were bound up with fear of blame. These adverse experiences generated negative affective emotional states such as anger and resentment, linked with a lowered sense of self worth and loss of enthusiasm. Nurses often spoke about feeling powerless and trying to do the best under the conditions in which they were working.

Negative emotions identified in the current study have been reported elsewhere in the literature as a form of moral distress (Zuzelo, 2007). Studies have highlighted the impact of distress on nurses as a result of being unable to provide dignified care (Royal College of Nursing, 2008), increasing nurse turnover (Schluter *et al.*, 2008), job satisfaction (Elpern *et al.*, 2005), satisfaction with the quality of care (Hamric and Blackhall, 2007) burnout (Meltzer and Huckabay, 2004), work engagement (Lawrence, 2011) and the ability of nurses to speak up and challenge unacceptable practices and policies (Gallagher, 2010). The current study findings highlight the impact that frustrations and other negative emotions had on nurses and how this influenced the implementation of infection control protocols and guidelines. Nurses found ways of coping with the stress of juggling a high workload with structural constraints and limited resources, often by taking short cuts with infection control practice or by ‘working around’ procedures to make them workable. An important example relates to hygiene tasks such as ward cleaning and decontaminating patient equipment.

Balancing Ward Cleaning Duties With Patient Care

The study findings illustrate the frustrations experienced by nurses in trying to balance ward cleaning duties with patient care. For many nurses tension was associated with being unable to meet this balance. Caring for patients and doing things the right way, the way that they had been trained according to protocol to ensure the safety of the patient, were sometimes perceived as being at opposite ends of a continuum. When favourable conditions were in place, such as adequate

time, staff and skill mix, nurses perceived that the balance between patient care and cleaning the environment (patient safety) could be met. This meant that nurses felt able to clean and care for patients in addition to cleaning the ward environment (patient cabinets, sluice room) and equipment (commodes) to ensure their safety. When the conditions on the ward were unfavourable, nurses would cut corners with ward cleaning tasks as patient care was seen as their most important priority. For example, they would prioritise cleaning tasks and only items in close proximity to the patient, such as cabinets, would be cleaned. Where nurses on a day shift were too busy to clean, they would pass the responsibility for cleaning onto the night shift nurses. On a busy night shift, the reverse would happen. Inadequate time, heavy work pressure, lack of staff and inadequate skill mix were common reasons given to justify why cleaning did not always get done. Often a line would be crossed through the whole days cleaning tasks with the words '*no time to clean.*' Some nurses were concerned about the potential for litigation as a result of a patient getting infection when cleaning was not undertaken to the expected level. Some nurses seemed to tolerate that cleaning could not be done, possibly because they felt powerless (See later section – Dealing With Difficulties p.393).

Lymer *et al.* (2003) identified 'balancing' as a strategy that nurses in their study used to manage the risk from blood-borne infections. According to the authors, 'balancing' is the process in which healthcare workers juggle with competing demands yet try to do their best under the circumstances. They suggest that the act of balancing can vary from one person to another, vary with time and is

dependent on socio-cultural factors and situation-specific factors. The findings from the current study relating to ward cleaning highlight how nurses balanced contextual factors such as resource constraints, nurse identity and cultural norms against competing demands such as patient safety and patient care, which is explained in the next paragraph.

Responsibilities, Nurse Identity And Conflict

Cleaning and disinfection of equipment and surfaces is an essential measure for controlling the spread of *Clostridium difficile* infection (Department of Health, 2009a). This should be carried out daily using a chlorine-containing cleaning agent (actichlor). The findings indicate that the ward ran out of supplies of actichlor for approximately six weeks, due to ill-defined responsibilities for ordering stock. As a result nurses washed surfaces and equipment with soapy water, which would merely move the spores around in the environment (Wilcox and Fawley, 2000; Wilcox *et al.*, 2003).

Despite the constraints that nurses faced with juggling the time spent on different aspects of their role, many nurses recurrently commented that difficulties with ward cleaning may be overcome if nurses worked better as a team. Conflict between some nurses and a lack of understanding between the roles of the qualified and unqualified nurse were perceived as barriers to collaboration. For example, some of the auxiliary nurses argued that certain qualified nurses were

prioritising their paperwork over caring or cleaning tasks, which they interpreted as not putting the patient first and not pulling their weight. Failure of nurses to pull together when short staffed was associated with unfairness, resentment and conflict, especially where it was perceived that the ward was losing points in an audit of commodes.

Teamwork forms a layer of defences against error as team members aware of the vulnerabilities of its members “catch” gaps in practice before an error occurs (Kalisch and Aebersold, 2006). An example would be nurses supporting each other and assisting with heavy workloads to ensure that cleaning tasks get done. Teamwork requires leadership, by ensuring that someone coordinates the work of the entire team (Kalisch and Lee, 2010). The study findings suggest that culturally there was a divide between the nursing team, with those who accepted that cleaning the ward environment and patient equipment was part of the nurse’s role and some registered nurses who resisted cleaning because they perceived that *‘nurses are not cleaners.’* In the case of the latter, these nurses perceived their skills were not being used effectively. To these nurses, considering the resource constraints they were working under, their time was perceived to be better spent caring for the patient.

Use of a new documented cleaning schedule required nurses to provide a signature against each cleaning task. Some of the auxiliary nurses perceived that registered nurses could no longer hide from cleaning tasks, as evidence of who

was contributing to cleaning was now clear for everyone to see, suggesting that social norms had a positive influence on practice. The study findings provide an example of how the use of a documented cleaning schedule, which was an embedded form an infection control protocol, was perceived to be making ward cleaning appear a fairer, more transparent system of work.

Fragmented Infection Control Practice

A recurring response nurses and ward cleaners gave about responsibilities for stock ordering or cleaning tasks was *'it's not my job'*. This may have been a response to the constant changes to infection control practice and the numerous interventions that were being rolled out on the ward. Government initiatives aimed at eradicating healthcare-associated infections have focussed on infection control as a key priority in the NHS. One of the principle messages is that infection control is *'everybody's business'* (Department of Health, 2004b, 2008b). One of the ward managers said she recognised infection control as being *'everybody's business'* as a barrier to the implementation of infection control standards, as individuals do not always take ownership. The study findings suggest that by not taking ownership of some tasks, nurses and cleaners may have been relieving themselves from the perceived pressure from the relentless modifications and adaptations that were being made to infection control practice.

The findings from the current study about nurses perceptions of the difficulties they faced with balancing ward cleaning duties with patient care is a new finding. The studies that were identified in the literature relating to infection control and ward cleaning have tended to focus on the effectiveness of the cleaning routine rather than considering the perceptions of nurses. A recent survey of 1,000 NHS nurses and health assistants found a third had cleaned toilets or mopped floors in the previous 12 months. Two-fifths had cleaned a bed after an infectious patient had been discharged (Calkin, 2012). In the current study the findings indicate that there was a lack of clarity about who was responsible for cleaning tasks, with cleaning having become 'everybody's business'. The findings indicate that there were some areas that were not consistently being cleaned, for example, beneath patient beds, patient head-sets and patient telephones because of unclear responsibilities. A recent article published in the Guardian argues that as nursing staff are already overstretched, by using nurses to clean the hospital environment and hospital beds means that they are being taken away from delivering direct patient care (Mulholland and Ramesh, 2012).

The study findings also illustrate that some nurses had difficulty remembering the changes to the different coloured aprons and the colour coded waste bins for infected waste. Some 'rules' were perceived by nurses as 'rules for rules sake', creating more work for them. This was noticeable with the use of the colour coded aprons. Some nurses could not see any purpose or benefit of colour coded aprons and said they would tend to wear any colour apron regardless. Although it may at first appear that by disregarding some of the standard infection control

precautions, nurses were not taking protocols seriously, this may have been a way of reducing their feeling of being overwhelmed.

Healthcare professionals may differentiate from the path set out in protocols not because they disagree with its goals, but because adherence may conflict with other organisational goals (HsenFae Cheng Cain, 2003). The study findings illustrate that the introduction of too many 'rules' and initiatives may have been influencing the implementation of protocols. In the current study, infection control appeared to be fragmented as new 'rules' and initiatives were perceived as an extra task to do, rather than a task that needed to be integrated with patient care. This is possibly because nurses were finding it difficult to cope under unfavourable working conditions.

Summary

The findings provide many examples of where negative emotions were acting as a barrier to infection control practice. Professional frustrations, associated with organisational constraints and socio-cultural norms, resulted in short-cuts to practice, improvisations being made and/or tasks being missed as patient care was prioritised over patient safety, which nurses described as a balancing act. These are examples of coping mechanisms that nurses used as they struggled to meet their obligations to prevent infection under difficult conditions. The next section

discusses the final theme of dealing with difficulties, based on the third research question.

Research Question 3

What happens if difficulties are experienced?

Theme: Dealing With Difficulties

This section discusses some of the key findings from the study surrounding the theme of dealing with difficulties, based on the third research question.

Toleration Of Difficulties

The study findings suggest that there were many areas of infection control where difficulties were recognised and ‘worked around’. For example, knowing a patient with *C.difficile* infection had been removed from an isolation cubicle, was tolerated, although not accepted by nurses, because they often said it was the wrong thing to do. Toleration was a deeply ingrained practice that perhaps nurses had learned to accept as part of the ward culture.

According to Spear and Schmidhofer (2005) error prone organisations tolerate difficulties such as ambiguity by working around problems to get the job done. In the current study, one of the common reasons nurses gave for not questioning the difficulties they experienced was that they were ‘*just trying to do their job*’. Some nurses said that due to the busyness on the ward, they did not take time to reflect on their practice (See p.287). Reflection is a way of generating new knowledge

(Kuiper, 1999; Kuiper and Pesut, 2004) and an important part of double-loop learning (Argyris and Schon, 1978). According to Eraut (2004), the allocation and structuring of nurses work, in terms of workload, needs to be at a level that allows reflection to take place.

MacIntosh-Murray and Choo (2005) identified that nurses' task driven work and heavy work demands limited attention to and recognition of their information needs. In the current study, the busyness on the ward may have been acting as a barrier to some nurses to question and/or reflect on the difficulties they experienced, such as ambiguity. This may explain why nurses described the way that problems were being dealt with on the ward as 'fire fighting', suggesting that it was a reactive process (See p.286). However, some nurses said they did reflect on their practice when they arrived home and this made them feel worried about whether they had caused harm to a patient (See p.311), which may have added to their emotional anxiety.

Where difficulties were recognised and tolerated, a solution to clarify the problem was not being sought. Difficulties that are not addressed when revealed have the potential to be repeated (Spear and Schmidhofer, 2005) and this does not lend itself to a 'learning culture' which is advocated by the Department of Health (2000b). In the current study, the findings illustrate examples of where nurses had developed coping strategies to deal with the challenges they faced in their

practice, possibly because they felt unable to reflect and take alternative, more effective action.

Learning From Common Workflow Problems

The study findings suggest that common everyday problems were frequently repeated, as nurses and doctors were trying to do their best under the circumstances within which they were working. Nurses constantly struggled against a tide of problems, often due to lack of resources, poor skill mix and time constraints (See Professional Frustrations p.283). Due to these contextual difficulties, the way that work flow problems were commonly dealt with was to elicit quick fixes such as improvisation, 'making do', 'working around' procedures, sometimes missing steps in a procedure or passing the responsibility for tasks onto other nurses in the hope that someone else would take responsibility for it.

The way that work process difficulties were being dealt with on the ward is called first order problem solving (Tucker and Edmondson, 2003), which means that obstacles getting in the way of patient care were immediately solved without consideration of the underlying causes. Second order problem solving includes, for example, use of an incident reporting system or root cause analysis to determine what went wrong, how, why, so that steps can be put into place, where possible, to prevent a recurrence (Edmondson, 2004; Tucker and Edmondson,

2003). The study findings illustrate that the way difficulties were being solved on the ward did not alleviate the possibility of these problems recurring. Although this method of problem solving allowed patient care to continue with less disruption, learning from small process failures may not have taken place, as the underlying cause of these difficulties were prevented from surfacing (Tucker and Edmondson, 2003). Ways in which difficulties and/or improvements to practice may be brought to the surface is by voicing concerns and suggestions and use of incident reporting.

Voicing Concerns, Suggestions And Incident Reporting

Nurses and doctors on the front-line are well positioned to speak out about difficulties they experience (Tucker and Edmondson, 2003) and making suggestions for improvement. The study findings suggest that considerable difficulties were experienced with some people voicing and therefore escalating their concerns about problems with infection control practice.

Personal attributes such as young age, inexperience, lack of self-confidence and personality traits such as being timid were factors perceived as barriers to nurses speaking out about perceived difficulties with infection control practice in the current study. Barriers to voicing concerns included not wanting to cause offence, fear of reprisal, hierarchy, professional boundaries, lack of support and lack of feedback to confirm that concerns had been acted upon. It is argued that the

patient's need for safety should supersede any factor that may cause hesitancy for staff to speak out about difficulties and concerns about practice (Seiden *et al.*, 2006). To enable this to happen, staff need to feel encouraged and supported to voice their concerns to other members of staff on the ward (Scholefield, 2007). This may be difficult to achieve considering the culturally ingrained values that were identified in the current study findings.

Socio-cultural barriers to voicing concerns included the dynamics and norms within a professional group. Dixon-Woods *et al.* (2009) reported that once practices in their study (for example 'work arounds') had become rendered non-deviant, acceptable and formally unsanctioned, informal sanctions can operate to prevent the restoration of the official rules. In the current study, some nurses and doctors justified that they did not speak out when they witnessed infection control standards being breached because either they took similar short cuts themselves, they did not want to be labelled a trouble maker or they wanted to 'fit in'. This suggests that there may be a tendency to maintain silence as a means of maintaining the status quo and not 'rocking the boat'.

An earlier discussion of the study findings suggested that nurses and doctors mainly learned from observing the behaviour of their colleagues and peers (See p.244). If speaking out is not something which experienced nurses valued and enacted in their practice, then less experienced individuals are less likely to value speaking out and voicing their concerns. In some cases, speaking out may risk

isolation of the individual from the group (Henriksen and Dayton, 2006) as it breaks from the social norm (Kalisch *et al.*, 2009). This allows gaps and variation in practice to become established and accepted as part of the ward culture.

The new initiative being introduced throughout the hospital for infection control link nurses to be accountable for enforcing ward infection control standards (See p.308), does not consider these culturally ingrained barriers, which may become a major obstacle to its success. Blame was cited as a reason for nurses not volunteering for the link nurse role, as accountability was associated with taking responsibility when things go wrong.

Weick (1990) argued that people fall back on what they learn. In the current study, if nurses have experienced negative consequences as a result of voicing their concerns or suggestions in the past, this may explain why hesitation has become the norm. Similarly, failure to see their concerns, suggestions and/or corrective action being taken may explain why failure to speak out and implement formal reporting procedures, such as incident reporting, has become embedded on the ward. If the organisation would like staff to raise their concerns, suggestions and formally report difficulties to improve infection control practice, people need to see these being acted upon. Similarly, if nurses are to volunteer for additional responsibilities such as the link nurse role they need to feel supported in this role. Over time, trust can be built up which may support staff speaking out, adding to the organisations' safety defences. Speaking out could be added to the

behavioural change framework put forward by Michie *et al.* (2005) as a sub-construct under the domain of 'behavioural regulation', as a form of regulatory feedback from employees (See Appendix 11) and an important part of single-loop learning (Argyris and Schon, 1978).

Where nurses were concerned about fear of blame, they used the incident reporting system to 'cover themselves' yet these were only for issues such as being short staffed on a shift or lack of an isolation cubicle where a patient was placed on the open ward. The incident reporting system appears to have become a common way of dealing with organisational constraints rather than a tool to assist organisational learning. This has implications for the Government's incident reporting system which is a tool designed to identify the root cause of adverse events and near misses in order to assist with learning from failure (National Patient Safety Agency, 2006).

Summary

The findings from this study have identified several important factors that may act as a barrier to learning from failure. These are important factors that need to be taken into consideration with strategies aimed at closing the intention-behaviour gap. The next section discusses the conclusions of the study.

Conclusions

Within the healthcare literature, a small number of quantitative studies have used one or more behavioural theories to predict factors that were influencing the use of infection control protocols and guidelines. These studies have focused on a limited number of variables without consideration of contextual influences. The current study used a qualitative case study approach with a behavioural change framework developed by Michie *et al.* (2005) to explore how a wide range of infection control behaviours were being implemented by ward staff to prevent and control *Clostridium difficile* infection. This study has sought to explore three issues, firstly how infection control protocols and guidelines were being used by staff on the ward, secondly to explore the factors that were perceived to be influencing the implementation of standards and best practice recommendations laid down in these documents, and thirdly to explore what happens in practice if and when difficulties occurred.

The findings from this study suggest a considerable amount of ‘not knowing’ about protocols and guidelines. Detachment, lack of ownership and lack of accountability were individual barriers to ‘knowing’ about protocols and guidelines. Organisational and socio-cultural influences seemed to hinder awareness of protocols and guidelines. These included difficulties with communication, shift patterns which did not coincide with training sessions and/or meetings where explicit knowledge may be imparted, lack of ward funding to support reading (such as providing supernumerary days), poor visibility of

protocols and guidelines on notice boards, lack of computer skills and discouragement of nurses to spend time at the nurses' station where protocols may be accessed. By addressing these factors, this may assist with increasing familiarity and awareness of explicit knowledge contained within protocols and guidelines.

The study findings suggest that nurses and doctors may have internalised some of the knowledge contained within protocols and guidelines, possibly as part of their education, training, through use of 'communities of practice' (Lave and Wenger, 1991) and experiential learning (Estabrooks *et al.*, 2005). Internalisation of explicit knowledge and having to frequently implement infection control precautions, as *Clostridium difficile* infection was commonly encountered with patients on the ward, are important factors that may explain why protocols and guidelines were not observed being consulted. Nevertheless, although nurses and doctors said they knew how to implement infection control precautions, what they actually did in practice sometimes differed with ideal ways of working defined by protocols or guidelines. Lack of encouragement and commitment by nurse managers and consultants to use these documents may have also influenced why protocols and guidelines did not appear to be relied upon as an important information resource.

Instead of relying on explicit, robust knowledge contained within infection control protocols and guidelines, nurses and doctors tended to privilege and prefer the use

of social interactions with their colleagues and peers when they felt uncertain about their infection control practice. Tacit knowledge that had been assimilated in terms of 'rules of thumb' and 'mind lines' (Gabbay and leMay, 2004, 2011), professional 'know how' learned through past experience and clinical practice, preferences, common sense, intuition and how sense was being made of the local context, were all heavily relied upon as informal ways of 'knowing'. The study findings illustrate how tacit and experiential knowledge could be passed on through social interactions to less experienced nurses as they mainly learned about infection control through 'on-the-job' training. Lack of supervision of less experienced nurses, and lack of monitoring infection control practice, other than hand hygiene and commode audits, may explain why variations in infection control practice were wide spread. These findings illustrate the importance of supporting and taking into account tacit and experiential knowledge when using strategies to try to close the research evidence-behaviour gap.

The findings from this study demonstrate the challenges that healthcare professionals faced with the implementation of infection control protocols and guidelines. It highlights the complexity of factors which may exist at the individual, team and organisational level, which may play a part in the gap between ideal and actual infection control practice. This myriad of inter-related factors were organised into four themes. These include ambiguity, organisational issues, perceptions of contamination and professional frustrations.

Ambiguity was identified as a major barrier affecting the implementation of protocols and guidelines. The theme of ambiguity illustrates how uncertainty flowed through a whole string of processes related to *Clostridium difficile* infection, from diagnosis to 'clearing' the patient. Examples were given by ward staff to illustrate how ambiguity had the potential to create delays in diagnosis, assessment, treatment and barrier nursing of patients. Difficulties with 'blending' explicit knowledge from protocols and guidelines with other types of tacit or experiential knowledge were illustrated. This suggests that awareness of protocol and guideline knowledge is not enough on its own to support its implementation in practice. The gaps in practice that resulted from ambiguity (for example the patient not being barrier nursed) could potentially increase the cross-contamination of *C.difficile* spores and spread *C.difficile* infection to vulnerable patients on the ward. Therefore understanding how these gaps develop by taking into account tacit understanding is important.

For some nurses and doctors anxiety about the risk to their own health and that of their families from exposure to *Clostridium difficile* infection appeared to be a motivating factor which influenced their implementation of infection control precautions. This was not the case with all staff as some nurses and doctors appeared to be more accepting of the consequences of infection. These differences may be due to the different ways that individuals were making sense of the infection risk. The influence of intuition in relation to physical and emotional cues also played an important role in the way that infection control precautions were put into practice and clean and dirty tasks were prioritised. Both

findings have important implications for how different strategies, including education and training, should be used when trying to close the evidence to practice gap.

The themes of professional frustrations and organisational issues illustrate how nurses struggled with caring for patients with *C.difficile* infection under the conditions in which they worked. These themes highlight how sense was being made about contextual issues, for example, resource and structural constraints, time constraints, competing priorities (privacy and dignity versus infection control), competing demands (patient care versus ward cleaning) and lack of organisational support. Structural constraints and a high profile government 'rule' on single gender wards often meant that single gender wards took precedent over infection control, whilst nurses made difficult decisions on bed allocation. Having to deal with these difficult decisions and demands took its toll on nurses' emotions, whilst they struggled to meet their obligations. Feeling overwhelmed with the new initiatives and changes to infection control practice often resulted in nurses and doctors struggling to keep up to date. The importance of infection control had to be juggled within the demands of their role against other competing priorities.

The findings suggest that common everyday work problems were frequently repeated as nurses and doctors struggled to do their best whilst dealing with constraints with their practice. Quick fixes, such as improvisation and 'work

arounds', were commonly used by staff to alleviate the difficulties they encountered. This meant that the underlying cause of the problem was often not brought to the surface. Lack of reflection and questioning of infection control practice were identified as important factors that were associated with problems not surfacing. Reasons nurses and doctors gave to justify lack of reflection or questioning of their own or others' behaviour included being rushing off their feet, working from task to task in order to 'get things done', seeing no point in raising difficulties as 'there was so much wrong', and an overwhelming perception of feeling powerless to change work conditions because it was perceived that 'nothing would be done' about concerns that were raised or formally reported. In general, there was an acceptance of these difficulties as an inevitable consequence of coping under the circumstances with the realities of practice on the ward. The findings from the study therefore highlight the importance of how sense is made of the local context and ward culture and the negative influence this can have on infection control practice and organisational learning. These difficulties may be difficult to change without a shift in the ward and organisational culture.

Some nurses said that they did reflect on their practice, often when they arrived home at the end of their shift, yet this made them feel worried that they had done everything they could have to protect their patients. Knowing that they were taking short cuts to deal with organisational constraints often made nurses feel anxious and worried about being blamed. Where nurses were concerned about fear of blame, they used the incident reporting system to 'cover themselves'. This system was used for issues such as being short staffed on a shift or where a

patient was placed on the open ward when no isolation cubicles were available. The incident reporting system appears to have become a common way of dealing with organisational constraints and a means of 'self-protection' rather than a tool to assist organisational learning from error. A cultural shift is therefore required from blaming individuals to an environment where learning from error is encouraged. This requires a balance between a blame-free environment to one where there are consequences for not following standard practice (Reason, 1998).

Study Limitations

The findings from this study are limited for several reasons. Firstly, the number of doctors included in the study was smaller compared with the number of nurses used. Only a small number of physiotherapists, phlebotomists and housekeeping staff were included. Less time was spent observing the physiotherapists, phlebotomists and housekeeping staff compared with nurses and doctors. Therefore this may have limited the insights that were gained. Future studies could include a larger sample from a wider range of professional groups to determine whether the findings from this study are relevant to them.

Secondly, this was an exploratory case study using one hospital ward, therefore the findings were not meant to be generalised to the wider population. In addition, the findings are contextually bound therefore these may be different in other hospitals depending on the context. The strength of this study was that a theoretically informed behavioural change framework (Michie *et al.*, 2005) was used with a qualitative design to help capture a wide range of factors influencing the use of infection control protocols and guidelines in practice.

Original Conceptual Contribution To Knowledge

This study makes a conceptual contribution to knowledge because it has identified certain factors which the behavioural framework developed by Michie *et al.* (2005) does not seem to take into account. Firstly, the findings demonstrate that healthcare professionals and other healthcare workers tended to privilege and prefer the use of tacit and experiential knowledge to guide and inform their infection control practice on the ward. They made sense of explicit knowledge from protocols and guidelines by using common sense, intuition and clinical experience, often taking into account contextual factors, such as social norms, preferences and organisational constraints. Nurses and doctors often recalled to memory simple ways of remembering infection control procedures by use of ‘rules of thumb’ and/or ‘mind lines.’ These ways of ‘knowing’ represent examples of mental short cuts, not necessarily linked to a protocol or guideline, which were used when deciding or reminding others how to act. Use of Michie *et al.*'s (2005) behavioural change framework was useful in that it enabled a comprehensive exploration of the difficulties associated with the implementation of infection control protocols and guidelines experienced by staff on the ward. However, this study has identified that the framework developed by Michie *et al.* (2005) only seems to take into account explicit (codified) knowledge that is available from protocols and guidelines. It does not seem to take into account tacit and experiential knowledge learned through communities of practice (Lave and Wenger, 1991), professional knowledge, clinical practice (Rycroft-Malone *et al.*, 2004) or how sense is made of information from the local context.

Secondly, the framework developed by Michie *et al.* (2005) does not seem to consider the process of reflection as part of learning (Kuiper, 1999; Kuiper and Pesut, 2004). Extending Michie *et al.*'s (2005) behavioural framework to include these concepts would help to capture important potential barriers that may influence the use of protocols and guidelines that are currently missing.

Original Empirical Contribution to Knowledge

The study findings highlight the complexity surrounding the implementation of infection control protocols and guidelines and the various inter-related barriers that influenced infection control practice. The findings highlight the unrealistic conflicting priorities that nurses were expected to meet (single gender wards versus infection control). Nurses were expected to isolate or cohort patients known or suspected of having *C.difficile* infection but often this did not happen because of a government rule which required different genders to be kept separate. Conflicting priorities in relation to trying to maintain privacy and dignity by use of single gender wards and trying to prevent and manage infection by the use of infection control protocols and guidelines is a new finding and a new empirical contribution to knowledge.

This is the first study to shed light on the difficulties that nurses and doctors experienced with ambiguity and the treatment and care of patients with *C.difficile* infection. It highlights the uncertainty that occurred when nurses and doctors

made decisions as to when to start or cease barrier nursing patients. It shed light on the uncertainty that was experienced regarding when to cease barrier nursing patients suspected of being a carrier for *C.difficile* infection. The findings for the first time illuminate the dissonance that nurses experienced when patients with *Clostridium difficile* infection were moved from an isolation cubicle and nursed on the open ward.

The findings from the current study highlight nurses' perceptions of the difficulties they faced with balancing ward cleaning duties with patient care, which is a new finding. These findings illustrate that unclear responsibilities, government messages about infection control being 'everybody's business' (Department of Health, 2004b, 2008b) and feeling overwhelmed all contributed to some cleaning tasks not being consistently undertaken and infection control practice becoming fragmented.

The findings from this study extend our knowledge relating to the use of infection control protocols and guidelines in two areas. Firstly, few studies were identified that explained the factors that nurses and doctors take into account when assessing the risk from healthcare-associated infection. The findings from the current study identified a range of factors that were considered when nurses and doctors assessed the risk to themselves and to ward patients from *C.difficile* infection.

Secondly, the findings expand our knowledge relating to emotion and how this influences the way that infection control protocols and guidelines are implemented, particularly relating to visible or perceived dirt and how this is associated with disgust and the threat of contracting infection.

Recommendations

This study has illuminated the perceptions and experiences of hospital staff working on one acute ward within an NHS hospital, concerning their implementation of protocols and guidelines to prevent and control *Clostridium difficile* infection. Based on the findings of this study, recommendations are suggested for further research, practice, education and policy.

Further Research

This study has demonstrated nurses and doctors drawing upon tacit and experiential knowledge to inform their infection control practice and how they make sense of information from their context. The findings suggest that individuals may not always reflect on this knowledge or on the difficulties they experience as part of this process. Furthermore, the findings suggest that there may be difficulties blending explicit knowledge with tacit and experiential knowledge. Further research could focus on providing a better understanding of how nurses and doctors reflect on their practice and how mixing explicit knowledge (standards and best practice recommendations laid down in protocols and guidelines) with tacit and experiential knowledge can be used to close the evidence-practice gap. One way of doing this could be to use facilitation. The use of a skilled facilitator has been used to explore the complexity of implementing protocols and guidelines at the individual, team and organisational level using the PARIHS framework with urinary incontinence (Seers *et al.*, 2012).

Further research could use this framework and apply it to the management of healthcare-associated infection.

The findings identified important barriers and facilitating factors that were seen to be influencing the use of protocols and guidelines in practice. These include individual factors such as detachment and lack of accountability (moral and professional obligation), ambiguity, emotion, risk perception, reflection and the ability to voice concerns, team factors (role modelling, collaboration) and organisational factors (spatial and structural constraints, resource constraints, diffusion of responsibilities, organisational support, competing goals and organisational feedback). Taking these factors into account is important if we are to try to close any potential gaps that exist between actual and ideal infection control practice. Further research could be carried out using these barriers to design a behavioural change intervention using a behavioural theory (Michie, 2011) to improve the use of infection control protocols and guidelines into practice.

The findings from this study demonstrate examples of how nurses and doctors make sense of the local context and ward culture when applying their tacit and explicit infection control knowledge into practice. They often devised solutions to deal with the contextual difficulties they faced, such as being short staffed, having an inappropriate nursing skill mix, lacking time, competing priorities, having to deal with defective facilities within isolation cubicles, insufficient

equipment and lack of patient supplies. This often meant that infection control protocols and guidelines would be ‘worked around’, often as a coping strategy. Contextual factors influencing ‘work arounds’ may be shaped by organisational culture such as leadership, organisational commitment and trust, organisational support and communication. Future interventions seeking to strengthen context within hospitals could consider how these factors at the wider hospital level may influence individual and team behaviour relating to infection control at the ward level (Schultz and Kitson, 2010).

The findings illustrate the difficulties that nurses and doctors experienced with communication. Further research could explore how these difficulties could be minimised and communication between nurse-nurse, nurse-doctor and nurse-housekeeper may be improved relating to the management of healthcare-associated infection.

Practice Implications

The study findings suggest that some nurses and doctors perceived the lack of induction, training, and attendance at meetings as barriers to ‘knowing’ about protocols and guidelines. It is recommended that nurses and doctors be given time to complete training/refresher courses relating to infection control. In order for nurses and doctors to be encouraged to read and implement protocols and guidelines on the ward a culture shift is needed to allow this to happen, for

example, by encouraging nurses to read protocols at the nurses' station. By encouraging and emphasising the importance that ward managers and consultants place on the use of protocols and guidelines this would help to instil their commitment to the use of protocols and guidelines as an important means of improving patient care.

The study findings highlight the reactive nature of reminders that were used by ward managers to keep behaviour aligned with protocols, which usually occurred following an outbreak of *C.difficile*. Feedback from hand hygiene, commode audits and the incidences of *C.difficile* infection on the ward was lacking. A review of studies by the Cochrane data base (Gould *et al.*, 2011; Jamtvedt *et al.*, 2006) indicates that for audit, feedback and reminders to be successful these need to be implemented consistently. It is recommended that ward managers and consultants provide frequent reminders to their teams about implementing infection control protocols and give regular feedback on team performance in terms of the ward level of *C.difficile* infection. In addition to hand hygiene and commode audits, it is recommended that additional frequent monitoring of infection control practice is carried out. This could include audits relating to use of isolation cubicles, barrier nursing practices including cohorting and ward cleaning.

Nurses and doctors are responsible for the decisions they make and where these differ from protocols they could be held accountable (Department of Health,

2009b; Hewitt-Taylor, 2004). The findings indicate that some nurses were concerned about blame and the legal consequences of 'working around' protocols which was a reality on the ward due to the constraints on their practice. It is recommended that nurses and doctors are encouraged to document any deviation from standards and best practice, for example, in patient notes and monitoring records such as cleaning schedules. This would assist by providing an audit trail in the event of any criticism or legal action. Monitoring and reviewing the recorded deviations from standard practice will assist ward managers to identify problem areas so that solutions can be prioritised.

The study findings have brought to light the difficulties that ward staff faced with trying to prevent and control *Clostridium difficile* infection with significant resource constraints. The Department of Health document *A Matron's Charter: An action plan for cleaner hospitals* (2004a) sets out ten broad commitments that should be adopted by all staff with the NHS. One of those commitments is that "*sufficient resources will be dedicated to keeping hospitals clean*" (p.3). The study findings highlight that because stocks of supplies were kept so low and lines of responsibility were unclear, nurses sometimes experienced extreme difficulties with caring for patients. It is recommended that ward managers ensure that clear lines of responsibilities are provided to nurses and ward cleaners to enable them to ensure that stock levels remain adequate for infection control practice. This may assist by preventing the diffusion of responsibilities by making individuals clearly accountable for certain tasks.

The findings suggest that infection control practice was fragmented possibly because staff were overwhelmed with the constant changes to their practice and the stream of infection control initiatives that were being introduced. Greenhalgh *et al.* (2004) carried out an extensive review of how innovations are spread within healthcare organisations. The authors identify certain factors that need to be taken into account when considering a new intervention. This includes, for example, an organisation's readiness for change, a receptive context for change, the use of champions, and the ability to assimilate information. It is recommended that these factors be taken into account when introducing new infection control initiatives on the ward.

Education Implications

The study findings illustrate that the implementation of standards and best practice recommendations laid down in infection control protocols and guidelines can be influenced by the perceived consequences of infection. For example, anxiety about the consequences seemed to be a motivating factor to implement infection control precautions and/or take extra precautions to avoid the threat of *C.difficile* infection for some nurses and doctors. Whereas other nurses and doctors seemed more accepting of the consequences for various reasons. Physical cues (for example, visible blood, skin) and emotional cues (fear, disgust) seemed to play an important role in the way that infection control precautions were put into practice and clean and dirty tasks were prioritised. It is recommended that these factors are taken into consideration when designing education and training strategies to

assist with closing the evidence to practice gap. This means that different strategies may need to be used for different groups of individuals depending on their perceptions of risk.

The study findings illustrate the impact that the behaviour of senior nurses and doctors had on others, such as junior staff and ancillary staff. For example, where a junior nurse or doctor perceived that his/her peers did not value a particular behaviour (for example because they did not implement the behaviour themselves), their own commitment to the implementation of the behaviour could be eroded. It is recommended that the importance of being a role model forms part of nurses and doctors leadership education, for example, forming part of a national curriculum. This could be re-enforced by including it as part of on-going hospital infection control training. It is unlikely that junior staff will value or adopt the required attitudes and behaviours unless they see their peers and senior staff adopting and modelling them. This highlights the importance of context and organisational culture and the influence this can have on infection control practice.

Policy Implications

The study findings illustrate how nurses did not implement the infection control policy relating to cohorting patients with known or suspected *C.difficile* infection (Department of Health, 2009a). By meeting this recommendation nurses

perceived that they would contravene a Government 'rule' about keeping different sexes apart to maintain the privacy and dignity of patients (Department of Health, 2009b). Nurses experienced tension in trying to meet these two objectives due to structural and design constraints in relation to the ward layout. As a result single gender wards would often take priority over preventing the spread of infection.

A Government document that relates to Privacy and Dignity (Department of Health, 2007b) acknowledges that separating the sexes may not always be possible, because of the design of many hospitals based on open wards. It suggests that mixed sex accommodation needs to be eliminated in all but the most unusual circumstances. The findings from the current study highlights that the need to cohort patients with a healthcare-infection is not an unusual circumstance; rather it can be a frequent requirement due to the incidence of *C.difficile* infection on the ward. It is recommended that patients with known or suspected *C.difficile* infection are cohorted. To deal with the issue of privacy versus dignity the Department of Health (2007b) guidelines should be followed. As a short term goal, the Department of Health (2007b) recommend that where different genders have to be mixed, curtains are used to protect patients' privacy, and patients, relatives and visitors are reassured that the best solution is being taken. Secondly, effort is made to ensure nurses remain present on mixed wards, and thirdly all episodes of mixing are recorded in patients' notes. As a long-term goal, this difficulty may be alleviated in the future as hospitals are designed with more isolation cubicles.

Concluding Remarks

This study has identified a myriad of complex inter-related factors that may influence how infection control protocols and guidelines are implemented on a hospital ward relating to the prevention and control of *Clostridium difficile* infection. Patients who are admitted to hospital do not expect to be harmed by an infection that they have contracted either from the hospital environment or as part of their treatment and care. Implementing the recommendations from this study would therefore be an important contribution to the management of healthcare associated infection and thus patient safety.

References

Aboelela, S.W., Stone, P.W. and Larson, E.L. (2007). Effectiveness of bundled behavioural interventions to control healthcare-associated infections: a systematic review of the literature. *Journal of Hospital Infection*, 66:101-108.

Adams, J. (1995). *Risk*. London: UCL Press Ltd.

Afif, W., Huor, P., Brassard, P. and Loo, V.G. (2002). Compliance with methicillin resistant *Staphylococcus aureus* precautions in a teaching hospital. *Am J Infect Control*, 30: 430-433.

Agency for Health Research and Quality. (2001). *Translating Research into Practice II (TRIPII)*. Washington D.C: Agency for Health Research and Quality.

Ajzen, I. (1985). From intentions to actions: A theory of planned behaviour. In: Kuhl, J. and Beckmann, J. (Eds.). *Action Control: From Cognitions to Behavior*, New York: Springer-Verlag, (pp. 11-39).

Ajzen, I. (1991). The theory of planned behaviour. *Organizational Behavior and Human Decision Processes*, 50: 179-211.

Ajzen, I. and Fishbein, M. (1980). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, New Jersey: Prentice-Hall.

Ajzen, I. and Madden, T.J. (1986). Prediction of goal-directed behaviour: attitudes, intentions and perceived behavioural control. *Journal of Experimental Social Psychology*, 22: 453-474.

Albarracin, D., Johnson, B.T., Fishbein, M. and Muellerleile, P.A. (2001). Theories of reasoned action and planned behaviour as models of condom use: A meta-analysis. *Psychological Bulletin*, 127: 142-161.

Alex, L. and Hammarström, A. (2008). Shift in power during an interview situation: methodological reflections inspired by Foucault and Bourdieu. *Nursing Inquiry*, 15(2): 169-176.

Allegranzi, B., Bagheri Nejad, S., Combescure, C., Graafmans, W., Attar, H., Donaldson, L. and Pittet, D. (2011). Burden of endemic health-care-associated infection in developing countries: systematic review and meta-analysis. *The Lancet*, 377, (9761): 228-241.

Allegranzi, B. and Pittet, D. (2009). Role of hand hygiene in healthcare-associated infection prevention. *Journal of Hospital Infection*, 73 (4): 305-315.

Allen, G. (2004). Ethnomethodological insights into insider-outsider relationships in nursing ethnographies of healthcare settings. *Nursing Inquiry*, 11(1): 14-24.

Amalberti, R., Vincent, C., Auroy, Y. and de Saint Maurice, G. (2006). Violations and migrations in health care: a framework for understanding and management. *Qual. Saf. Health Care*, 15: 66-71.

Argyris, C. and Schon, D. (1978). *Organizational learning*. Reading, M.A: Addison-Wesley.

Armitage, C.J. and Conner, M. (2001). Efficacy of the theory of planned behaviour: a meta-analytic review. *Br J Soc Psychol*, 40: 471-479.

Armstrong, R., Waters, E., Dobbins, M., Lavis, J.N., Petticrew, M., Christensen, R. (2011). Knowledge translation strategies for facilitating evidence informed public health decision making among managers and policy-makers (Protocol). *Cochrane Database of Systematic Reviews*, (6).

Ashforth, B.E. and Kreiner, G.E. (1999). ‘How can you do it?’: Dirty work and the challenge of constructing a positive identity. *Academy of Management Review*, 24 (3): 413-434.

Austin, W., Bergum, V. and Goldberg, L. (2003). Unable to answer the call of our patients: mental health nurses’ experience of moral distress. *Nursing Inquiry*, 10 (3): 177-183.

Baird, D. R., Henry, M., Liddell, K. G., Mitchell, C. M. and Sneddon, J. G. (2001). Post-operative endophthalmitis: the application of hazard analysis critical control points (HACCP) to an infection control problem. *Journal of Hospital Infection*, 49 (1): 14-22.

Baker, G. R., Norton, P. G., Flintoft, V., Blais, R., Brown, A., Cox, J., Etchells, E., Ghali, W. A., Hebert, P., Majumdar, S. R., O’Beirne, M., Palacios-Derflingher, L., Reid, R. J., Sheps, S. and Tamblyn, R. (2004). The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *Canadian Medical Association Journal*, 170 (11): 1678-1686.

Bandura, A. (1977). Self-Efficacy: Toward a Unifying Theory of Behavioural Change. *Psychology Review*, 84: 191-215.

Bandura, A. (1982). Self-efficacy mechanism in human agency. *American Psychologist*, 37: 122-147.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, New Jersey: Prentice-Hall.

Banfield, K.R. and Kerr, K.G. (2005). Could hospital patients’ hands constitute a missing link? *Journal of Hospital Infection*, 61: 183-188.

Barbut, F., Mastrantonio, P., Delmée, M., Brazier, J., Kuijper, E. and Poxton, I. European Study Group on *Clostridium difficile* (ESGCD). (2007). Prospective study of *Clostridium difficile* infections in Europe with phenotypic and genotypic characterisation of the isolates. *Clin Microbiol Infect*, 13 (11): 1048-1057.

Barbut, F., Richard, A., Hamadi, K., Chomette, V., Burghoffer, B. and Petit, J. C. (2000). Epidemiology of recurrences or reinfections of *Clostridium difficile*-associated diarrhea. *Journal of Clinical Microbiology*, 38 (6): 2386-2388.

Bargh, J. A. and Ferguson, M. J. (2000). Beyond behaviorism: On the automaticity of higher mental processes. *Psychological Bulletin*, 126: 925-945.

Barlow, G., Sachdev, N. and Nathwani, D. (2002). The use of adult isolation facilities in a UK infectious diseases unit. *Journal of Hospital Infection*, 50.

Barter, C. and Renold, E. (1999). The Use of Vignettes in Social Research. *Social Research Update Issue 25*, Department of Sociology, University of Surrey. Accessed online on 5th January 2009 at <http://sru.soc.surrey.ac.uk/SRU25.html>

Barter, C. and Renold, E. (2000). I wanna tell you a story: exploring the application of vignettes in qualitative research with children and young people. *International Journal of Social Research Methodology*, 3(4): 307-323.

Bateson, G. (1972). *Steps toward an ecology of mind*. S.Albany, Australia: Paladin.

Bauer, M.P., Notermans, D.W., van Benthem, B.H.B., Brazier, J.S., Wilcox, M.H., Rupnik, M., Monnet, D.L., van-Dissel, J.T. and Kuijper, E.J. for the ECDIS Study Group. (2011). *Clostridium difficile* infection in Europe: a hospital-based survey Source: *The Lancet*, 377 (9759): 63-73.

Bazeley, P. (2007). *Qualitative data analysis with NVivo*. London: Sage Publications.

Behi R. (1995). The individuals right to informed consent. *Nurse Researcher*, 3: 14-23.

Belk, R.W., Sherry, J.F. and Wallendorf, M. (1988). A Naturalistic Inquiry into Buyer and Seller Behavior at a Swap Meet. *Journal of Consumer Research*, 14: 449-470.

Benenson AS. (1995). *Control of communicable diseases manual*. (16th ed.) Washington: American Public Health Association. In: World Health Organization (Eds.). (2002) *Prevention of hospital-acquired infections. A practical guide*. (2nd ed.), (pp. 1). Accessed online on 16th February 2009 at <http://www.who.int/csr/resources/publications/whocdscsreph200212.pdf>

Berhe, M., Edmond, M.B. and Bearman, G. (2005). Practices and an assessment of health care workers' perceptions of compliance with infection control knowledge of nosocomial infections. *Am J Infect Control*, 33: 55-7.

Best, E. L., Fawley, W. N., Parnell, P. and Wilcox, M. H. (2010). The Potential for Airborne Dispersal of *Clostridium difficile* from Symptomatic Patients. *Clinical Infectious Diseases*, 50 (11): 1450-1457.

Best, E. L., Sandoe, J. A. T. and Wilcox, M. H. (2012). Potential for aerosolization of *Clostridium difficile* after flushing toilets: the role of toilet lids in reducing environmental contamination risk. *Journal of Hospital Infection*, 80 (1): 1-5.

Bick, D. and Rycroft-Malone, J. (2010). Limited literature available regarding the role of nurses, midwives and health visitors in development and implementation of protocol-based care. *Evidence-Based Nursing*, 13 (4): 114-115.

Bion, J.F., Abrusci, T. and Hibbert, P. (2010). Human factors in the management of the critically ill patient. *British Journal of Anaesthesia*, 105 (1): 26-33.

Bonner, A. and Tolhurst, G. (2002). Insider-outsider perspectives of participant observation. *Nurse Researcher*, 9: 7-19.

Boyce, J. M., Ligi, C., Kohan, C., Dumigan, D. and Havill, N. L. (2006). Lack of association between the increased incidence of *Clostridium difficile*-associated disease and the increasing use of alcohol-based hand rubs. *Infection Control and Hospital Epidemiology*, 27.

Bradley, E.H., Curry, L.A, and Devers, K.J. (2006). Qualitative data analysis for health services research: developing taxonomy, themes and theory. *Health Services Research*, 42 (4): 1758-1772.

Brasel, K. J., Layde, P. M. and Hargarten, S. (2000). Evaluation of error in medicine: Application of a public health model. *Academic Emergency Medicine*, 7 (11): 1298-1302.

British Medical Association. (2011). The psychological and social needs of patients. Accessed online on 25th February 2012 at <http://www.scribd.com/doc/94820870/BMA-psychologicalsocialneedsofpatients-tcm41-202964>

British Standard (BS 18001 OHAS:2007). *Occupational Health and Safety Management Systems Requirements Standard*. Accessed online on 27th February 2009 at <http://www.bsi-global.com/en/>

- Brooks, S., Khan, A., Stoica, D., Griffith, J., Friedeman, L., Mukherji, R., Hameed, R. and Schupf, N. (1998). Reduction in vancomycin-resistant Enterococcus and *Clostridium difficile* infections following change to tympanic thermometers. *Infection Control and Hospital Epidemiology*, 19 (5): 333-336.
- Brown, S.M., Lubimova, A.V., Khrustalyeva, N.M., Shulaeva, S.V., Tekhova, I., Zueva, L.P., Goldmann, D., O'Rourke, E.J. (2003). Use of an alcohol-based hand rub and quality improvement interventions to improve hand hygiene in a Russian neonatal intensive care unit. *Infect Control Hosp Epidemiol*, 24 (3): 172-179.
- Bryman, A. (2008). *Social Research Methods*. (3rd ed.). Oxford: Oxford University Press.
- Burgess, R. G. (1984). *In the field: An introduction to field research*. London and New York: Routledge.
- Burnett, E., Lee, K. and Kydd, P. (2008). Hand Hygiene: What about our patients? *British Journal of Infection Control*, 9 (1): 19-24.
- Busby, A. (2011). "You're not going to write about that are you?": what methodological issues arise when doing ethnography in an elite political setting? *Sussex European Institute, University of Sussex, SEI Working Paper No 12*. Accessed online on 30th August 2012 at <http://www.sussex.ac.uk/profiles/187143>
- Cabana, M.D., Rand, C.S., Powe, N.R., Wu, A.W., Wilson, M.H., Abboud, P.C. and Rubin, H.R. (1999). Why Don't Physicians Follow Clinical Practice Guidelines? *JAMA*, 282 (15): 1458-1465.
- Calkin, S. (2012). *Nurses left to fill gaps in cleaning*. *Nursing Times*, 4th September, 2012. Accessed on 15th October, 2012 at <http://www.nursingtimes.net/nursing-practice/clinical-zones/infection-control/nurses-left-to-fill-gaps-in-cleaning/5048827.article>
- Campbell, D. (2012). Cameras to monitor hospital staff, *The Guardian*, 8th May 2012. Accessed online on 10th July 2012 at <http://www.guardian.co.uk/society/2012/may/08/cameras-monitor-hospital-staff>
- Carayon, P., Schoofs Hundt, A., Karsh, B-T., Gurses, A.P., Alvarado, C.J., Smith, M. and Flatley Brennan, P. (2006). Work system design for patient safety: the SEIPS model. *Qual Saf Health Care*, 15 (Suppl 1):i50-i58.
- Card, A.J. (2012). Successful risk assessment may not always lead to successful risk control: A systematic review of risk control after root cause analysis. *American Society for Healthcare Risk Management*, 31 (3): 6-12.

Carlet, J., Astagneau, P., Brun-Buisson, C., Coignard, B., Salomon, V., Tran, B., Desenclos, J.-C., Jarlier, V., Schlemmer, B., Parneix, P., Regnier, B., Fabry, J. and Coopersmith, C.M., Rebmann, T.L., Zack, J.E., Ward, M.R., Corcoran, R.M., Schallom, M.E., Sona, C.S., Buchman, T.G., Boyle, W.A., Polish, L.B., Fraser, V.J. (2002). Effect of an education program on decreasing catheter-related bloodstream infections in the surgical intensive care unit. *Crit Care Med*, 30: 59-64.

Carlet, J., Astagneau, P., Brun-Buisson, C., Coignard, B., Salomon, V., Tran, B., Desenclos, J.C., Jarlier, V., Schlemmer, B., Parneix, P., Regnier, B., Fabry, J. French National Program for Prevention of Healthcare-Associated Infections and Antimicrobial Resistance. (2009). French National Program for Prevention of Healthcare-Associated Infections and Antimicrobial Resistance, 1992-2008: Positive Trends, But Perseverance Needed. *Infection Control and Hospital Epidemiology*, 30 (8): 737-745.

Carter, S.M. and Little, M. (2007). Justifying Knowledge, Justifying Method, Taking Action: Epistemologies, Methodologies, and Methods in Qualitative Research. *Qual Health Res*, 17(10): 1316-1328.

Caulkin, S. (2003). Who's in charge here? No one. *The Observer*. 27th April. Accessed online on 17th July 2012 at <http://www.guardian.co.uk/business/2003/apr/27/theobserver.observerbusiness7>

Cheater, F., Baker, R., Gillies, C., Hearnshaw, H., Flottorp, S., Robertson, N., Shaw, E.J. and Oxman, A.D. (2005). Tailored interventions to overcome identified barriers to change: effects on professional practice and health care outcomes. *Cochrane Database of Systematic Reviews*, (3). (Re-published 2009).

Clifford, J. and Thorpe, S. (2007). More ways than one . . . exploring the use of different learning methods in organizations. *Industrial and Commercial Training*, 39 (5): 267-271.

Coello, R., Brannigan, E., Lawson, W., Wickens, H. and Holmes, A. (2011). Prevalence of healthcare device-associated infection using point prevalence surveys of antimicrobial prescribing and existing electronic data. *Journal of Hospital Infection*, 78 (4): 264-268.

Coffey, A. (1999). *The ethnographic self: Fieldwork and the representation of identity*. London: Sage Publications.

Cohen, A. and Court, D. (2003). Ethnography and case study: a comparative analysis. *Academic Exchange Quarterly*, 7 (3): 283-287.

Cohen, D.J. and Crabtree, B.F. (2008). Evaluative Criteria for Qualitative Research in Health Care: Controversies and Recommendations. *Ann Fam Med*, 6 (4): 331-339.

Coia, J. E., Duckworth, G.J., Edwards, D.I., Farrington, M., Fry, C. Humphreys, H., C. Mallaghan, C., Tucker, D.R. and for the Joint Working Party of the British Society of Antimicrobial Chemotherapy, the Hospital Infection Society, and the Infection Control Nurses Association. (2006). Guidelines for the control and prevention of meticillin-resistant *Staphylococcus aureus* (MRSA) in healthcare facilities. *Journal of Hospital Infection*, 63 (1): 1-44.

Colla, J. B., Bracken, A. C., Kinney, L. M. and Weeks, W. B. (2005). Measuring patient safety climate: a review of surveys. *Quality and Safety in Health Care*, 14.

Collins English Dictionary and Thesaurus. (2000). (2nd ed.). England: HarperCollins.

Conner, M. and Abraham, C. (2001). Conscientiousness and the Theory of Planned Behaviour: Toward a More Complete Model of the Antecedents of Intentions and Behaviour. *Pers Soc Psychol Bull*, 27 (11): 1547-1561.

Conner, M. and Armitage, C.J. (1998). Extending the theory of planned behaviour: A review and avenues for further research. *Journal of Applied Social Psychology*, 28: 1429-1464.

Conner, M. and Norman, P. (1995). The role of social cognition in health behaviours. In: Conner, M. and Norman, P. (Eds.). *Predicting Health Behaviour. Research and Practice with Social Cognition Models*. Buckingham, United Kingdom: Open University, (pp. 1-22).

Conner, M., Povey, R., Sparks, P., James, R. and Shepherd, R. (2003). Moderating the role of attitude ambivalence within the theory of planned behaviour. *British Journal of Social Psychology*, 42 :75-94.

Cook, S.D.N. and Brown, J.S. (1999). Bridging Epistemologies: The generative dance between Organizational knowledge and organizational knowing. *Organizational Science*. 10 (4): 381-400.

Coopersmith, C.M., Rebmann, T.L., Zack, J.E., Ward, M.R., Corcoran, R.M., Schallom, M.E., Sona, C.S., Buchman, T.G., Boyle, W.A., Polish, L.B. and Fraser, V.J. (2002). Effect of an education program on decreasing catheter-related bloodstream infections in the surgical intensive care unit. *Crit Care Med*, 30 (1):59-64.

Coopersmith, C.M., Zack, J.E., Ward, M.R., Sona, C.S., Schallom, M.E., Everett, S.J., Huey, W.Y, Garrison, T.M., McDonald, J., Buchman, T.G., Boyle, W.A., Fraser, V.J., Polish, L.B. (2004). The impact of bedside behaviour on catheter related bacteraemia in the intensive care unit. *Arch Surg*, 139 (2): 131-136.

- Crawford, P., Brown, B., Nerlich, B. and Koteyko, N. (2008). The 'moral careers' of microbes and the rise of the matrons: An analysis of UK national press coverage of methicillin-resistant *Staphylococcus aureus* (MRSA) 1995-2006. *Health Risk and Society*, 10 (4): 331-347.
- Creswell, J.W. (1998). *Qualitative Inquiry and Research Design. Choosing Among Five Traditions*. London: Sage Publications.
- Cullen, Hon Lord. (1990). *The Public Inquiry into the Piper Disaster*. Department of Energy, HMSO, London.
- Curtis, V., Aunger, R., Rabie, T. (2004). Evidence that disgust evolved to protect from risk of disease, *Proc R Soc B*, 271: S131-133.
- Curtis, V. and Biran, A. (2001). Dirt, disgust, and disease: is hygiene in our genes? *Perspectives in Biology and Medicine*, 44: 17-31.
- Curtis, V., de Barra, M. and Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour, *Phil. Trans. R. Soc. B*, 366: 389-401.
- Daly, J., Willis, K., Small, R., Green, J., Welsh, N., Kealy, M. and Hughes, E. (2007). A hierarchy of evidence for accessing qualitative health research. *J Clin Epidemiol*, 60: 43-49.
- Damji, S., Barlow, G.D., Patterson, L. and Nathwani, D. (2005). An audit of the use of isolation facilities in a UK National Health Service trust. *Journal of Hospital Infection*, 60: 213-217.
- Davies, P., Walker, A.E. and Grimshaw, J.M. (2010). A systematic review of the use of theory in the design of guideline dissemination and implementation strategies and interpretation of the results of rigorous evaluations. *Implementation Science*, 5: 14.
- Davis, D.D. and Taylor-Vaisey, A. (1997). Translating Guidelines into Practice: A systematic review of theoretic concepts, practical experience and research evidence in the adoption of clinical practice guidelines. *Can Med Assoc J*, 157: 408-16.
- Dawson, S. J. (2003). The role of the infection control link nurse, *Journal of Hospital Infection*, 54 (4): 251-257.
- Dekker, S. (2002). *The Field Guide to Human Error Investigations*. (Aldershot): Ashgate.
- Deming, W.F. (2000). *Out of the Crisis*. (2nd ed.). Cambridge, MA: MIT Press.

- Denscombe, M. (2003). *The Good Research Guide*. (2nd ed.). England: Open University Press.
- Denzin, N.K. (1970). *The research act: A theoretical introduction to sociological methods*. Chicago: Aldine.
- Denzin, N. K. and Lincoln, Y. S. (2000). *Handbook of Qualitative Research*. (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Denzin, N. K. and Lincoln, Y. S. (2005). Methods of collecting and analyzing empirical materials. In: Denzin, N.K. and Lincoln, Y.S. (Eds.). *The SAGE handbook of qualitative research*. (3rd ed.). Thousand Oaks: CA: Sage Publications, (pp. 641-649).
- Department of Health. (2000a). *Working in partnership: developing a whole systems approach. Good practice guide*. London: Department of Health.
- Department of Health. (2000b). *An organisation with a memory*. London: Department of Health.
- Department of Health. (2001a). Learning from Bristol. *The report of the public inquiry into children's heart surgery at the Bristol Royal Infirmary, 1984-1995*.(Cm 5363). London: Department of Health.
- Department of Health. (2001b). The epic project: developing national evidence-based guidelines for preventing healthcare association infections phase 1: guidelines for preventing hospital-acquired infections. *Journal of Hospital Infection*, 47 (Supplement): S13-19.
- Department of Health. (2001c). Health Service Circular HSC2001/010. *Implementing the NHS plan: Modern Matrons*. London: Department of Health.
- Department of Health. (2003). *Winning Ways: Working together to reduce Healthcare Associated Infection in England*. London: Department of Health.
- Department of Health. (2004a). *A Matron's Charter: An Action Plan for Cleaner Hospitals*. London: Department of Health.
- Department of Health. (2004b). *Towards Cleaner Hospitals and Lower Rates of Infection: a Summary of Action*. London: Department of Health.
- Department of Health. (2006). *The Health Act 2006: Code of Practice for health and adult social care on the Prevention and Control of Health Care Associated Infections*. London: Department of Health.

Department of Health. (2007a). *High Impact Intervention No 7. Care bundle to reduce the risk from Clostridium difficile*. Accessed online on 29th May 2012 at http://www.sussexcritcare.nhs.uk/profclinical/carebundles/documents/DH_7CarebundletoreducetheriskfromClostridiumdifficile.pdf

Department of Health. (2007b). *Privacy and dignity -A report by the Chief Nursing Officer into mixed sex accommodation in hospitals*. London: Department of Health.

Department of Health. (2008a). *Board to Ward how to embed a culture of HCAI prevention in acute trusts*. London: Department of Health.

Department of Health. (2008b). *Clean, safe care. Reducing infections and saving lives*. London: Department of Health.

Department of Health. (2009a). *Clostridium difficile infection: How to deal with the problem*. London: Department of Health.

Department of Health. (2009b). *The Health and Social Care Act 2008. Code of Practice for health and adult social care on the prevention and control of infections and related guidance*. London: Department of Health.

Department of Health. (2009c). *Putting an end to mixed sex hospital accommodation*. London: Department of Health.

Department of Health. (2010). *Health and Social Care Act (Regulated Activities) Regulations*, London: HMSO.

Department of Health. (2012). *Updated guidance on the diagnosis and reporting of Clostridium difficile*. London: Department of Health.

Department of Health, Social Services and Public Safety. (2010). *Controls Assurance in Infection Control*. Accessed online on 18th May 2012 at http://www.dhsspsni.gov.uk/changing_the_culture.pdf

de Vries, E. N., Ramrattan, M. A., Smorenburg, S. M., Gouma, D. J. and Boermeester, M. A. (2008). The incidence and nature of in-hospital adverse events: a systematic review. *Qual. Saf. Health Care*, 17: 216-223.

Dixon-Woods, M., Suokas, A., Pitchforth, E. and Tarrant, C. (2009). An ethnographic study of classifying and accounting for risk at the sharp end of medical wards. *Social Science and Medicine*, 69.

Doherty, C. and Stavropoulou, C. (2012). Patients' willingness and ability to participate actively in the reduction of clinical errors: A systematic literature review. *Social Science and Medicine*, In Press.

Doherty, T., Thomas, T., Walsh, J., Moore, J., Morris-Downes, M., Smyth, E.G. and Humphreys, H. (2007). Isolation facilities for patients with methicillin resistant *Staphylococcus aureus* (MRSA): how adequate are they? *Journal of Hospital Infection*, 65 (3): 274-275.

Dorn, S. D. (2009). *Clostridium difficile* Colitis in a Health Care Worker: Case Report and Review of the Literature. *Digestive Diseases and Sciences*, 54: 178-180.

Douglas M. (1966). *Purity and danger: an analysis of the concepts of pollution and taboo*. London: Routledge and Kegan Paul.

Douglas M. (1985). *Risk acceptability according to the social sciences*. London: Routledge and Kegan Paul.

Drennan D. (1992). *Transforming Company Culture*. McGraw-Hill, London

Dreyfus, H.L. and Dreyfus, S.E. (1986). *Mind over machine: The power of human intuition and expertise in the era of the computer*. Oxford: Basil Blackwell.

Dubberke, E. R., Reske, K. A., Noble-Wang, J., Thompson, A., Killgore, G., Mayfield, J., Camins, B., Woeltje, K., McDonald, J. R., McDonald, L. C. and Fraser, V. J. (2007). Prevalence of *Clostridium difficile* environmental contamination and strain variability in multiple health care facilities. *American Journal of Infection Control*, 35 (5) 315-318.

Ducel, G., Fabry, J. and Nicolle, L. (2002). *Guide pratique pour la lutte contre l'infection hospitalière*. In: World Health Organization. (Eds.) (2002). *Prevention of hospital-acquired infections. A practical guide*. (2nd ed.), (pp.1). Accessed online on 16th February 2009 at <http://www.who.int/csr/resources/publications/whocdscsreph200212.pdf>

Duerden, B. (2007). Confronting infection in the English National Health Service. *Journal of Hospital Infection*, 65 (S2): 23-26.

Dumford, D. M., III, Nerandzic, M. M., Eckstein, B. C. and Donskey, C. J. (2009). What is on that keyboard? Detecting hidden environmental reservoirs of *Clostridium difficile* during an outbreak associated with North American pulsed-field gel electrophoresis type I strains. *American Journal of Infection Control*, 37 (1): 15-19.

Duncan, E. and Nicol, M. (2004). Subtle Realism and Occupational Therapy: an Alternative Approach to Knowledge Generation and Evaluation. *British Journal of Occupational Therapy*, 67 (10): 453-456.

Durlach, R., McIlvenny, G., Newcombe, R. G., Reid, G., Doherty, L., Freuler, C., Rodriguez, V., Duse, A. G. and Smyth, E. T. M. (2012). Prevalence survey of healthcare-associated infections in Argentina; comparison with England, Wales, Northern Ireland and South Africa. *Journal of Hospital Infection*, 80 (3): 217-223.

Dyson, J., Lawton, R., Jackson, C. and Cheater, F. (2011). Does the use of a theoretical approach tell us more about hand hygiene behaviour? The barriers and levers to hand hygiene. *Journal of Infection Prevention*, 12 (1): 17-24.

Eccles, M.P., Grimshaw, J.M., Johnston, M., Steen, N., Pitts, N.B., Thomas, R., Glidewell, E., Maclennan, G., Bonetti, D. and Walker, A. (2007). Applying psychological theories to evidence-based clinical practice: Identifying factors predictive of managing upper respiratory tract infections without antibiotics. *Implement Sci*, 2: 26.

Eccles, M.P., Hrisos, S., Francis, J., Kaner, E.F., Dickinson, H.O., Beyer, F. and Johnston, M. (2006). Do self-reported intentions predict clinicians' behaviour: a systematic review. *Implement Sci*, 1: 28.

Edmondson, A.C. (2003). Speaking up in the operating room: How team leaders promote learning in interdisciplinary action teams. *Journal of Management Studies*, 40.

Edmondson, A.C. (2004). Learning from failure in health care: frequent opportunities, pervasive barriers. *Quality and Safety in Health Care*, 13: 3-9.

Elpern, E.H., Covert, B. and Kleinpell, R. (2005). Moral distress of staff nurses in a medical intensive care unit. *American Journal of Critical Care*, 14 (6): 523-530.

Emmerson, A. M., Enstone, J. E., Griffin, M., Kelsey, M. C. and Smyth, E. T. M. (1996). The second national prevalence survey of infection in hospitals - Overview of the results. *Journal of Hospital Infection*, 32 (3): 175-190.

Entwistle, V. A., Mello, M. M. and Brennan, T. A. (2005). Advising patients about patient safety: current initiatives risk shifting responsibility. *Joint Commission journal on quality and patient safety / Joint Commission Resources*, 31 (9): 483-494.

Erasmus, V., Brouwer, W., van Beeck, E.F., Oenema, A., Daha, T.J., Richardus, J.H., Vos, M.C. and Brug, J. (2009). A Qualitative Exploration of Reasons for Poor Hand Hygiene Among Hospital Workers: Lack of Positive Role Models and of Convincing Evidence That Hand Hygiene Prevents Cross-Infection. *Infection Control and Hospital Epidemiology*, 30 (5): 415-419.

Erasmus, V., Daha, T.J., Brug, H., Richardus, J.H., Behrendt, M.D., Vos, M.C. and van Beeck, E.F. (2010). Systematic review of studies on compliance with hand hygiene guidelines in hospital care. *Infect Control Hosp Epidemiol*, 31 (3):283-294.

- Eraut, M. (2000). Non-formal learning and tacit knowledge in professional work. *British Journal of Educational Psychology*, 70.
- Eraut, M. (2004). Informal learning in the workplace. *Studies in Continuing Education*, 26 (2): 247-273.
- Estabrooks, C. A., Rutakumwa, W., O'Leary, K. A., Profetto-McGrath, J., Milner, M., Levers, M. J. and Scott-Findlay, S. (2005). Sources of practice knowledge among nurses. *Qualitative Health Research*, 15: 460-476.
- Estabrooks, C.A., Thompson, D.S., Jacque, J., Lovely, E. and Hofmeyer, A. (2006). A Guide to Knowledge Translation Theory. *The Journal of Continuing Education in the Health Professions*, 26: 25-36.
- European Antimicrobial Resistance Surveillance System (2007). Susceptibility results for *S. aureus* isolates for 2007. Accessed online on 19th February 2009 at <http://www.rivm.nl/earss/database/>
- European Centre for Disease Prevention and Control. (2008). *European Centre for Disease Prevention and Control: Annual Epidemiological Report on Communicable Diseases in Europe*. Stockholm, European Centre for Disease Prevention and Control.
- European Centre for Disease Prevention and Control. (2012). Point prevalence survey of healthcare associated infections and antimicrobial use in European acute care hospitals. Protocol Version 4.3. Full scale survey codebook. Accessed online on 9th May 2012 at <http://ecdc.europa.eu/en/publications/Publications/0512-TED-PPS-HAI-antimicrobial-use-protocol.pdf>
- Evans, S. M., Berry, J. G., Smith, B. J., Esterman, A., Selim, P., O'Shaughnessy, J. and DeWit, M. (2006). Attitudes and barriers to incident reporting: a collaborative hospital study. *Quality and Safety in Health Care*, 15 (1): 39-43.
- Farmer, R. and Miller, D. (1991). *Lecture Notes on Epidemiology and Public Health Medicine*. (3rd ed). London: Blackwell Scientific Publications.
- Fazio, R. H., Sanbonmatsu, D. M., Powell, M. C. and Kardes, F. R. (1986). On The Automatic Activation Of Attitudes. *Journal of Personality and Social Psychology*, 50: 229-238.
- Ferlie, E.B. and Shortell, S.M. (2001). Improving the Quality of Health Care in the United Kingdom and the United States: A Framework for Change. *The Milbank Quarterly*, 79 (2): 281-315.
- Finlay, L. (2002). Negotiating the swamp: the opportunity and challenge of reflexivity in research practice. *Qualitative Research*, 2(2): 209-230.

Firth-Cozens, J., Redfern, N. and Moss, F. (2004). Confronting errors in patient safety: the experiences of doctors and nurses. *Clin Risk*, 10: 184-190.

Fischhoff, B., Slovic, Lichtenstein S., Read S. and Combs B. (2000). How safe is safe enough? A psychometric study of attitudes toward technological risks and benefits. In: Slovic, P. (Eds.) *Risk Perception*. London: Earthscan, (pp. 80-103).

Fishbein, M. and Ajzen, I. (1975). *Beliefs, attitude, intention, and behavior: An introduction to theory and research*. Reading, Mass: Addison-Wesley.

Fishbein, M. and Ajzen, I. (1980). Predicting and understanding consumer behaviour: attitude-behaviour correspondence. In: Ajzen, I. and Fishbein, M. (Eds.). *Understanding attitudes and predicting social behaviour*. Englewood Cliffs, New Jersey: Prentice-Hall, (pp. 148-172).

Fishbein, M., Triandis, H.C., Kanfer, F.H, Becker, M., Middlestadt, S.E. and Eichler, A. (2001). Factors influencing behavior and behavior change. In: Baum, A., Revenson, T.A. and Singer, J.E. (Eds.). *Handbook of health psychology*. Mahwah, New Jersey: Lawrence Erlbaum Associates, (pp. 3-17).

Fitzpatrick, F., McIlvenny, G., Oza, A., Newcombe, R. G., Humphreys, H., Cunney, R., Murphy, N., Ruddy, R., Reid, G., Bailie, R., Lavelle, C., Doherty, L. and Smyth, E. T. M. (2008). Hospital infection society prevalence survey of healthcare associated infection 2006: comparison of results between Northern Ireland and the Republic of Ireland. *Journal of Hospital Infection*, 69 (3): 265-273.

Fleming, M. and Lardner, R. (1999). Safety culture - the way forward. *The Chemical Engineer*. 11th March: 16-18. Accessed online on 18th February 2009 at <http://www.keilcentre.co.uk/downloads/Culture.pdf>

Fleming, M. and Lardner. R. (2002). *Strategies to promote safe behaviour as part of a health and safety management system*. Contract Research Report 430/2002. Sudbury, UK: HSE Books.

Flemming, K. (2007). The synthesis of qualitative research and evidence-based nursing. *Evid. Based Nurs*, 10: 68-71.

Flin, R., Burns, C., Mearns, K., Yule, S. and Robertson, E. M. (2006). Measuring safety climate in health care. *Quality and Safety in Health Care*, 15.

Flin, R., Mearns, K., O'Connor, P. and Bryden, R. (2000). Measuring safety climate: identifying the common features. *Safety Science*, 34.

Flynn, A.V. and Sinclair, M. (2005). Exploring the relationship between nursing protocols and nursing practice in an Irish intensive care unit. *International Journal of Nursing Practice*, 11: 142-149.

- Fraise, A. (2011). Currently available sporicides for use in healthcare and their limitations. *Journal of Hospital Infection*, 77 (3): 210-212.
- Francis, J., Eccles, M., Johnston, M., Walker, A., Grimshaw, K., Foy, R., Kaner, E., Smith, L. and Bonetti, D. (2004). Constructing questionnaires based on The Theory of Planned Behaviour: A manual for health service researchers. Accessed online on 3rd February 2012 at http://pages.bangor.ac.uk/~pes004/exercise_psych/downloads/tpb_manual.pdf
- Francke, A.L., Smit, M.C., de Veer, A. and Mistiaen, P. (2008). Factors influencing the implementation of clinical guidelines for health care professionals: A systematic meta-review. *BMC Medical Informatics and Decision Making*, 8:38.
- Friedrich, A.W., Daniels-Haardt, I., Koçk, R., Verhoeven, F., Mellmann, A., Harmsen, D., Gemert-Pijnen, J.E.W.C., van Becker, K., Hendrix, M.G.R. (2008). EUREGIOMRSA-netTwente/Münsterland-a Dutch-German cross-border network for the prevention and control of infections caused by Methicillin-resistant *Staphylococcus aureus*. *Eurosurveillance*, 35: 1-11.
- Fuller, D. (1999). Part of the action, or 'going native'? Learning to cope with the 'politics of integration.' *Area*, 31 (3): 221-227.
- Gabbay, J. and leMay, A. (2004). Evidenced based guidelines or collectively constructed 'mindlines?' Ethnographic study of knowledge management in primary care. *BMJ*, 329: 1-5.
- Gabbay, J. and leMay, A. (2011). *Practice-based evidence for health care: clinical mindlines*. London: Routledge.
- Gadd, S. and Collins, A. (2002). *Safety culture: A review of the literature*. HSL/2002/25. HSE Books.
- Gagnon, M. P., Sanchez, E. and Pons, J. M. V. (2006). Integration of health technology assessment recommendations into organizational and clinical practice: A case study in Catalonia. *International Journal of Technology Assessment in Health Care*, 22: 169-176.
- Gains, F. (2011). Elite ethnographies: Potential, pitfalls, and prospects for getting 'up close and personal.' *Public Administration*, 81 (1): 156-166.
- Gallagher, A. (2010). Moral Distress and Moral Courage in Everyday Nursing Practice. *The Online Journal of Issues in Nursing*, 16 (2).
- Gardiner, D. F., Rosenberg, T., Zaharatos, J., Franco, D. and Ho, D. D. (2009). A DNA vaccine targeting the receptor-binding domain of *Clostridium difficile* toxin A. *Vaccine*, 27 (27): 3598-3604.

Gastmeier, P., Kampf, G., Wischniewski, N., Hauer, T., Schulgen, G., Schumacher, M., Daschner, F. and Rueden, H. (1998). Prevalence of nosocomial infections in representative German hospitals. *Journal of Hospital Infection*, 38 (1): 37-49.

Gastmeier, P., Sohr, D., Rath, A., Forster, D. H., Wischniewski, N., Lacour, M., Brauer, H., Daschner, F. and Ruden, H. (2000). Repeated prevalence investigations on nosocomial infections for continuous surveillance. *Journal of Hospital Infection*, 45 (1): 47-53.

Geertz, C. (1973). Thick Description: Toward an Interpretative Theory of Culture. In: *The Interpretation of Cultures*. Selected essays. New York: Basic Books, (pp.3-30).

Geertz, C. (1979). From the native's point of view: On the nature of anthropological understanding. In: Rabinow, P. and Sullivan, W.M. (Eds.) *Interpretive social science: A reader*. Berkeley: University of California Press, (pp.225-241). Reprinted from *Meaning in anthropology*, by Basso, K.H. and Selby, H.A. (Eds.) (1976). Albuquerque: University of New Mexico Press, (pp. 221-237).

Gellner, D.N. and Hirsch, E. (2001). Introduction: Ethnography of Organisations and Organisations of Ethnography. In: Gellner, D.N. and Hirsch, E. (Eds.). *Inside Organizations: Anthropologists at Work*. Oxford: Berg, (pp. 1-18).

General Medical Council. (2009). *Good Medical Practice: Guidance for doctors*. General Medical Council. Accessed online on 23rd March 2012 at http://www.gmc-uk.org/static/documents/content/GMP_0910.pdf

Gerding, D. N., Muto, C. A. and Owens, R. C., Jr. (2008). Measures to control and prevent *Clostridium difficile* infection. *Clinical Infectious Diseases*, 46: S43-S49.

Gerrish, K. (1995). Being a 'marginal native': Dilemmas of the participant observer. *Nurse Researcher*, 5: 25-34.

Ghose, C., Kalsy, A., Sheikh, A., Rollenhagen, J., John, M., Young, J., Rollins, S. M., Qadri, F., Calderwood, S. B., Kelly, C. P. and Ryan, E. T. (2007). Transcutaneous immunization with *Clostridium difficile* toxoid A induces systemic and mucosal immune responses and toxin A-neutralizing antibodies in mice. *Infection and Immunity*, 75 (6): 2826-2832.

Giannasca, P. J. and Warny, M. (2004). Active and passive immunization against *Clostridium difficile* diarrhea and colitis (Reprinted from 22(7)848 Feb 17 2004). *Vaccine*, 22: 848-856.

Gill, J., Kumar, R., Todd, J. and Wiskin, C. (2006). Methicillin-resistant *Staphylococcus aureus*: awareness and perceptions. *Journal of Hospital Infection*, 62: 333-337.

Gillham, B. (2000). *Case study research methods*. (1st ed). London: Continuum.

Gillham, B. (2008). *Observation Techniques: Structured to Unstructured*. Real World Research Series. London: Continuum.

Ginsburg, L.R., Lewis, S., Zackheim, L. and Casebeer, A. (2007). Revisiting interaction in knowledge translation. *Implementation Science*, 30 (2): 34.

Glaser, B.G. and Strauss, A. L. (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Chicago: Aldine.

Godin, G., Bélanger-Gravel, A., Eccles, M. and Grimshaw, J. (2008). Healthcare professionals' intentions and behaviours: A systematic review of studies based on social cognitive theories. *Implementation Science*, 3: 36.

Godin, G. and Kok, G. (1996). The theory of planned behaviour: a review of its applications to health-related behaviours. *Am J Health Promot*, 11: 87-98.

Godin, G., Naccache, H. and Fortin, C. (1998). Understanding physicians' intention to use a simple infection control measure: Wearing gloves. *Am J Infect Control*, 26: 413-417.

Godin, G., Naccache, H., Morel, S. and Ebacher, M.F. (2000). Determinants of Nurses' adherence to universal precautions for venipunctures. *Am J Infect Control*, 28: 359-364.

Goldenberg, S. D. and French, G. L. (2011). Diagnostic testing for *Clostridium difficile*: a comprehensive survey of laboratories in England. *Journal of Hospital Infection*, 79 (1): 4-7.

Gollwitzer, P. M. (1993). Goal achievement: The role of intentions. *European Review of Social Psychology* 4 (1): 141-185.

Gough, E., Shaikh, H. and Manges, A. R. (2011). Systematic Review of Intestinal Microbiota Transplantation (Fecal Bacteriotherapy) for Recurrent *Clostridium difficile* Infection. *Clinical Infectious Diseases*, 53 (10): 994-1002.

Gould, C. V. and McDonald, L. C. (2008). Bench-to-bedside review: *Clostridium difficile* colitis. *Critical Care*, 12 (1): 203.

Gould, D. J., Drey, N. S., Millar, M., Wilks, M. and Chamney, M. (2009). Patients and the public: knowledge, sources of information and perceptions about healthcare-associated infection. *Journal of Hospital Infection*, 72 (1): 1-8.

Gould, D. J., Moralejo, D., Drey, N. and Chudleigh, J. H. (2011). Interventions to improve hand hygiene compliance in patient care. *Cochrane Database of Systematic Reviews*, (9).

Graham, I.D., Beardsall, S., Carter, A.O., Tetroe, J. and Davies, B. (2003). The state of the science and art of practice guidelines development, dissemination and evaluation in Canada. *Journal of Evaluation in Clinical Practice*, 9 (2): 195-202.

Graham, I.D., Logan, J., Harrison, M.B., Straus, S., Tetroe, J.M., Caswell, W. and Robinson, N. (2006). Lost in Knowledge Translation: Time for a Map? *Journal of Continuing Education in Health Professions*, 26: 13-24.

Green, B., Seagrott, J. and Hewitt, J. (2006). Developing nursing and midwifery research capacity in a university department: case study. *Journal of Advanced Nursing*, 56 (3): 302-313.

Greenhalgh, J., Flynn, R., Long, A.F. and Tyson, S. (2008). Tacit and encoded knowledge in the use of standardised outcome measures in multidisciplinary team decision making: A case study of in-patient neurorehabilitation. *Social Science and Medicine*, 67: 183-194.

Greenhalgh, R.G., Macfarlane, F., Bate, P. and Kyriakidou, O. (2004). Diffusion of innovations in service organizations: Systematic review and recommendations. *Milbank Q*, 82: 581-629.

Greenhalgh, T. (1997). How to read a paper: Papers that go beyond numbers (qualitative research). *BMJ*, 315: 243-246.

Greenhalgh, T. (2001). How to read a paper: The basics of evidence based medicine. (2nd Ed). London. BMJ.

Greenhalgh, T. and Wieringa, S. (2011). Is it time to drop the 'knowledge translation' metaphor? A critical literature review. *J R Soc Med*, 104: 501-509.

Griffiths, C. (2006). HACCP and the management of healthcare associated infections: Are there lessons to be learnt from other industries? *International Journal of Health Care Quality Assurance*, 19 (4): 351-367.

Grimshaw, J., Eccles, M. and Tetroe J. (2004a). Implementing Clinical Guidelines: Current Evidence and Future Implications. *Journal of Continuing Educ Health Prof*, 24: S31-S37.

Grimshaw, J.M., Thomas, R.E., MacLennan, G., Fraser, C., Ramsey, C.R., Vale, L., Whitty, P., Eccles, M.P., Matowe, L., Shirran, L., Wensing, M., Dijkstra R. and Donaldson, C. (2004b). Effectiveness and efficiency of guideline dissemination and implementation strategies. *Health Technology Assessment*, 8 (6): 1-352.

Grol, R. and Grimshaw, J. (2003). From best evidence to best practice: effective implementation of change in patients' care. *Lancet*, 362: 1225-1230.

Guba, E. G. and Lincoln, Y. S. (1994). Competing paradigms in qualitative research. In: Denzin, N.K. and Lincoln, Y.S. (Eds.), *Handbook of qualitative research*. London: Sage Publications, (pp. 105-117).

Guldenmund, F. W. (2000). The nature of safety culture: a review of theory and research. *Safety Science*, 34.

Gurses, A.P., Seidl, K. L., Vaidya, V., Bochicchio, G. Harris, A.D., Hebden J. and Xiao, Y. (2008). Systems ambiguity and guideline compliance: a qualitative study of how intensive care units follow evidence-based guidelines to reduce healthcare-associated infections. *Qual. Saf. Health Care*, 17: 351-359.

Haas, J.P. and Larson, E.L. (2007) Measurement of compliance with hand hygiene. *Journal of Hospital Infection*, 66: 6-14.

Haddock, J. (1997). Nurses' perceptions of reflective practice. *Nursing Standard*, 11: 39-41.

Haddon, W.A. (1972). A logical framework for categorizing highway safety phenomena and activity. *J Trauma*, 12: 193-207.

Hakkennes, S. and Dodd, K. (2008). Guideline implementation in allied health professions: a systematic review of the literature. *Qual. Saf. Health Care*, 17: 296-300.

Hamilton, S., McLaren, S. and Mulhall, A. (2007). Assessing organisational readiness for change: use of diagnostic analysis to the implementation of a multidisciplinary assessment for acute stroke care. *Implementation Science*, 2 (1): 1-11.

Hammersley, M. (1992). *What's Wrong With Ethnography? -Methodological Explorations*. London: Routledge.

Hammersley, M. and Atkinson, P. (1983). *Ethnography: Principles in practice*. London. Tavistock.

Hamric, A.B. and Blackhall, L.J. (2007). Nurse physician perspectives on the care of dying patients in intensive care units: collaboration, moral distress and ethical climate. *Crit Care Med*, 35 (2): 422-429.

Hannes, K. (2011). Chapter 4: Critical appraisal of qualitative research. In: Noyes, J., Booth, A., Hannes, K., Harden, A., Harris, J., Lewin, S., Lockwood, C. (Eds). *Supplementary Guidance for Inclusion of Qualitative Research in Cochrane Systematic Reviews of Interventions*. Version 1 (updated August 2011). Cochrane Collaboration Qualitative Methods Group, 2011. Accessed online on 31st August 2012 at <http://cqrmg.cochrane.org/supplemental-handbook-guidance>

Hansen, D., Patzke, P. -I., Werfel, U., Benner, D., Brauksiepe, A. and Popp, W. (2007). Success of MRSA Eradication in Hospital Routine: Depends on Compliance. *Infection*, 35: 260-264.

Harbarth, S., Sax, H. and Gastmeier, P. (2003). The preventable proportion of nosocomial infections: an overview of published reports. *Journal of Hospital Infection*, 54 (4): 258-266.

Hardy S., Titchen A. and Manley K. (2007). Patient narratives in the investigation and development of nursing practice expertise: a potential for transformation. *Nursing Inquiry*, 14 (1): 80-88.

Harris, A., Samore, M., Nafziger, R., DiRosario, K., Roghmann, M. and Carmeli, Y. (2000). A survey on hand-washing practices and opinions of health care workers. *Journal of Hospital Infection*, 45: 318-321.

Harrison, M. B., Legare, F., Graham, I. D. and Fervers, B. (2010). Adapting clinical practice guidelines to local context and assessing barriers to their use. *Canadian Medical Association Journal*, 182 (2).

Hawkings, N. J., Wood, F. and Butler, C. C. (2007). Public attitudes towards bacterial resistance: a qualitative study. *Journal of Antimicrobial Chemotherapy*, 59: 1155-1160.

Health Act (2006). (C.28). London: The Stationary Office.

Health and Social Care Act (2008). (C.14). London: The Stationary Office.

Health and Safety at Work etc Act. (1974). (C.37). London: The Stationary Office.

Health and Safety Executive. (1992). *Workplace (Health, Safety and Welfare) Regulations* (1992). Approved Code of Practice L24, HSE Books.

Health and Safety Executive. (1997). *Successful Health and Safety Management*; HS(G)65. Sudbury, Suffolk: HSE Books.

Health and Safety Executive. (2006). *The Management of Health and Safety at Buckinghamshire NHS Hospitals Trust. Report of the Inspection by the Health and Safety Executive*. Accessed online on 10th February 2009 at <http://www.hse.gov.uk/healthservices/hospitalinfect/stokemandeville.pdf>

Health and Safety Executive. (2008). *Infections at work-Healthcare*. Accessed online on 10th February 2009 at <http://www.hse.gov.uk/biosafety/healthcare.htm>

Healthcare Commission. (2006). *Investigation into outbreaks of Clostridium difficile at Stoke Mandeville Hospital, Buckinghamshire Hospitals NHS Trust*. London: Commission for Healthcare Audit and Inspection.

Healthcare Commission. (2007). *Investigation into outbreaks of Clostridium difficile at Maidstone and Tunbridge Wells NHS Trust*. London: Commission for Healthcare Audit and Inspection.

Healthcare Improvement Scotland (2011). 'How well did we do in our inspection?' *A survey to evaluate the Healthcare Environment Inspectorate's inspection programme (September 2009-September 2010)*. Accessed online on 18th May 2012 at http://www.healthcareimprovementscotland.org/programmes/inspecting_and_regulating_care/hei_inspections/hei_evaluation_report.aspx

Healthcare Inspectorate Wales. (2007). *Report on Infection Control - Findings and Themes*. Caerphilly, Wales: Healthcare Inspectorate Wales.

Health Protection Agency. (2007). *National Confidential Study of Deaths Following Meticillin-Resistant Staphylococcus aureus Infection*. London: Health Protection Agency.

Health Protection Agency. (2010). *Healthcare-Associated Infections and Antimicrobial Resistance: 2009/10*. London: Health Protection Agency.

Henriksen, K. and Dayton, E. (2006). Organizational silence and hidden threats to patient safety. *Health Services Research*, 41.

Hewitt-Taylor, J. (2004). Clinical guidelines and care protocols. *Intensive and Critical Care Nursing*, 20: 45-52.

Higuera, F., Rosenthal, V.D., Duarte, P., Ruiz, J., Franco, G. and Safdar, N. (2005). The effect of process control on the incidence of central venous catheter-associated blood stream infections and mortality in intensive care units in Mexico. *Crit Care Med*, 33: 2022-2027.

Hoffmann, B. and Rohe, J. (2010). Patient Safety and Error Management What Causes Adverse Events and How Can They Be Prevented? *Deutsches Arzteblatt International*, 107 (6): 92-99.

Horan, T., C., Andrus, M. and Dudeck, M. A. (2008). CDC/NHSN surveillance definition of health care-associated infection and criteria for specific types of infections in the acute care setting. *Am J Infect Control*, 36: 309-332.

Horne, C. (2001). Sociological Perspectives on the Emergence of Social Norms. In: Hecter, M. and Opp, K-D. (Eds.). *Social Norms*. (pp3-34). Accessed online on 11th February 2009 at <http://books.google.co.uk/books?hl=enandlr=andid=HZl19nBSbGkCandoi=fndandpg=PR9anddq=definition+of+social+normandots=7MdEs5c1wmandsig=l2Gfi-YxYwG9v7Nlgw1SXOdOCRk>

House of Commons Committee of Public Accounts. (2005). House of Commons Committee of Public Accounts Twenty-fourth Report 2004-2005. *Improving patient care by reducing the risks of hospital acquired infection: A progress report*. London: The Stationary Office.

HsenFae Cheng Cain, C. (2003). *Representing and reasoning about contextually changing organizational behavior using simulation models of medical work*. Thesis Dissertation. Accessed online on 16th February 2012 at http://bmir.stanford.edu/file_asset/index.php/22/SMI-2004-0977.pdf

Huang, H., Weintraub, A., Fang, H. and Nord, C. E. (2009). Antimicrobial resistance in *Clostridium difficile*. *International Journal of Antimicrobial Agents*, 34 (6): 516-522.

Hughes, E.C. (1951). Work and the self. In: Rohrer, J.R. and Sherif, M. (Eds). *Social Psychology at the crossroads*. New York: Harper and Brothers, (pp. 312-323).

Humphreys, H., Newcombe, R. G., Enstone, J., Smyth, E. T. M., McIlvenny, G., Fitzpatrick, F., Fry, C., Spencer, R. C. and Hosp Infection Soc Steering, G. (2008). Four country healthcare associated infection prevalence survey 2006: risk factor analysis. *Journal of Hospital Infection*, 69 (3): 249-257.

Humphreys, H. and Smyth, E. T. M. (2006). Prevalence surveys of healthcare-associated infections: what do they tell us, if anything? *Clinical Microbiology and Infection*, 12 (1): 2-4.

Hutchinson, A., Young, T. A., Cooper, K. L., McIntosh, A., Karnon, J. D., Scobie, S. and Thomson, R. G. (2009). Trends in healthcare incident reporting and relationship to safety and quality data in acute hospitals: results from the National Reporting and Learning System. *Quality and Safety in Health Care*, 18 (1): 5-10.

Ilott, I., Booth, A., Rick, J. and Patterson, M. (2010). How do nurse, midwives and health visitors contribute to protocol-based care? A synthesis of the UK literature. *International Journal of Nursing Studies*, 47: 770-780.

Ilott, I., Rick, J., Patterson, M., Turgoose, C. and Lacey, A. (2006). What is protocol-based care? A concept analysis. *Journal of Nursing Management*, 14: 544-552.

International Organisation for Standardisation (ISO) 14001 (2004) *Environmental management systems-Requirements*. Accessed online on 27th February 2009 at http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000/iso_14000_essentials.htm

International Organisation for Standardisation (ISO) 19001 (2008). *Quality management systems-Requirements*. Accessed online on 27th February 2009 at http://www.iso.org/iso/iso_catalogue/management_standards/iso_9000_iso_14000/iso_9000_essentials.htm

Jabbar, U., Leischner, J., Kasper, D., Gerber, R., Sambol, S. P., Parada, J. P., Johnson, S. and Gerding, D. N. (2010). Effectiveness of Alcohol-Based Hand Rubs for Removal of *Clostridium difficile* Spores from Hands. *Infection Control and Hospital Epidemiology*, 31 (6): 565-570.

Jamtvedt, G., Young, J.M., Kristoffersen, D.T., O'Brien, M.A. and Oxman, A.D. (2006). Audit and feedback: effects on professional practice and healthcare outcomes. *Cochrane database of systematic reviews*, (2).

Janz.N.K. and Becker.M.H. (1984). The Health Belief Model: a decade later. *Health Education Quarterly*, 11: 1-47.

Jenner, E. A., Watson, W. B., Miller, L., Jones, F. and Scott, G. M. (2002). Explaining hand hygiene practice: An application of the theory of planned behaviour. *Psychology. Health and Medicine*, 7 (3): 311-326.

Jensen, J.L. and Rodgers, R. (2001). Cumulating the intellectual gold of case study research. *Public Administration Review*, 61: 235-246.

Jha, A. K., Prasopa-Plaizier, N., Larizgoitia, I., Bates, D. W. On Behalf of the Research Priority Setting Working Group of the WHO World Alliance for Patient Safety. (2010). Patient safety research: an overview of the global evidence. *Quality and Safety in Health Care*, 19 (1): 42-47.

Jick, T. (1979). Mixing qualitative and quantitative methods: triangulation in action. *Administrative Science Quarterly*, 24: 602-611.

Jodra, V.M., Diaz-Agero Perez, C., Sainz de Los Terreros Soler, L., Saa Requejo, C.M., Dacosta Ballesteros, D. (2006). Results of the Spanish national nosocomial infection surveillance network (VICONOS) for surgery patients from January 1997 through December 2003. *American Journal of Infection Control*, 34 (3): 134-141.

Johnson M. (1992). A silent conspiracy? Some ethical issues of participant observation in nursing research. *International Journal of Nursing Studies*, 29: 223.

Johnson, S. (2009). Recurrent *Clostridium difficile* infection: A review of risk factors, treatments, and outcomes. *Journal of Infection*, 58 (6): 403-410.

- Jorgensen, D.L. (1989). Participant Observation: A Methodology for Human Studies. *Applied Social Research Methods Series. Volume 15*. Thousand Oaks, CA: Sage Publications.
- Kahneman, D., Slovic, P. and Tversky, A. (1982). *Judgement under uncertainty: heuristics and biases*. Cambridge: Cambridge University Press.
- Kalisch, B.J. and Aebbersold, M. (2006). Overcoming barriers to patient safety, *Nurs Econ*, 24 (3): 143-148.
- Kalisch, B.J., Landstrom, G.L. and Hinshaw, A.S. (2009). Missed nursing care: a concept analysis, *Journal of Advanced Nursing*, 65 (7): 1509-1517.
- Kalisch, B.J. and Lee, K.H. (2010). The impact of teamwork on missed nursing care. *Nurs Outlook*, 58 (5): 233-241.
- Kalisch, B. J., Tschannen, D., Lee, H. and Friese, C. R. (2011). Hospital Variation in Missed Nursing Care. *American Journal of Medical Quality*, 26.
- Kamboj, M., Khosa, P., Kaltsas, A., Babady, N. E., Son, C. and Sepkowitz, K. A. (2011). Relapse Versus Reinfection: Surveillance of *Clostridium difficile* Infection. *Clinical Infectious Diseases*, 53 (10): 1003-1006.
- Kampf, G. and Loffler, H. (2003). Dermatological aspects of a successful introduction and continuation of alcohol-based hand rubs for hygienic hand disinfection. *Journal of Hospital Infection*, 55.
- Karas, J. A., Enoch, D. A. and Aliyu, S. H. (2010). A review of mortality due to *Clostridium difficile* infection. *Journal of Infection*, 61 (1): 1-8.
- Kasperson, R. E., Renn, O., Slovic, P., Brown, H.S., Emel, J., Goble, R., Kasperson, J.X. and Ratick, S. (1988). The Social Amplification of Risk: A Conceptual Framework. *Risk Analysis*, 8 (2): 177-187.
- Keady, S. and Thacker, M. (2008). National Patient Safety Agency: Improving patient safety across all critical care areas. *Intensive and Critical Care Nursing*, 24: 137-140.
- Kee, V. R. (2012). *Clostridium difficile* Infection in Older Adults: A Review and Update on Its Management. *American Journal of Geriatric Pharmacotherapy*, 10 (1): 14-24.
- Keith, N. and Frese, M. (2005). Self-regulation in error management training: Emotion control and metacognition as mediators of performance effects. *Journal of Applied Psychology*, 90: 677-691.

Kemmis, S. and Smith, T. (2010). Praxis development: learning through experience. In: Kemmis, S and Smith, T. (Eds). *Enabling Praxis: Challenges for education*. Rotterdam: Sense Publications.

Kilpatrick, C., Prieto, J. and Wigglesworth, N. (2008). Single room isolation to prevent the transmission of infection: development of a patient journey tool to support safe practice. *British Journal of Infection Control*, 9: 19-25.

Kim, D.H. (1993). The link between individual and organizational learning. *Sloan Management Review*. Accessed on 16th October 2012 at <http://hcs.science.uva.nl/kennisenleren/cursus0203/kim.pdf>

Kingston, M. J., Evans, S. M., Smith, B. J. and Berry, J. G. (2004). Attitudes of doctors and nurses towards incident reporting: a qualitative analysis. *Medical Journal of Australia*, 181 (1): 36-39.

Kinley, J. and Brennan. S. (2004). Changing practice: use of audit to change oral care practice. *International Journal of Palliative Nursing*, 10: 580-587.

Kitson, A., Harvey, G. and McCormack, B. (1998). Enabling the implementation of evidence based practice: a conceptual framework. *Quality in Health Care*, 7, 149-158.

Klavs, I., Luznik, T. B., Skerl, M., Grgic-Vitek, M., Zupanc, T. L., Dolinsek, M., Prodan, V., Vegnuti, M., Kraigher, A., Arnez, Z. and Slovenian Hosp Acquired, I. (2003). Prevalance of and risk factors for hospital-acquired infections in Slovenia - results of the first national survey, 2001. *Journal of Hospital Infection*, 54 (2): 149-157.

Klevens, R.M., Edwards, J.R., Richards, C.L. Horan, T.C., Gaynes, R.P., Pollock, D.A. and Cardo, D.M. (2007). Estimating health care-associated infections and deaths in US hospitals, 2002. *Public Health Reports*, 122: 160-166.

Knafli, K.A. and Breitmayer, B.J. (1991). Triangulation in qualitative research: issues of conceptual clarity and purpose. In: Morse, J.M. (Ed.). *Qualitative Nursing Research. A Contemporary Dialogue* (Revised ed.), London: Sage Publications, (pp. 226-239).

Knight, N., Strait, T., Anthony, N., Lovell, R., Norton, H. J., Sautter, R. and Scobey, M. (2010). *Clostridium difficile* colitis: A retrospective study of incidence and severity before and after institution of an alcohol-based hand rub policy. *American Journal of Infection Control*, 38 (7): 523-528.

- Knoop, F. C., Owens, M. and Crocker, I. C. (1993). *Clostridium difficile* - Clinical-disease and diagnosis. *Clinical Microbiology Reviews*, 6 (3): 251-265.
- Kohn, L.T., Corrigan, J.M. and Donaldson, M.S. (Institute of Medicine). (2000). *To err is human: building a safer health system*. Washington, DC: National Academy Press.
- Kojima, S., Kato, M., Wang, D.-H., Sakano, N., Fujii, M. and Ogino, K. (2008). Implementation of HACCP in the risk management of medical waste generated from endoscopy. *Journal of Risk Research*, 11 (7): 925-936.
- Koteyko, N. and Nerlich, B. (2008). Modern matrons and infection control practices: aspirations and realities. *British Journal of Infection Control*, 9(2): 18-22.
- Kothari, A.R., Bickford, J.J., Edwards, N., Dobbins, M.J. and Meyer, M. (2011). Uncovering Tacit Knowledge: A Pilot Study to Broaden the Concept of Knowledge in Knowledge Translation and Mechthild Meyer. *BMC Health Services Research*, 11: 198.
- Kouabenan, D. R. and Dubois, M. (2007). Methicillin-Resistant Staphylococcus Aureus Risk Perception by Healthcare Personnel in a Public Hospital. *Social Behavior and Personality*, 35 (1): 89-100.
- Koutantji, M., Davis, R., Vincent, C. and Coulter, A. (2005). The patient's role in patient safety: engaging patients, their representatives, and health professionals. *Clin Risk*, 11: 99-104.
- Kretzer, E.K. and Larson, E.L. (1998). Behavioral interventions to improve infection control practices. *American Journal of Infection Control*, 26: 245-253.
- Krueger R.A. (1994). *Focus Groups: A Practical Guide for Applied Research*. (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Krueger R.A. (1998). *Developing Questions for Focus Groups (Focus Group Kit 3)*. Thousand Oaks, CA: Sage Publications.
- Kuiper, R.A. (1999). The Effect of Prompted Self-Regulated Learning Strategies in a Clinical Nursing Preceptorship. *Doctoral Dissertation*, University of South Carolina, Columbia. Dissertation Abstracts International, 9 928 324.
- Kuiper, R.A. and Pesut, D.J. (2004). Promoting cognitive and metacognitive reflective reasoning skills in nursing practice: self-regulated learning theory. *Journal of Advanced Nursing*, 45 (4): 381-391.
- Kvale, S. (1996). *Interviews: An introduction to qualitative research interviewing*. Thousand Oaks, CA: Sage Publications.

- Kyne L, Warny M, Qamar A, Kelly CP (2001). Association between antibody response to toxin A and protection against recurrent *Clostridium difficile* diarrhea. *Lancet*, 357: 189-193.
- Labodova, A. (2004). Implementing integrated management systems using a risk analysis based approach. *Journal of Cleaner Production*, 12: 571-580.
- Larsen, A.-C. (2005). In the public interest: autonomy and resistance to methods of standardising nurses' advice and practices from a health call centre in Perth, Western Australia. *Nursing inquiry*, 12: 135-43.
- Larson, E.L., Early, E., Cloonan, P., Surgue, S. and Parides, M. (2000). An organizational climate intervention associated with handwashing and decreased nosocomial infections. *Behav Med*, 26: 14-22.
- Lave, J. and Wenger, E. (1991). *Legitimate peripheral participation in communities of practice. Situated learning: legitimate peripheral participation*. Cambridge: Cambridge University press.
- Lawrence, L.A. (2011). Work engagement, moral distress, education level, and critical reflective practice in intensive care nurses. *Nursing Forum*, 46 (4): 256-268.
- Leape, L.L. (1994). Error in medicine. *JAMA*, 272: 1851-1857.
- Leape, L.L., Weissman, J.S., Schneider, E.C., Piana, R.N., Gatsonis, C., Epstein A.M. (2003). Adherence to practice guidelines: the role of specialty society guidelines. *Am Heart J*, 145: 19-26.
- Leininger, M. and McFarland, M. (2006). *Culture Care Diversity and Universality: A Worldwide Nursing Theory*. (2nd ed.). Sudbury, MA: Jones and Bartlett.
- Leonard, M., Graham, S. and Bonacum, D. (2004). The human factor: the critical importance of effective teamwork and communication in providing safe care. *Quality and Safety in Health Care*, 13: I85-I90.
- Lett, R., Kobusingye, O. and Sethi, D. (2002). A unified framework for injury control: the public health approach and Haddon's Matrix combined. *Injury control and safety promotion*, 9 (3): 199-205.
- Levin, P.F. (1999). Test of the Fishbein and Ajzen models as predictors of health care workers' glove use. *Res Nurs Health*, 22: 295-307.
- Lewin K. (1951). *Field Theory in Social Science*. London: Harper Row.
- Li, L.C., Grimshaw, J.M., Nielsen, C., Judd, M., Coyte, P.C. and Graham, I.D. (2009). Evolution of Wenger's concept of community of practice. *Implementation Science*, 4: 11.

Lincoln, Y.S. and Guba, E.G. (1985). *Naturalistic inquiry*. Thousand Oaks, CA: Sage Publications.

Livesey, E.A. and Noon, J.M. (2007). Implementing guidelines: what works?. *Arch Dis Child Educ Pract*, 92: 129-134.

Lizarondo, L., Grimmer-Somers, K. and Kumar, S. (2011). A systematic review of the individual determinants of research evidence use in allied health. *Journal of Multidisciplinary Healthcare*, 4: 261-272.

Lohr, K. N. and Field, M. J. (1992). A provisional instrument for assessing clinical practice guidelines. In: Field, M. J. and Lohr, K.N. (Eds.). *Guidelines for Clinical Practice from Development to Use*. Washington DC: National Academy Press, (pp. 349-410).

Long, A. (1994). Guidelines, protocols and outcomes. *International Journal of Health Care Quality Assurance*, 7: 4-7.

Longtin, Y., Sax, H., Leape, L. L., Sheridan, S. E., Donaldson, L. and Pittet, D. (2010). Patient Participation: Current Knowledge and Applicability to Patient Safety. *Mayo Clinic Proceedings*, 85 (1): 53-62.

Loos, M., Schlieper, B. and Hagemann-White, C. (1999). Observing the Interaction of Nurses and Physicians in Hospitals. Some Encountered Methodological Pitfalls. *Paper presented at Women's Worlds 99: The International Interdisciplinary Congress on Women genDerations. Tromsø, Norway; June 20-26*. Accessed online on 9th January 2009 at http://www.skk.uit.no/WW99/papers/Hagemann_White_Carol_.pdf

Luck, L., Jackson, D. and Usher, K. (2006). Case study: a bridge across the Paradigms. *Nursing Inquiry*, 13 (2): 103-109.

Lunt, J., Bowen, J. and Lee. (2005). *HSE Review of the Risk Prevention Approach to Occupational Health Applying Health Models to 21st Century Occupational Health Needs*. HSL/2005/5. Accessed online on 18th February 2009 at http://www.hse.gov.uk/research/hsl_pdf/2005/hsl0557.pdf

Lymer, U. B., Richt, B. and Isaksson, B. (2003). Health care workers' action strategies in situations that involve a risk of blood exposure. *Journal of Clinical Nursing*, 12.

Lyons, M. (2007). Should patients have a role in patient safety? A safety engineering view. *Quality and Safety in Health Care*, 16 (2): 140-142.

MacIntosh-Murray, A. and Choo, C. W. (2005). Information behavior in the context of improving patient safety. *Journal of the American Society for Information Science and Technology*, 56.

Madeo, M. and Boyack, M. (2010). Using the lived experiences of patients with *Clostridium difficile* infection to improve care. *Nurs Times*, 106 (36): 10-3.

Madhill., A., Jordan, A. and Shirley, C. (2000). Objectivity and reliability in qualitative analysis: Realist, contextualist and radical constructionist epistemologies. *British Journal of Psychology*, 91: 1-20.

Magiorakos, A.P., Leens, E., Drouvot, V., May-Michelangeli, L., Reichardt, C., Gastmeier, P., Wilson, K., Tannahill, M., McFarlane, E. and Simon, A. (2010). Pathways to clean hands: highlights of successful hand hygiene implementation strategies in Europe. *Euro Surveill*, 15 (18):pii=19560. Accessed online on 24th May 2012 at <http://www.eurosurveillance.org/images/dynamic/EE/V15N18/art19560.pdf>

Malkan, A. D. and Scholand, S. J. (2012). Preventing downstream *Clostridium difficile* infections with upstream antibiotic management. *Medical Hypotheses*, 78 (1): 136-137.

Manias, E., Aitken, R. And Dunning, T. (2005). How graduate nurses use protocols to manage patients' medications. *Journal of Clinical Nursing*, 14: 935-944.

Manias, E. and Street, A. (2000). Legitimation of nurses' knowledge through policies and protocols in clinical practice. *Journal of Advanced Nursing*, 32: 1467-1475.

Mathai, E., Allegranzi, B., Kilpatrick, C. and Pittet, D. (2010). Prevention and control of health care-associated infections through improved hand hygiene. *Indian J Med Microbiol*, 28 (2): 100-6.

Maue, S., Segal, R., Kimberlin, C. and Lipowski, E. (2004). Predicting physician guideline compliance: an assessment of motivators and perceived barriers. *Am J Manag Care*, 10: 383-391.

Mayo, Elton (1949). *Hawthorne and the Western Electric Company*. The Social Problems of an Industrial Civilisation. Routledge.

Mays, N. and Pope, C. (2000). Qualitative research in health care: Assessing Quality in qualitative research . *BMJ*, 320: 50-52.

McCahill, L.E., Ahern, J.W., Gruppi, L.A., Limanek, J., Dion, G.A. Sussman, J.A., McCaffrey, C.B., Leary, D.B., Lesage, M.B. and Single, R.M. (2007). Enhancing Compliance With Medicare Guidelines for Surgical Infection Prevention. *Arch Surg*, 142: 355-361.

McDonald, L.C. (2006). Trends in antimicrobial resistance in health care-associated pathogens and effect on treatment. *Clinical Infectious Diseases*, 42 (Suppl 2): S65-71.

McDonald, R., Waring, J., Harrison, S., Walshe, K. and Boaden, R. (2005). Rules and guidelines in clinical practice: a qualitative study in operating theatres of doctors' and nurses' views. *Quality and Safety in Health Care*, 14: 290-294.

McDonnell, A., Myfanwy, L.J. and Read, S. (2000). Practical considerations in case study research: The relationship between methodology and process. *Journal of Advanced Nursing* 32: 383-390.

McDonough, J.E. (2002). *Proactive hazard analysis and health care policy*. *Milbank New York: Memorial Fund*. Accessed online on 16th May 2012 at http://www.cenetec.salud.gob.mx/descargas/Cursos_Ing_clinica2011/Curso_Avanzado_Ing.Clinica_2011/Dia3/ECRI_Hazard_Analysis.pdf

McFarland, L. V. (2006). Meta-analysis of probiotics for the prevention of antibiotic associated diarrhea and the treatment of *Clostridium difficile* disease. *American Journal of Gastroenterology*, 101 (4): 812-822.

McFarland, L. V. (2010). Systematic review and meta-analysis of *Saccharomyces boulardii* in adult patients. *World Journal of Gastroenterology*, 16 (18): 2202-2222.

McFarland, L. V., Mulligan, M. E., Kwok, R. Y. Y. and Stamm, W. E. (1989). Nosocomial acquisition of *Clostridium difficile* infection. *New England Journal of Medicine*, 320 (4): 204-210.

McLaughlin, A.C. and Walsh, F. (2011). Individual differences in judgements of hand hygiene risk by healthcare workers. *Am J Infect Control*, 39: 456-463.

Meers, P. D., Ayliffe, G. A.J., Emmerson, A. M., Leigh, D. A., Mayton-White, R. T., Mackintosh, C.A., Stronge, J.L. (1981). Report on the national survey of infection in hospitals in 1980. *Journal of Hospital Infection* (Supplementary) 2: 1-53.

Meltzer, L.S. and Huckabay, L.M. (2004). Critical care nurses' perceptions of futile care and its effect on burnout. *Am J Crit Care*, 13: 202-208.

Merriam, S.B. (2002). Introduction to Qualitative Research. In: Merriam, S.B. and associates. (Eds.). *Qualitative research in practice*. (1st ed.). San Francisco: Jossey-Bass, (pp. 1-17).

Michie, S. (2011). The behaviour change wheel: A new method for characterising and designing behaviour change interventions. *Implementation Science*, 6:42.

Michie, S. Johnston, M., Abraham, C., Lawton, R., Parker, D. and Walker, A. (2005). Making psychological theory useful for implementing evidence based practice: a consensus approach. *Qual Saf Health Care*, 14: 26-33.

- Miles, M. B. and Huberman, A. M. (1994). *Qualitative Data Analysis. A Sourcebook of New Methods*. (2nd ed). Thousand Oaks, CA: Sage Publications.
- Morrow, E., Griffiths, P., Rao, G.G. and Flaxman, D. (2011). ‘Somebody else’s problem?’ Staff perceptions of the sources and control of meticillin-resistant *Staphylococcus aureus*. *Am J Infect Control*, 39 (4): 284-91.
- Morse, J. M., Barrett, M., Mayan, M., Olson, K. and Spiers, J. (2002). Verification strategies for establishing reliability and validity in qualitative research. *International Journal of Qualitative Methods*, 1(2): 1-19. Accessed online 22nd February 2009 at http://www.ualberta.ca/~iiqm/backissues/1_2Final/html/morse.html
- Muhlemann, K., Franzini, C., Aebi, C., Berger, C., Nadal, D., Stahelin, J., Gnehm, H., Posfay-Barbe, M., Gervaix, A., Sax, H., Heininger, U., Bonhoeffer, J., Eich, G., Kind, C., Petignat, C. and Scalfaro, P. (2004). Prevalence of nosocomial infections in Swiss children’s hospitals. *Infection Control and Hospital Epidemiology*, 25 (9): 765-771.
- Mulhall, A. (2003). In the field: notes on observation in qualitative research. *Journal of Advanced Nursing*, 41 (3): 306-313.
- Munhall P. (1988). Ethical considerations in qualitative Research. *Western Journal of Nursing Research*, 10 (2): 150-162.
- Mulholland, H. and Ramesh, R. (2012). Labour puts pressure on Lansley over nurses cleaning wards. *The Guardian*, 31st July 2012. Accessed on 15th October 2012 at <http://www.guardian.co.uk/society/2012/jul/31/labour-pressure-lansley-nurses-cleaning>
- Munro, S., Lewin, S., Swart, T. and Volmink, J. (2007). A review of health behaviour theories: how useful are these for developing interventions to promote long-term medication adherence for TB and HIV/AIDS? *BMC Public Health*, 7.
- Murphy, E., Dingwall, R., Greatbatch, D., Parker, S., Watson, P. (1998). Qualitative research methods in health technology assessment: a review of the literature. *Health Technology Assessment*, 2 (16): 1-276.
- Murphy, F. (2005). Preparing for the field: developing competence as an ethnographic field worker. *Nurse Researcher*, 12 (3): 52-60.
- Musgrave, C. R., Bookstaver, P. B., Sutton, S. S. and Miller, A. D. (2011). Use of alternative or adjuvant pharmacologic treatment strategies in the prevention and treatment of *Clostridium difficile* infection. *International Journal of Infectious Diseases*, 15 (7): E438-E448.

Naikoba, S. and Hayward, A. (2001). The effectiveness of interventions aimed at increasing handwashing in healthcare workers-a systematic review. *Journal of Hospital Infection*, 47 (3): 173-180.

National Audit Office. (2009). *Reducing Healthcare Associated Infections in Hospitals in England*. (HC 560 Session 2008-2009). London: National Audit Office.

National Institute for Occupational Safety and Health (NIOSH). (2011). *Engineering Controls*. Accessed online on 18th May 2012 at <http://www.cdc.gov/niosh/topics/engcontrols/>

National Patient Safety Agency. (2004). *Ready, steady, go! The full guide to implementing the cleanyourhands campaign in your Trust*. London: National Patient Safety Agency.

National Patient Safety Agency. (2006). *Learning through Action to Reduce Infection*. London: National Patient Safety Agency.

National Patient Safety Agency. (2010). *National Framework for reporting and Learning from Serious Incidents Requiring Investigation*. London: National Patient Safety Agency

NHS Centre for Reviews and Dissemination. (2009). *Undertaking systematic reviews of research on effectiveness: CRD's guidance for those carrying out or commissioning reviews*. (3rd ed). York: Centre for Reviews and Dissemination. Accessed online on 13th February 2009 at <http://www.york.ac.uk/inst/crd/SysRev/!SSL!/WebHelp/SysRev3.htm>

NHS Quality Improvement Scotland. (2008). *Healthcare associated infection standards*. Edinburgh, NHS Quality Improvement Scotland. Accessed online on 12th February 2009 at http://www.nhshealthquality.org/nhsqis/files/HAI_STNF_MAR08.pdf

NICE. (2008). *NICE: our guidance sets the standard for good healthcare*. Accessed online on 13th February 2009 at <http://www.nice.org.uk/media/888/38/ourguidancesetsstandard.pdf>

NICE. (2011). *Prevention and control of healthcare-associated infections - quality improvement guide*. Accessed online on 18th May 2012 at <http://www.nice.org.uk/media/842/61/HCAIQualityImprovementGuide.pdf>

Nicol, P., Watkins, R., Donovan, R., Wynaden, D. and Cadwallader, H. (2009). The power of vivid experience in hand hygiene compliance. *Journal of Hospital Infection*, 72 (1): 36-42.

- Nicolini, D. and Meznar, M. B. (1995). The Social Construction of Organizational Learning - Conceptual and Practical Issues in the Field. *Human Relations*, 48 (7): 727-746.
- Noar, S.M. and Zimmerman, R.S. (2005). Health Behaviour Theory and cumulative knowledge regarding health behaviours: are we moving in the right direction? *Health Educ. Res*, 20: 275-290.
- Noble, S. E., Welfare, M. and Seymour, K. (2009). The role of surgery in *Clostridium difficile* colitis. *British Medical Journal*, 338: b1563.
- Nursing and Midwifery Council. (2008). *The code: Standards of conduct, performance and ethics for nurses and midwives*. Nursing and Midwifery Council. Accessed online on 15th April 2011 at <http://www.nmc-uk.org/Publications/Standards/The-code/Introduction/>
- Nutley, S. M. and Davies, H. T. O. (2001). Developing organizational learning in the NHS. *Medical Education*, 35 (1): 35-42
- Oaten, M., Stevenson, R.J. and Case, T.I. (2009). Disgust as a disease avoidance Mechanism. *Psychological Bulletin*, 135: 303-321.
- Oborn, E., Barrett, M. And Racko, G. (2010). Knowledge translation in healthcare: A review of the literature. *Working Paper Series 5/2010*, Cambridge Judge Business School, University of Cambridge. Accessed online on 1st October 2012 at http://www.jbs.cam.ac.uk/research/working_papers/2010/index.html
- O'Boyle, C.A., Henly, S.J. and Larson, E. (2001). Understanding adherence to hand hygiene recommendations: the theory of planned behavior. *Am J Infect Control*, 29: 352-360.
- O'Cathain, A., Sampson, F. C., Munro, J. F., Thomas, K. J. and Nicholl, J. P. (2004). Nurses' views of using computerized decision support software in NHS Direct. *Journal of Advanced Nursing*, 45: 280-286.
- Odell, M. (2009). Single-sex accommodation in intensive care, a nurse consultant's View. *Journal of the Intensive Care Society*, 10 (4): 252.
- Office for National Statistics. (2008). *Health Statistics Quarterly 39*: 1-102. Accessed online on 20th July 2012 at <http://www.ons.gov.uk/ons/publications/all-releases.html?definition=tcm%3A77-21560>
- O'leary, D.F. and Mhaolru'naigh, S.N. (2012). Information-seeking behaviour of nurses: where is information sought and what processes are followed? *Journal of Advanced Nursing*, 68 (2): 379-390.

Olsen, S., Neale, G., Schwab, K., Psaila, B., Patel, T., Chapman, E.J. and Vincent, C. (2007). Hospital staff should use more than one method to detect adverse events and potential adverse events: incident reporting, pharmacist surveillance and local real-time record review may all have a place. *Qual Saf Health Care*, 16: 40-4.

Oughton, M. T., Loo, V. G., Dendukuri, N., Fenn, S. and Libman, M. D. (2009). Hand Hygiene with Soap and Water Is Superior to Alcohol Rub and Antiseptic Wipes for Removal of *Clostridium difficile*. *Infection Control and Hospital Epidemiology*, 30 (10): 939-944.

Pant, C., Sferra, T. J., Deshpande, A. and Minocha, A. (2011). Clinical approach to severe *Clostridium difficile* infection: Update for the hospital practitioner. *European Journal of Internal Medicine*, 22 (6): 561-568.

Parker, D. and Lawton, R. (2000). Judging the use of clinical protocols by fellow professionals. *Social Science and Medicine*, 51: 669-677.

Parker, D. and Lawton, R. (2003). Psychological contribution to the understanding of adverse events in health care. *Qual Saf Health Care*, 12: 453-457.

Perin, C. (1992). British Rail: the case of the unrocked boat. In *Workshop on Managing the Technological Risk in Industrial Society*, 14-16 May, Bad Homburg, Germany.

Perkins, M., Jensen, P.S., Jaccard, J., Gollwitzer, P., Oettingen, G., Pappadopulos, E. and Hoagwood, K.E. (2007). Applying Theory-Driven Approaches to Understanding and Modifying Clinicians' Behaviour: What Do We Know? *Psychiatric services*, 58 (3): 342-348.

Perneger, T. V. (2005). The Swiss cheese model of safety incidents: are there holes in the metaphor? *BMC Health Services Research*, 5.

Pessoa-Silva, C.L., Posfay-Barbe, K., Pfister, R., Touveneau, S., Perneger, T.V. and Pittet, D. (2005). Attitudes and perceptions toward hand hygiene among healthcare workers caring for critically ill neonates. *Infect Control Hosp Epidemiol*, 26: 305-311.

Pettigrew, A., Ferlie, E. and McKee, L. (1992). *Shaping Strategic Change*. London: Sage Publications.

Pittet, D. (2004). The Lowbury lecture: behaviour in infection control. *Journal of Hospital Infection*, 58: 1-13.

Pittet, D., Allegranzi, B., Storr, J., Bagheri Nejad, S., Dziekan, G., Leotsakos, A. and Donaldson, L. (2008). Infection control as a major World Health Organization priority for developing countries. *Journal of Hospital Infection*, 68 (4): 285-292.

Pittet, D. and Donaldson, L. (2005). Clean Care is Safer Care: The First Global Challenge of the WHO World Alliance for Patient Safety. *Infection Control and Hospital Epidemiology*, 26 (11): 891-894.

Pittet, D., Panesar, S. S., Wilson, K., Longtin, Y., Morris, T., Allan, V., Storr, J., Cleary, K. and Donaldson, L. (2011). Involving the patient to ask about hospital hand hygiene: a National Patient Safety Agency feasibility study. *Journal of Hospital Infection*, 77 (4): 299-303.

Pittet, D., Simon, A., Hugonnet, S., Pessoa-Silva, C-L., Sauvan, V. and Perneger, T-V. (2004). Hand hygiene among physicians: performance, beliefs, and perceptions. *Annals of Internal Medicine*, 141: 1-8.

Ploeg, J., Davies, B., Edwards, N., Gifford, W. and Elliot Millar, P. (2007). Factors influencing best-practice guideline implementation: lessons learned from administrators, nursing staff, and project leaders. *Worldviews on Evidenced Based Nursing*, 4 (4): 210-219.

Polit, D.F and Beck, C. T. (2008). *Nursing Research: Generating and Accessing Evidence for Nursing Practice*. (8th ed.). Philadelphia: Lippincott Williams and Wilkins.

Ponterotto, J.G. (2005). Qualitative Research in Counseling Psychology: A Primer on Research Paradigms and Philosophy of Science. *Journal of Counseling Psychology*, 52 (2): 126-136.

Pope, C. and Mays, N. (2006). Chapter 1. Qualitative Methods in Health Research. In: *Qualitative Research in Health Care* (3rd ed.). Blackwell Publishing Ltd. Oxford. (pp. 1-11).

Porzig-Drummond, R., Stevenson, R., Case, T. and Oaten, M. (2009). Can the emotion of disgust be harnessed to promote hand hygiene? Experimental and field-based tests. *Social Science and Medicine*, 68: 1006-1012.

Poutanen, S. M. and Simor, A. E. (2004). *Clostridium difficile*-associated diarrhea in adults: A Review. *Canadian Medical Association Journal*, 171 (1): 51-58.

Pratt, R. J., Loveday, H.P., Pellowe, C.M., Harper, P., Jones, S., Cookson, B. and Macqueen, S. (2003). *A comparison of international practices in the management and control of hospital-acquired infections. A Component of the VFM Follow-up Study of the National Audit Office Report: The Management and Control of Hospital Acquired Infections in Acute NHS Hospitals in England (2000)*. Richard Wells Research Centre, Thames Valley University, London. Accessed online on 18th July 2012 at <http://web.nao.org.uk/search/search.aspx?Schema=&terms=A+comparison+of+international+practices+in+the+management+and+control+of+hospital-acquired+infections>

Pratt, R.J. Pellowe, C.M., Wilson, J.A., Loveday, H.P., Harper, P.J., Jones, S.R.L.J., McDougall, C. and Wilcox, M.H. (2007). epic2: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England. *Journal of Hospital Infection*, 65, Supplement 1: S1-64.

Prieto, J. and Macleod Clark, J. (2005). Contact precautions for *Clostridium difficile* and Methicillin resistant *Staphylococcus aureus* . Assessing the impact of a supportive intervention to improve practice. *Journal of Research in Nursing*, 10 (5): 511-526.

Prochaska, J. and DiClemente, C. (1983). Stages and processes of self-change of smoking: towards an integrated model of change. *Journal of Consulting Clinical Psychology*, 51: 390-395.

Puffer, S. and Rashidian, A. (2004). Practice nurses' intentions to use clinical guidelines. *Journal of Advanced Nursing*, 47: 500-509.

Punch, M. (1994). Politics and ethics in qualitative research. In: Denzin, N.K. and Lincoln, Y.S. (Eds.). *Handbook of Qualitative Research*. Newbury Park, CA: Sage Publications, (pp. 83-97).

Rachman, S. (2004). 'Fear of contamination.' *Behaviour Research and Therapy* 42: 1227-1255.

Ranmuthugala, G., Plumb, J. J., Cunningham, F. C., Georgiou, A., Westbrook, J. I. and Braithwaite, J. (2011). How and why are communities of practice established in the healthcare sector? A systematic review of the literature. *BMC Health Services Research*, 11.

Rashman, L., Withers, E. and Hartley, J. (2008). *Organizational Learning, Knowledge and Capacity: A systematic literature review for policy-makers, managers and academics*. Department for Communities and Local Government: London.

Rasmussen, J. (1997). Risk management in a dynamic society: A modelling problem. *Safety Science*, 27 (2-3): 183-213.

Reason, J. (1990). *Human Error*. Cambridge: Cambridge University Press.

Reason, J. (1995). Understanding adverse events: human factors. *Quality in health care: QHC*, 4 (2): 80-89.

Reason, J. (1997). *Managing the risks of organizational accidents*. Aldershot, United Kingdom: Ashgate Avebury.

Reason, J. (1998). Achieving a safety culture: theory and practice. *Work and Stress*, 12 (3): 293-306.

Reason, J (2000). Human error: models and management. *BMJ*, 320: 768-770.

Reason, J., Hollnagel, E. and Paries, J. (2006). Revisiting the Swiss Cheese Model of Accidents. *EEC Note No. 13/06. Project Safbuild*. EUROCONTROL. Accessed online on 3rd February 2012 at http://www.eurocontrol.int/eec/public/standard_page/DOC_Report_2006_017.html

Reilly, J., Stewart, S., Allardice, G. A., Noone, A., Robertson, C., Walker, A. and Coubrough, S. (2008). Results from the Scottish National HAI prevalence survey. *Journal of Hospital Infection*, 69 (1): 62-68.

Renn, O. (1992). Concepts of risk: a classification. In: Krimsky S. and Golding D. (Eds.) *Social theories of risk*. Westport, CT. London: Praeger, (pp. 53-79).

Richards, L. (2009). *Handling qualitative data*. (2nd ed.). London: Sage Publications.

Riggs, M. M., Sethi, A. K., Zabarsky, T. F., Eckstein, E. C., Jump, R. L. P. and Donskey, C. J. (2007). Asymptomatic carriers are a potential source for transmission of epidemic and nonepidemic *Clostridium difficile* strains among long-term care facility residents. *Clinical Infectious Diseases*, 45 (8): 992-998.

Roberts, K., Hathway, A., Fletcher, L. A., Beggs, C. B., Elliott, M. W. and Sleigh, P. A. (2006). Bioaerosol production on a respiratory ward. *Indoor and Built Environment*, 15 (1): 35-40.

Roberts, K., Smith, C. F., Snelling, A. M., Kerr, K. G., Banfield, K. R., Sleigh, P. A. and Beggs, C. B. (2008). Aerial Dissemination of *Clostridium difficile* spores. *BMC Infectious Diseases*, 8.

Robertson, N., Baker, R. and Hearnshaw, H. (1996). Changing the clinical behaviour of doctors: A psychological framework. *Quality in Health Care*, 5, 51-54.

Rogers, E.M. (2003). *Diffusion of innovations*. (5th ed.). New York: Free Press.

Rogers, R.W. (1983). Cognitive and physiological processes in fear appeals and attitude change: a revised theory of protection motivation. In: Cacioppo, J.R. and Petty, R.E. (Eds.). *Social Psychology: A Sourcebook*. New York: Guilford Press, (pp. 153-176).

Rolfe, G. (2006). Validity, trustworthiness and rigour: quality and the idea of qualitative research. *Journal of Advanced Nursing*, 53 (3): 304-310.

Rossello-Urgell, J., Vaque-Rafart, J., Armadans-Gil, L. L., Vaquero-Puerta, J. L., Elorza-Ricart, J. M., Quintas-Fernandez, J. C., Hidalgo-Pardo, O., Arevalo-Alonso, J. M. and Grp, E. W. (2004). The importance of the day of the week and duration of data collection in prevalence surveys of nosocomial infections. *Journal of Hospital Infection*, 57 (2): 132-138.

Rotter, J.B. (1954). *Social learning and clinical psychology*. New York: Prentice-Hall.

Royal College of Nursing (2006). *Informed consent in health and social care research. RCN guidance for nurses*. Accessed online on 22nd January 2009 at http://www.rcn.org.uk/__data/assets/pdf_file/0010/78607/002267.pdf

Royal College of Nursing (2008). *Defending Dignity - Challenges and opportunities for nursing*. London: Royal College of Nursing.

Rupp, M. E., Fitzgerald, T., Puumala, S., Anderson, J. R., Craig, R., Iwen, P. C., Jourdan, D., Keuchel, J., Marion, N., Peterson, D., Sholtz, L. and Smith, V. (2008). Prospective, controlled, cross-over trial of alcohol-based hand gel in critical care units. *Infection Control and Hospital Epidemiology*, 29: 8-15.

Rycroft-Malone, J. (2004). The PARIHS framework-a framework for guiding the implementation of evidence-based practice. *Journal of Nursing Care Quality*, 19 (4): 297-304.

Rycroft-Malone, J., Fontenla, M., Bick, D. and Seers, K. (2008). Protocol based care: impact on roles and service delivery. *Journal of Evaluation in Clinical Practice*, 14: 867-873.

Rycroft-Malone, J., Fontenla, M., Bick, D. and Seers, K. (2010). A realistic evaluation: the case of protocol-based care. *Implementation Science*, 5.

Rycroft-Malone, J., Fontenla, M., Seers, K. and Bick, D. (2009). Protocol-based care: the standardisation of decision-making? *Journal of Clinical Nursing*, 18: 1490-1500.

Rycroft-Malone J., Seers K., Titchen A., Harvey G., Kitson A. and McCormack B. (2004). What counts as evidence in evidence-based practice? *Journal of Advanced Nursing*, 47: 81-90.

Sackett, D.L. Rosenberg, W.M.C., Muir Gray, J.A., Haynes, R.B. and Richardson, W.S. (1996). Evidence based medicine: what it is and what it isn't. *BMJ*, 312 (7023): 71-72.

Saldana, J. (2010). *The Coding Manual for Qualitative Researchers*. London: Sage Publications.

- Sandelowski, M. (1993). Rigor or rigor mortis: the problem of rigor in qualitative research revisited. *Advances in Nursing Science*, 16 (2): 1-8.
- Sax, H., Hugonnet, S., Harbarth, S., Herrault, P. and Pittet, D. (2001). Variation in nosocomial infection prevalence according to patient care setting: a hospital-wide survey. *Journal of Hospital Infection*, 48 (1): 27-32.
- Schluter, J., Winch, S., Holzhauser, K. and Henderson, A. (2008). Nurses' moral sensitivity and hospital ethical climate: A literature review. *Nursing Ethics*, 15 (3): 304-321.
- Scholefield, H. (2007). Embedding quality improvement and patient safety at Liverpool Women's NHS Foundation Trust. *Best Practice and Research Clinical Obstetrics and Gynaecology*, 21 (4): 593-607.
- Schultz, T. J. and Kitson, A. L. (2010). Measuring the context of care in an Australian acute care hospital: a nurse survey. *Implementation Science*, 5.
- Schwandt, T. A. (2001). *Dictionary of qualitative inquiry* (2nd ed.). Thousand Oaks, CA: Sage Publications.
- Scott, J. (2000). Rational Choice Theory. In: *Understanding Contemporary Society: Theories of The Present*, (Eds.). Browning, G., Halcli, A. and Webster, F. Thousand Oaks, CA: Sage Publications.
- Scott, P., Ross, P. and Prytherch, D. (2012). Evidence-based inpatient handovers - a literature review and research agenda. *Clinical Governance: An International Journal*, 17 (1): 14-27.
- Scottish Executive Health Department. (2004). *The NHS Scotland code of practice for the local management of hygiene and healthcare associated infection*. Edinburgh: Scottish Executive Health Department. Accessed online on 18th May 2012 at <http://www.scotland.gov.uk/Resource/Doc/25954/0013320.pdf>
- Seers, K., Cox, K., Crichton, N. J., Edwards, R. T., Eldh, A. C., Estabrooks, C. A., Harvey, G., Hawkes, C., Kitson, A., Linck, P., McCarthy, G., McCormack, B., Mockford, C., Rycroft-Malone, J., Titchen, A. and Wallin, L. (2012). FIRE (Facilitating Implementation of Research Evidence): a study protocol. *Implementation Science*, 7.
- Seiden, S.C., Galvan, C. and Lamm, R. (2006). Role of medical students in preventing patient harm and enhancing patient safety. *Qual Saf Health Care*, 15: 272-276.
- Semler, R. (1993). *Maverick!: The success story behind the world's most unusual workplace*. London: Century, The Random House Group Ltd.

- Semler, R. (2003). *The seven-day weekend. A better way to work in the 21st century*. London: Century, The Random House Group Ltd.
- Seregin, S. S., Aldhamen, Y. A., Rastall, D. P. W., Godbehere, S. and Amalfitano, A. (2012). Adenovirus-based vaccination against *Clostridium difficile* toxin A allows for rapid humoral immunity and complete protection from toxin A lethal challenge in mice. *Vaccine*, 30 (8): 1492-1501.
- Sethi, A. K., Al-Nassir, W. N., Nerandzic, M. M., Bobulsky, G. S. and Donskey, C. J. (2010). Persistence of Skin Contamination and Environmental Shedding of *Clostridium difficile* during and after Treatment of *C-difficile* Infection. *Infection Control and Hospital Epidemiology*, 31 (1): 21-27.
- Shannon-Lowe, J., Matheson, N. J., Cooke, F. J. and Aliyu, S. H. (2010). Prevention and medical management of *Clostridium difficile* infection. *British Medical Journal*, 340: c1296.
- Shearn, P. (2004). *Workforce participation in the management of occupational health and safety. HSL/2005/09*. Sudbury: HSE Books.
- Sheeran, P. (2002). Intention-behaviour relations: a conceptual and empirical review. *European Review of Social Psychology*, 12: 1-36.
- Sheeran, P. and Silverman, M. (2003). Evaluation of three interventions to promote workplace health and safety: evidence for the utility of implementation intentions. *Social Science and Medicine*, 56: 2153-2163.
- Shepherd, R. (2008). Decision Making in Eating Behaviour: Integrating Perspectives from the Individual, Family, and Environment. Accessed online on 11th February 2009 at <http://www3.niddk.nih.gov/fund/other/decision2008/Summaries/ShepherdSummary.pdf>
- Shorrocks, S., Young, M., Faulkner, J. (2005). Who moved my (Swiss) cheese? *Aircraft and Aerospace*, January/February: 31-33.
- Sinh, P., Barrett, T. A. and Yun, L. (2011). *Clostridium difficile* Infection and Inflammatory Bowel Disease: A Review. *Gastroenterology Research and Practice*, 136064.
- Sinuff, T., Eva, K.W., Meade, M., Dodek, P., Heyland, D. and Cook, D. (2007). Clinical practice guidelines in the intensive care unit: a survey of Canadian clinicians' attitudes. *Can J Anesth*, 54 (9): 728-736.
- Skar, S., Sniehotta, F.F., Araujo-Soares, V. and Molloy, G.J. (2008). Prediction of Behaviour vs. Prediction of Behaviour Change: The Role of Motivational Moderators in the Theory of Planned Behaviour. *Applied Psychology*, 57 (4): 609-627.

- Skinner, B. F. (1974). Behavior-modification, *Science*, 185 (4154): 813-813.
- Slovic, P., Fischhoff, B. and Liechtenstein, S. (1986). Why study risk perception? *Risk Analysis*, 2 (2): 83-93.
- Smith, S.J., Young, V., Robertson, C. and Dancer, S.J. (2012). Where do hands go? An audit of sequential hand-touch events on a hospital ward. *Journal of Hospital Infection*, in press: 1-6.
- Smyth, E. T. M., McIlvenny, G., Enstone, J. E., Emmerson, A. M., Humphreys, H., Fitzpatrick, F., Davies, E., Newcombe, R. G., Spencer, R. C. and Hosp Infection Soc Prevalence, S. (2008). Four country healthcare associated infection prevalence survey 2006: overview of the results. *Journal of Hospital Infection*, 69 (3): 230-248.
- Snow, M, White Jr, G.L., Alder, S.C. and Stanford, J.B. (2006). Mentor's hand hygiene practices influence student's hand hygiene rates. *Am J Infect Control*, 34 (1): 18-24.
- Sparks, P., James,R., Conner,M., Shepherd, R. and Povey,R. (2001). Ambivalence about health-related behaviors: an exploration in the domain of food choice. *British Journal of Health Psychology*, 6: 53-68.
- Spear, S. J. and Schmidhofer, M. (2005). Ambiguity and workarounds as contributors to medical error. *Annals of Internal Medicine*, 142.
- Squires, J.E., Moralejo, D. and LeFort, S. (2007). Exploring the role of organizational policies and procedures in promoting research utilization in registered nurses. *Implementation Science*, 2: 17.
- Stake, R.E. (1995). *The Art of Case Study Research*. Thousand Oaks, CA: Sage Publications.
- Stecher, B. and Hardt, W.-D. (2011). Mechanisms controlling pathogen colonization of the gut. *Current Opinion in Microbiology*, 14 (1): 82-91.
- Stetler, C.B., Ritchie, J., Rycroft-Malone, J., Schultz, A., and Charns, M. (2007). Improving quality of care through routine, successful implementation of evidence-based practice at the bedside: an organizational case study protocol using the Pettigrew and Whipp model of strategic change. *Implementation Science*, 2: 3.
- Stone, S. P., Fuller, C., Savage, J., Cookson, B., Hayward, A., Cooper, B., Duckworth, G., Michie, S., Murray, M., Jeanes, A., Roberts, J., Teare, L. and Charlett, A. (2012). Evaluation of the national Cleanyourhands campaign to reduce *Staphylococcus aureus* bacteraemia and *Clostridium difficile* infection in hospitals in England and Wales by improved hand hygiene: four year, prospective, ecological, interrupted time series study. *BMJ*, 344: e3005.

- Struwe, J., Dumpis, U., Gulbinovic, J., Lagergren, A. and Bergman, U. (2006). Healthcare associated infections in university hospitals in Latvia, Lithuania and Sweden: a simple protocol for quality assessment. *Euro surveillance : bulletin europeen sur les maladies transmissibles = European communicable disease bulletin*, 11 (7): 167-171.
- Sunenshine, R. H. and McDonald, L. C. (2006). *Clostridium difficile*-associated disease: New challenges from an established pathogen. *Cleveland Clinic Journal of Medicine*, 73 (2): 187-197.
- Tanenbaum, S. J. (1994). Knowing and acting in medical practice-The epistemological politics of outcomes research. *Journal of Health Politics Policy and Law*, 19: 27-44.
- Tedesco, F.J., Gordon, D. and Fortson, W.C. (1985). Approach to patients with multiple relapses of antibiotic-associated pseudomembranous colitis. *Am J Gastroenterol*, 80: 867-868.
- Tetroe, J.M., Graham, I.D., Foy, R., Robinson, N., Eccles, M.P., Wensing, M., Durieux, P., Legare, F., Nielson, C.P., Adily, A., Ward, J.E., Porter, C., Shea, B. and Grimshaw, J.M. (2008). Health Research Funding Agencies' Support and Promotion of Knowledge Translation: An International Study. *The Milbank Quarterly*, 86 (1): 125-155.
- The RAISIN Group Working Group. (2009). "RAISIN" - a national programme for early warning, investigation, and surveillance of healthcare-associated infection in France. *Euro Surveill.* 14 (46): pii=19408. Accessed online on 3rd May 2012 at <http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19408>
- Thomas, L., Cullum, N., McColl, E., Rousseau, N., Soutter, J. and Steen, N. (1999). Guidelines in professions allied to medicine. *Cochrane Database of Systematic Reviews*, (1). (Reprinted 2009).
- Toft, B. and Mascie-Taylor, H. (2005). Involuntary automaticity: a work-system induced risk to safe health care. *Health services management research: an official journal of the Association of University Programs in Health Administration / HSMC, AUPHA*, 18 (4): 211-216.
- Triandis, H. C. (1980). Values, attitudes, and interpersonal behavior. In: Howe, H. and Page, M.M. (Eds.), *Nebraska Symposium on Motivation 1979*, Lincoln, Nebraska: University of Nebraska Press, (pp.195-295).
- Trifiletti, L. B., Gielen, A. C., Sleet, D. A. and Hopkins, K. (2005). Behavioral and social sciences theories and models: are they used in unintentional injury prevention research? *Health Education Research*, 20 (3): 298-307.

Tucker, A. L. and Edmondson, A. C. (2003). Why hospitals don't learn from failures: Organizational and psychological dynamics that inhibit system change. *California Management Review*, 45 (2): 55-72.

Umscheid, C. A., Mitchell, M. D., Doshi, J. A., Agarwal, R., Williams, K. and Brennan, P. J. (2011). Estimating the Proportion of Healthcare-Associated Infections That Are Reasonably Preventable and the Related Mortality and Costs. *Infection Control and Hospital Epidemiology*, 32 (2): 101-114.

Van Gemert-Pijnen, J., Hendrix, M. G. R., van der Palen, J. and Schellens, P. J. (2005). Performance of methicillin-resistant *Staphylococcus aureus* protocols in Dutch hospitals. *American Journal of Infection Control*, 33.

Van Maanen, J. (1988). *Tales of the field: On writing ethnography*. Chicago: University of Chicago Press.

Vaughan, D. (1996). *The Challenger launch decision: Risky technology, culture and deviance at NASA*. Chicago: Chicago University Press.

Verhoeven, F., Steehouder, M.F., Hendrix, R.M.G., Van Gemert-Pijnen, J.E.W.C. (2009). Factors affecting health care workers' adoption of a website with infection control guidelines. *International Journal of Medical Informatics*, 78: 663-678.

Verhoeven, F., Steehouder, M. F., Hendrix, R. M. G. and Van Gemert-Pijnen, J. E. W. C. (2010). From expert-driven to user-oriented communication of infection control guidelines. *International Journal of Human-Computer Studies*, 68.

Vernaz, N., Sax, H., Pittet, D., Bonnabry, P., Schrenzel, J., Harbarth, S. (2008). Temporal effects of antibiotic use and hand rub consumption on the incidence of MRSA and *Clostridium difficile*. *J Antimicrob Chemother*, 62 : 601-617.

Vincent, C., Stanhope, N. and Crowley-Murphy, M. (1999). Reasons for not reporting adverse incidents: an empirical study. *Journal of Evaluation in Clinical Practice*, 5 (1): 13-21.

Vincent, C., Taylor-Adams, S. and Stanhope, N. (1998). Framework for analysing risk and safety in clinical medicine. *BMJ*, 316 (7138): 1154-1157.

Vonberg, R. P., Kuijper, E. J., Wilcox, M. H., Barbut, F., Tull, P., Gastmeier, P., on behalf of the European *C.difficile*-Infection Control Group and the European Centre for Disease Prevention and Control (ECDC), van den Broek, P. J., Colville, A., Coignard, B., Daha, T., Debast, S., Duerden, B. I., van den Hof, S., van der Kooi, T., Maarleveld, H. J. H., Nagy, E., Notermans, D. W., O'Driscoll, J., Patel, B., Stone, S., Wiuff, C. (2008). Infection control measures to limit the spread of *Clostridium difficile*. *Clinical Microbiology and Infection*, 14: 2-20.

Voss, A. and Widmer, A. F. (1997). No time for handwashing!? Handwashing versus alcoholic rub: can we afford 100% compliance? *Infection Control and Hospital Epidemiology*, 18 (3): 205-208.

Wagenvoort, J.H.T. (2000). Dutch measures to control MRSA and the expanding European Union. *Eurosurveillance*, 5: 26-28. Accessed online on 19th February 2009 at <http://www.eurosurveillance.org/em/v05n03/0503-222.asp>

Wakefield, J.G., McLaws, M-L., Whitby, M. and Patton, L. (2010). Patient safety culture: factors that influence clinician involvement in patient safety behaviours. *Qual Saf Health Care*, 19: 585-591.

Walker, A. S., Eyre, D. W., Wyllie, D. H., Dingle, K. E., Harding, R. M., O'Connor, L., Griffiths, D., Vaughan, A., Finney, J., Wilcox, M. H., Crook, D. W., Peto, T. E. A. and Infections Oxfordshire Res, D. (2012). Characterisation of *Clostridium difficile* Hospital Ward-Based Transmission Using Extensive Epidemiological Data and Molecular Typing. *Plos Medicine*, 9 (2): e1001172.

Walkling-Lea, C. (2004). Danger, protocol: handle with care! *Journal of Integrated Care Pathways*, 8: 42-43.

Ward, D. J. (2011). The role of education in the prevention and control of infection: A review of the literature. *Nurse Education Today*, 31.

Waring, J. (2005). Beyond blame: cultural barriers to medical incident. *Social Science and medicine*, 60: 1927-1935.

Washer, P. and Joffe, H. (2006). The ‘‘hospital superbug’’: Social representations of MRSA. *Social Science and Medicine*, 63 (8): 2141-2152.

Waterson, P. (2009). A systems ergonomics analysis of the Maidstone and Tunbridge Wells infection outbreaks. *Ergonomics*, 52 (10): 1196-1205.

Watson, P.W.B. and Myers, L.B. (2001). Which cognitive factors predict clinical glove use amongst nurses? *Psychology, Health and Medicine*, 10: 399-409.

Weber, D. J., Rutala, W. A., Miller, M. B., Huslage, K. and Sickbert-Bennett, E. (2010). Role of hospital surfaces in the transmission of emerging health care-associated pathogens: Norovirus, *Clostridium difficile*, and Acinetobacter species. *American Journal of Infection Control*, 38 (5): S25-S33.

Weick, K.E. (1990). The vulnerable system: An analysis of the Tenerife air disaster. *Journal of Management*, 16 (3): 571-593.

Weick, K.E. and Sutcliffe, K.M. (2003). Hospitals as cultures of re-enactment: a re-analysis of the Bristol Royal Infirmary. *California Management Review*. 45 (2): 73-84.

Weinstein, N.D. (1980). Unrealistic optimism about future life events. *Journal of Personality and Social Psychology*, 39: 806-820.

Welsh Assembly Government. (2004). *Healthcare Associated Infections - A Strategy for Hospitals in Wales*, Cardiff: Welsh Assembly Government.

Whitaker, M, P. (1996). Reflexivity. In: Barnard, A. and Spencer, J. (Eds.). *Encyclopaedia of Social and Cultural Anthropology*, (2nd ed.). London: Routledge, (pp. 478-482).

Whitby, M., McLaws, M-L. and Ross, R.W. (2006). Why healthcare workers don't wash their hands: a behavioral explanation. *Infection Control Hospital Epidemiology*, 27: 484-492.

Wilcox, M.H. and Fawley, W.N. (2000). Hospital disinfectants and spore formation by *Clostridium difficile*. *Lancet*, 356: 1324.

Wilcox, M. H., Fawley, W. N., Wigglesworth, N., Parnell, P., Verity, P. and 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 (2): 109-114.

Williams, O. M. and Spencer, R. C. (2009). The management of *Clostridium difficile* infection. *British Medical Bulletin*, 91 (1): 87-110.

Wilson, A. P. R., Gibbons, C., Reeves, B. C., Hodgson, B., Liu, M., Plummer, D., Krukowski, Z. H., Bruce, J., Wilson, J. and Pearson, A. (2004). Surgical wound infection as a performance indicator: agreement of common definitions of wound infection in 4773 patients. *British Medical Journal*, 329 (7468): 720-723.

Wilson, T.D. (1999). Exploring models of information behaviour: the 'uncertainty' project. *Information Processing and Management*, 35 (6): 839-849.

Wind, G. (2008). Negotiated interactive observation: Doing fieldwork in hospital settings. *Anthropology and Medicine*, 15 (2): 79 - 89.

Wood, C. (2002). Introducing a protocol for procedural pain. *Paediatric Nursing*, 14: 30-33.

World Health Organization. (2002). *Prevention of hospital-acquired infections. A practical guide*. (2nd ed.) Accessed online on 16th February 2009 at <http://www.who.int/csr/resources/publications/whocdscsreph200212.pdf>

World Health Organization. (2006). London Declaration: Patients for Patient Safety. Geneva, Switzerland: World Health Organization. Accessed online on 26th May 2012 at http://www.who.int/patientsafety/patients_for_patient/London_Declaration_EN.pdf

World Health Organization. (2009). *WHO Guidelines for Hand Hygiene in Health Care*. First Global Patient Safety Challenge Clean Care is Safer Care. Geneva: World Health Organization. Accessed online 3rd February 2012 at http://whqlibdoc.who.int/publications/2009/9789241597906_eng.pdf

Yagasaki, K. and Komatsu, H. (2011). Preconditions for successful guideline implementation: Perceptions of oncology nurses. *BMC Nursing*, 10: 23.

Yin, R.K. (2009). *Case study research, designs and method*. (4th ed). Thousand Oaks, CA: Sage Publications.

Zuzelo, P.R. (2007). Exploring the moral distress of registered nurses. *Nursing Ethics*, 14 (3): 344-359.

Appendices

Appendix 1	Literature Search Strategy.....	468
Appendix 2a	Studies Predicting Intention.....	470
Appendix 2b	Studies Predicting Behaviour.....	472
Appendix 3a	Letter from Infection Control Director.....	473
Appendix 3b	Ethics Approval.....	474
Appendix 4	Plan of Ward.....	477
Appendix 5a	Research Poster.....	478
Appendix 5b	Participant Leaflet.....	479
Appendix 6	Eligibility Criteria.....	481
Appendix 7a	Staff: Information Sheet, Consent Form.....	483
Appendix 7b	Patient: Information Sheet, Consent Form...	486
Appendix 7c	Visitor: Information Sheet, Consent Form...	489
Appendix 8	Observation Record.....	492
Appendix 9a	Staff: Interview Topic Guide.....	493
Appendix 9bi	Patient: Interview Topic Guide.....	495
Appendix 9bii	Patient: Interview Topic Guide.....	497
Appendix 9c	Visitor: Interview Topic Guide.....	499
Appendix 10	Example of Coding.....	501
Appendix 11:	Empirical findings from this study mapped onto Michie <i>et al's</i> (2005) Framework.....	502

Appendix 1

Relevant articles were identified using a wide range of key words grouped into categories. Examples of key words used are listed below.

Concept One: Key words relating to “healthcare professionals” “patient” “visitor” [doctor, physician, nurse, medical professional, allied health, allied health practitioner, allied health personnel, ancillary staff, visitor, relative, patient].

Concept Two: Key words relating to “evidence-based practice” [protocol, guideline, implementation, evidence, use, getting knowledge into practice, getting research into practice, translating research into practice, knowledge exchange, knowledge transfer, knowledge use, diffusion of innovation, evidence-based practice, research utilization, research use, research transfer, research uptake, research translation, knowledge translation, evidence translation, evidence uptake, adherence, compliance, bundle].

Concept Three: Key words relating to “behavioural theory” [behaviour, behavior, model, theory, framework, social cognitive model, theory of planned behaviour]

Concept Four: Key words relating to “healthcare-associated infection” [nosocomial infection, healthcare-infection, MRSA, *Clostridium difficile*, infection control, infection control practice, contact precautions, universal precautions]

Time period: Jan 2000 – October 2012

Studies included: National & international studies

Language: English only

MESH or INDEX terms (where available) were searched in title or abstract.

The following electronic databases were searched:

- QSHC
- COCHRANE LIBRARY
- MEDLINE
- PUBMED

- EMBASE
- CINAHL
- PSYCLIT
- PsycARTICLES
- PsycINFO

- BUSINESS SOURCE PREMIER
- ABI INFORM GLOBAL
- CSA
- WEB OF KNOWLEDGE
- EBSCO
- JSTOR
- Google Scholar
- Biomed Central Gateway
- TRIP Database
- Journal citation reports

Indexes of relevant journals were also hand searched. These include QSHC Online, British Medical Journal, Journal of Hospital Infection, Journal of Infection Prevention, British Journal of Infection Control, American Journal of Infection Control, Infection Control and Hospital Epidemiology, The New England Journal of Medicine, International Journal for Quality in Health Care, Sage Publications, Journal of Research in Nursing, Qualitative Health Research, Western Journal Nursing Research, Science Direct, Worldviews on Evidence-Based Nursing.

The reference lists of retrieved papers were searched for additional studies.

Appendix 2a: Studies predicting health professionals' intention

Study	1. Type of participant 2. Sample size	1. Theoretical Framework 2. Behaviour studied	Measure of intention Nb of items (PQ) ^a	Final model	R ²
Godin <i>et al.</i> 1998	1. Physicians 2. 667	1. Theory of Planned Behaviour 2. Wearing gloves	1	<ul style="list-style-type: none"> • Attitude • Perceived behavioural control • Perceived social norm • Perceived risk • Habit • Age 	O/S
Godin <i>et al.</i> 2000	1. Nurses 2. 156	1. Theory of Planned Behaviour 2. Adherence to universal precautions for venipuncture	4 (0.82)	<ul style="list-style-type: none"> • Barriers • Subjective norm • Personal normative beliefs 	0.68

Source: Godin *et al.*, 2008

Appendix 2a: Studies aimed at predicting health professionals' intention

Study	1. Type of participant 2. Sample size	1.Theoretical Framework 2. Behaviour studied	Measure of intention Nb of items (PQ) ^a	Final model	R ²
Jenner <i>et al.</i> 2002	1. Health professionals 2.104	1. Theory of Planned Behaviour 2. Hand hygiene practice	4 (0.78)	<ul style="list-style-type: none"> • Attitude • Personal responsibility 	O/S
Levin 1999	1. Nurses and medical laboratory workers	1. Theory of Planned Behaviour 2. Wearing gloves	1	<ul style="list-style-type: none"> • Attitude • Perceived behavioural control • Perceived risk 	0.73
Maue <i>et al.</i> 2004	1. Physician and nurse practitioners 2. 60	1. Theory of Planned Behaviour 2. Compliance with guidelines	2 (>0.60)	<ul style="list-style-type: none"> • Attitude • Perceived behavioural control • Level of difficulty 	0.68
O'Boyle <i>et al.</i> 2001	1. Nurses 2. 120	1. Theory of Planned Behaviour 2. Adherence to hand hygiene recommendations	5 (0.74)	<ul style="list-style-type: none"> • Subjective norm • Control belief 	0.56
Pessoa-silva <i>et al.</i> 2005	1. Health workers 2. 61	1. Theory of Planned Behaviour 2. Hand hygiene	12 (0.81)	<ul style="list-style-type: none"> • Perceived difficulties • Subjective norm 	O/S

Appendix 2b: Studies aimed at predicting health professionals' behaviour

Study	1. Type of participant 2. Sample size	1.Theoretical Framework 2. Behaviour studied	Measure of behaviour	Correspondence between intention and behaviour	Final model	R ²
Godin <i>et al.</i> 2000	1. Nurses 2. 105	1. Theory of Planned Behaviour 2. Adherence to universal precautions for venipuncture	Number of times nurses adhered to universal precautions	Good	<ul style="list-style-type: none"> • Intention • Perceived behavioural control 	0.28
Maue <i>et al.</i> 2004	1. Providers 2. 33	1. Theory of Planned Behaviour 2. Compliance with practice guidelines	Medical record audits Observation	Good	<ul style="list-style-type: none"> • Attitude 	0.0076
O'Boyle <i>et al.</i> 2001	1. Nurses 2. 120	1. Theory of Planned Behaviour 2. Adherence to hand hygiene recommendations	Observation	Poor	<ul style="list-style-type: none"> • Intensity of activity in the unit 	0.12

Source: Godin *et al.*, 2008

Appendix 3a: Permission From The Hospital

21 April 2010

To whom it may concern:

Re: PhD studies of Julie Rasmussen

I can confirm that I am happy to support Julie Rasmussen's PhD studies entitled "Exploring the Use of Protocols and Guidelines in the Management of Healthcare-Associated Infection: A Case Study".

I have had several meetings with Julie concerning her study, she will need to study two wards within the **** as part of her work and I am happy to support this work within the hospital subject to appropriate R&D and ethical approval.


The work is of great interest to those of us engaged in managing healthcare associated infections and I look forward to seeing the results of her study in due course.

With kind regards,

*Consultant Medical Microbiologist and Director of Infection Prevention and Control Department, **** NHS Trust*



Appendix 3b: Ethics Approval

	GIG CYMRU NHS WALES	Canolfan Gwasanaethau Busnes Business Services	Research Ethics Committee Panel C
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Ms Julie Rasmussen
Doctoral Student
University of Warwick

12 July 2010

Dear Ms Rasmussen

Study Title: Exploring the use of infection control protocols and guidelines in the management of healthcare-associated infection: A Case Study

REC reference number: 10/WSE03/20

Protocol number: N/A

Thank you for your letter of the 30 June 2010, responding to the Committee's request for further information on the above research, and for submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

Confirmation of ethical opinion

On behalf of the Committee, I am pleased to confirm a favourable ethical opinion for the above research on the basis described in the application form, protocol and supporting documentation [as revised], subject to the conditions specified below.

Ethical review of research sites

The favourable opinion applies to all NHS sites taking part in the study, subject to management permission being obtained from the NHS/HSC R&D office prior to the start of the study (see "Conditions of the favourable opinion" below).

Conditions of the favourable opinion

The favourable opinion is subject to the following conditions being met prior to the start of the study.

- Management permission or approval must be obtained from each host organisation prior to the start of the study at the site concerned.
- For NHS research sites only, management permission for research ("R&D approval") should be obtained from the relevant care organisation(s) in accordance with NHS research governance arrangements.

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- Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rdforum.nhs.uk>. *Where the only involvement of the NHS organisation is as a Participant Identification Centre, management permission for research is not required but the R&D office should be notified of the study. Guidance should be sought from the R&D office where necessary.*
- Sponsors are not required to notify the Committee of approvals from host organisations.
- It is the responsibility of the sponsor to ensure that all the conditions are complied with before the start of the study or its initiation at a particular site (as applicable).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Investigator CV	J Rasmussen	01 May 2010
Protocol	1	27 April 2010
Observation Record	1 - Appendix 1	01 May 2010
Topic Guide for Interviews - Patients without infection	1 - Appendix 2b	01 May 2010
REC application	2.5	14 May 2010
Covering Letter	J Rasmussen	20 May 2010
Letter from Sponsor	University of Warwick - Appendix 10	17 May 2010
Letter from Sponsor	Warwick University	17 May 2010
Advertisement	1 - Appendix 4a	01 May 2000
Response to Request for Further Information	J Rasmussen	30 June 2010
Participant Information Sheet: Government Leaflet on Clostridium difficile	Appendix 6	
Participant Information Sheet: Staff Information Sheet	2 - Appendix 5a	07 June 2010
Participant Information Sheet: Staff, Patients and Visitors	2 - Appendix 4b	07 June 2010
Participant Information Sheet: Patient Information Sheet	2 - Appendix 5b	07 June 2010
Participant Information Sheet: Visitor Information Sheet	2 - Appendix 5c	07 June 2010
Participant Information Sheet: Patient Information Sheet	2 - Appendix 7	07 June 2010
Participant Consent Form: Staff Consent Form	2	07 June 2010
Participant Consent Form: Patient Consent Form	2	07 June 2010
Participant Consent Form: Visitor Consent Form	2	07 June 2010
Participant Consent Form: Patient Consent Form	2	07 June 2010
Topic Guide for Staff Interviews	1 - Appendix 2a	01 May 2010
Topic Guide for Interviews - Patients with infection	1 - Appendix 2c	01 May 2010
Letter from Cardiff & Vale NHS Trust	Appendix 3	21 April 2010
Topic Guide for Interviews - Visitors	1 - Appendix 2d	01 May 2010
Upgrade Comments	Appendix 8	28 April 2009
Alison & Sue Vignette Transcript	1 - Appendix 9	01 May 2010
Evidence of insurance or indemnity	Zurich Commercial - Appendix 11	17 July 2009

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees (July 2001) and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Now that you have completed the application process please visit the National Research Ethics Service website > After Review

You are invited to give your view of the service that you have received from the National Research Ethics Service and the application procedure. If you wish to make your views known please use the feedback form available on the website.

The attached document "*After ethical review – guidance for researchers*" gives detailed guidance on reporting requirements for studies with a favourable opinion, including:

- Notifying substantial amendments
- Adding new sites and investigators
- Progress and safety reports
- Notifying the end of the study

The NRES website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

We would also like to inform you that we consult regularly with stakeholders to improve our service. If you would like to join our Reference Group please email referencegroup@nres.npsa.nhs.uk.

10/WSE03/20	Please quote this number on all correspondence
-------------	--

Yours sincerely



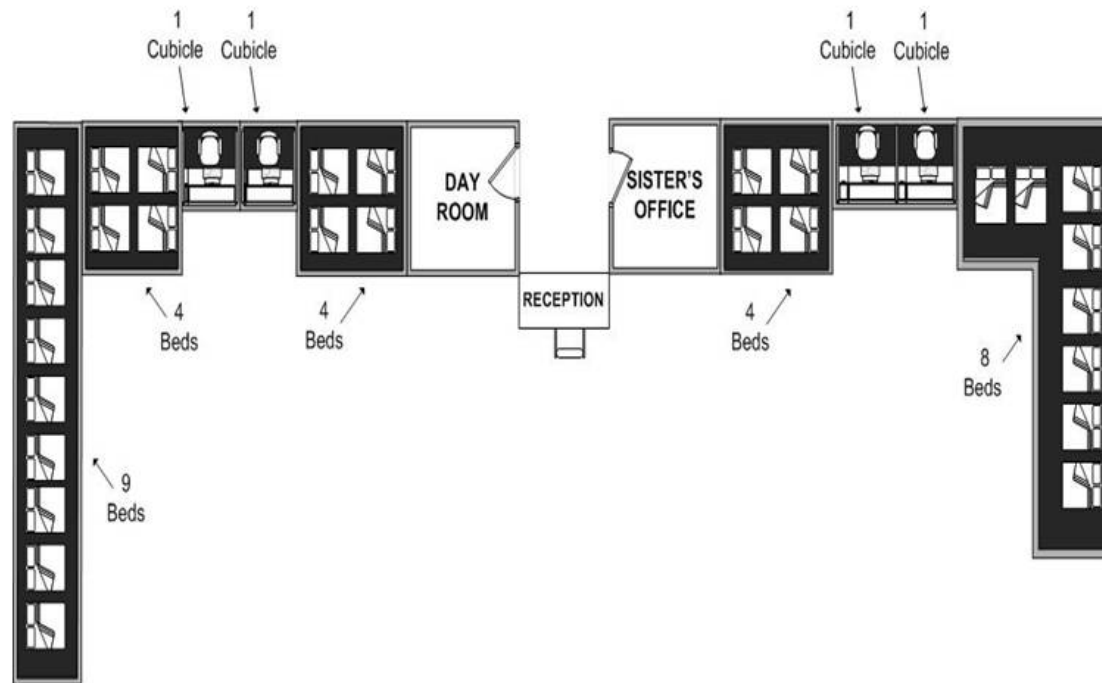
Chair, Panel C
Research Ethics Committees

Enclosures: "After ethical review – guidance for researchers" SL- AR2

Copy to: R & D Office

Professor K Seers, School of Health & Social Studies, University of Warwick, Coventry, CV4 7AL

APPENDIX 4 PLAN OF WARD



The prevention and control of *Clostridium difficile* infection: A case study to explore the use of protocols and guidelines

1. Background

Healthcare-associated infections are a challenge worldwide. *Clostridium difficile* is responsible for one of the problematic infections. It is resistant to many antibiotics and forms spores which can survive for long periods in the hospital environment. The germ can live in the human bowel without causing any symptoms. Once the normal balance of bacteria is altered following treatment with antibiotics, *Clostridium difficile* can multiply and cause infection¹. Patients who become infected often require a longer stay in hospital, their treatment can be more complicated, and the consequences can be severe, sometimes resulting in disability or death.

Effective implementation of hospital protocols and guidelines is key in the prevention and control of healthcare-associated infection². These documents lay down specific ways of working and guide hospital staff in making decisions about the treatment and care of patients. Studies have shown that protocols and guidelines are not always followed and improving their use remains a challenge³.

2. Research Questions

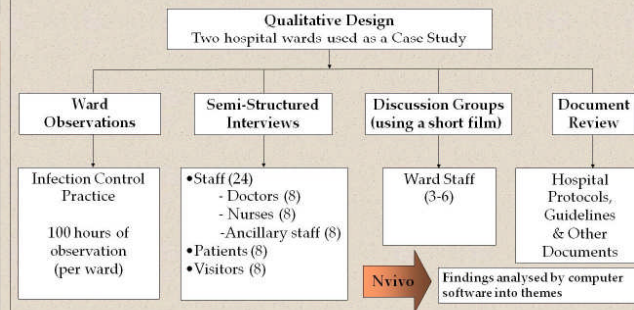
1. How are infection control protocols and guidelines being used on the hospital ward to manage the risk from *Clostridium difficile* infection?
2. What helps and hinders the use of protocols and guidelines in practice?
3. What happens if difficulties are experienced?

3. A Complex Issue

Shown below are examples of the types of issues that may be explored surrounding infection control:



4. Methods



5. Timetable

Data collection will commence as follows:
Ward ****: Start: 1st August 2010
End: 31st March 2011

6. References

1. Shannon-Lowe, J., Matheson, N.J., Cooke, F.J., Aliyu, S.H. (2010). "Prevention and medical management of *Clostridium difficile* infection". *BMJ*, **340**:641-645.
2. Pratt, R.J., Fellowe, C.M., Wilson, J.A., Loveday, H.P., Harper, P.J., Jones, S.R.L.J., McDougall, C. and Wilcox, M.H. (2007). "epic2: National Evidence-Based Guidelines for Preventing Healthcare-Associated Infections in NHS Hospitals in England". *Journal of Hospital Infection*, **65** Supplement: S1-S64.
3. Grimshaw, J.M., Thomas, R.E., MacLennan, G., Fraser, C., Ramsay, C.R., Vale, L., Whitty, P., Eccles, M.P., Matowe, L., Shirran, L., Wensing, M., Dijkstra R. and Donaldson, C. (2004b). "Effectiveness and efficiency of guideline dissemination and implementation strategies". *Health Technology Assessment*, **8**(6): 1-352.

7. Many thanks to:

My supervisors: Profs. Kate Seers & Gillian Hundt
School of Health & Social Studies, University of Warwick.

Director of Infection Prevention & Control for allowing the study to take place.

Thank you to all staff, patients and visitors who agree to take part in the study.

8. Contact details

Julie Rasmussen

Telephone: 07976 256773

Email: J.A.Rasmussen@warwick.ac.uk



Version 2. 7th June 2010



My name is Julie Rasmussen.
I am a PhD student at the
School of Health and Social
Studies, University of
Warwick.

This leaflet provides information about the
study, what is involved, how the findings will be
disseminated and how you can get in touch with
me if you would like further information.

Key information

My contact details:

Julie Rasmussen
Researcher
School of Health and Social Studies
University of Warwick

Email: J.A.Rasmussen@warwick.ac.uk
Mobile: 07976 256773
Telephone: 01443 223560

My PhD studentship is funded by:
The NHS Institute for Innovation and
Improvement www.institute.nhs.uk



Appendix 5b

Department of Health and Social
Studies
University of Warwick
Coventry
CV4 7AL

Contact Details

J.A.Rasmussen@warwick.ac.uk

Mob: 07976 256773
Office: 01443 223560

Academic supervisors:

Professor Kate Seers:
kate.seers@warwick.ac.uk

Professor Gillian Hundt:
gillian.hundt@warwick.ac.uk



THE UNIVERSITY OF
WARWICK

School of Health and Social Studies

Research Project

The Prevention and Control of Healthcare-Associated Infection

**Exploring the use of infection
control protocols & guidelines**



**Information for Staff,
Patients and Visitors**

What is the research about?

We would like to find out about what is being done in hospital to prevent the spread of infections. One way to control the spread of infection is to ensure that certain precautions are strictly followed. Examples include hand washing, glove and gown use and cleaning. The main purpose of this study is to understand how hospital infection control guidelines are put into practice, and how the staff find using them.

What would the study involve?

The study would take place on two wards within the hospital. Each ward would be studied for about three months. Staff, patients and visitors would be invited to take part. Data would be collected using several methods. These include ward observations, interviews, a review of hospital documents and discussion groups. A tape recorder may be used during the interviews and discussion groups, if participants agree to this. People may choose to take part in the whole study or just part of it, for example, just an interview.

Why is the study being carried out?

This research is being undertaken as a PhD study. It is not an audit and has not been commissioned by the University Health Board.

What are the possible benefits of the study?

There are no direct benefits of taking part in this study. However, we hope that the study generates important knowledge about hospital procedures to prevent and control infection.

Do people have to take part?

Taking part in this study is voluntary. Participants can drop out of the study at any time without giving any reason.

Would information be kept confidential?

Anything that participants tell me and anything that I observe would be kept strictly confidential. All names and identifying information would be removed. Apart from myself, only my two academic supervisors would read my notes.

What will happen to the results?

The results will be written up as a PhD thesis. The findings would be presented to the wards and to the University Health Board. The findings would also be presented to the NHS Institute for Innovation and Improvement and may be presented at conferences, in journal articles or other reports. A summary of the findings would be sent to interested participants, on request. No names or contact details would appear in any reports or articles.

To find out more:

If you have any questions about the study or would like to find out more information, please feel free to contact me. My contact details are listed over-leaf.

Thank you for taking the time to read this leaflet.

Appendix 6

Eligibility Criteria

The inclusion and exclusion criteria are illustrated below.

Inclusion criteria

1) NHS staff:

English speaking adult (18 years or over).

NHS staff working on the ward at the time of the study.

Staff participants were chosen from the following groups: consultant, registrar, senior house officer, junior doctor, ward manager, deputy ward manager, staff nurse, auxiliary nurse technician, auxiliary nurse, infection control nurse, infection control link nurse, physiotherapist, dietician, pharmacist, phlebotomist, housekeeper, caterer and porter.

Freely consent to taking part in the study.

2) Patients:

English speaking adult (18 years or over).

Patients receiving treatment and care on the ward at the time of the study.

Patients infected with *Clostridium difficile* infection or other healthcare-associated infection.

Patients showing no signs of a healthcare-associated infection.

Freely consent to taking part in the study.

3) Visitors:

English speaking adult (18 years or over).

Spouse/partner, family, relative, friend, or carer.

Visiting the patient on the ward at the time of the study.

Freely consent to taking part in the study.

Exclusion criteria

1) NHS staff:

Non-English speaking NHS staff.

NHS staff under the age of 18 years.

NHS students (e.g. medical students, nurses).

NHS staff who did not consent to taking part in the study.

Non-English speaking participants were excluded as there were no funds in the research budget to pay for the translation of documents such as information sheets, consent forms and dialogue during interviews. NHS students were excluded as they were training.

2) Patients:

Non-English speaking patients.

Patients under the age of 18 years.

Patients who were considered by the healthcare professionals responsible for their care to be too ill, too depressed, too vulnerable, under too much stress, or where it is felt that the intrusion is insensitive to their needs.

Patients unable to consent for themselves, for whatever reason.

Patients who did not consent to taking part in the study.

Non-English speaking participants were excluded as there were no funds in the research budget to pay for the translation of documents such as information sheets, consent forms and dialogue during interviews. Participants under 18 years of age were excluded due to difficulties and time constraints with obtaining parental consent.

3) Visitors:

Non-English speaking visitors.

Visitors under the age of 18 years.

Visitors who did not consent to taking part in the study.

Appendix 7a: Staff Information Sheet And Consent Form

Version Number: 2 Date: 7th June 2010

Staff Information Sheet

We would like to invite you to take part in a research study.

Title of Study The use of infection control protocols and guidelines.

Purpose of the study

The purpose of the study is to gain a better understanding of what staff think about using the *Clostridium difficile* protocols and guidelines on the ward, and what they believe influences their use.

What does the study involve?

The study would take place on two wards within the hospital. Each ward would be studied for about three months, using observations, informal conversations, interviews and discussion groups. Staff, patients and visitors would be invited to take part. You are being invited to take part because the ward where you are working has been chosen for the study.

Taking part is voluntary

Your participation is voluntary. If you decide not to take part, this would not be a problem. If you agree to take part and later decide to withdraw, you can do this without giving a reason.

What would happen during the study?

We would ask you to consider the issues in this information sheet and discuss any questions you have before making up your mind. You would be given up to 24 hours to decide whether you'd like to take part. You may decide to take part in the whole study (ward observations, an interview and the discussion group) or you may choose to take part in just one aspect e.g. the interview only or not take part at all. The choice is entirely up to you. If you agree to take part you would be asked to complete the attached consent form. During the study, I would not be participating in any work activities as I do not work for the hospital. How the study would affect you is explained below.

Ward observations and informal conversations

I would like to observe what happens on the ward and talk to staff about their experiences of trying to prevent *Clostridium difficile* infection. I would also like to talk to patients and visitors about their experiences. If you consent to being observed and to informal conversations, I may write down some notes as I observe and talk to you. I may also ask to observe during meetings or training sessions.

Document review

We would like to look at documents that support infection control practices on the ward. Examples include the infection control manual, protocol and guidelines that you use, and other supporting documents. Access would not be required to any medical records or personal data.

Interviews

We are interested in listening to your experiences and opinions about what it's like using the protocols and guidelines on the ward. If you agree to be interviewed, I would agree a convenient time with you. It would take place within the hospital and last up to an hour. A tape recorder would be used, if you agree, to allow me to concentrate on what you say. If you prefer not to be recorded, I would take hand written notes.

Discussion group

At the end of the study, you may be invited to attend a discussion group of between 3-6 staff participants. A 10 minute video would be shown relating to healthcare-associated infection. You would be asked to think about the issues raised. The session would last about 30 minutes and would be tape-recorded, if you agree.

Version Number: 2 Date: 7th June 2010

What do you need to be aware of before deciding to take part?

1. You may be concerned about the purpose of the study. The study is a research study. It is not an audit, hospital staff performance is not being monitored, and the research has not been commissioned by the University Health Board.
2. If you agree to being observed and then feel uncomfortable about being observed later on, please tell me, and I can stop observing at any time. If you agree to being observed I would always be considerate and agree a convenient time to observe or talk to you.
3. During the interview you are free not to answer any questions that you choose. We can stop the interview at any time.
4. You can drop out of the study at any time, without giving any reason.
5. All information will be strictly confidential. However, in the unlikely event that I witness something on the ward which puts the patient at risk, I would talk to my supervisors about what action I would take, which could include reporting to the ward manager. You would always be kept informed of what I had done.

What are the possible benefits of the study?

There is no direct benefit to you of taking part. However, we hope the study generates important knowledge and understanding about the challenges of using infection control protocols and guidelines.

Who is funding the study?

The study is being undertaken as a PhD which is being funded by the NHS Institute for Innovation and Improvement.

How would your information be kept confidential?

All identifying information would be removed from anything that you tell me or that I observe. Apart from myself, only my two academic supervisors would listen to the taped discussions or read my notes. All data collected would be kept securely for a period of five years and then destroyed.

What would happen to the study findings?

The information collected would be written up as part of my thesis. The findings would be presented to the ward, the University Health Board and the NHS Institute for Innovation and Improvement and may be presented at conferences, in journal articles or reports. If you are interested, we would send you a summary of the research.

Who can you contact if you have any concerns, questions or complaints?

If you have any concerns, questions or complaints about the way in which the study is conducted please contact me in the first instance. If I cannot resolve your concerns please feel free to contact either of my academic supervisors. Our contact details are listed below:

Researcher: Julie Rasmussen. School of Health and Social Studies, University of Warwick
j.a.rasmussen@warwick.ac.uk or 07976 256773

Professor Kate Seers. Director of the Royal College of Nursing Research Institute
kate.seers@warwick.ac.uk or 024 7615 0614

Professor Gillian Hundt. Professor of Social Sciences in Health
gillian.hundt@warwick.ac.uk or 024 7657 3814

Thank you for reading this information sheet and considering taking part in this study.

Appendix 7b: Patient Information Sheet And Consent Form

Version Number: 2 Date: 7th June 2010

Patient Information Sheet

We would like to invite you to take part in a research study.

Title of Study The use of infection control protocols and guidelines.

What is the purpose of the study?

We would like to find out more about what is being done in hospital to prevent the spread of infections. We are particularly interested in *Clostridium difficile* infection. One way to control the spread of infection is to ensure that certain precautions are strictly followed. Examples include hand-washing, glove and gown use and cleaning. The main purpose of the study is to understand how hospital infection control protocols and guidelines are put into practice, and how the staff find using them.

What does the study involve?

The study would take place on two wards within the hospital. Each ward would be studied for about three months, using observations, informal conversations, interviews and a discussion group. Staff, patients and visitors would be invited to take part. You are being invited to take part because the ward where you are staying has been chosen for the study.

Taking part is voluntary

Your participation is voluntary. If you decide not to take part, this would not be a problem. If you agree to take part and later decide to withdraw, you can do this without giving a reason. Taking part would not affect your medical or nursing care in any way.

What would happen during the study?

We would ask you to consider the issues in this information sheet and discuss any questions you have before making up your mind. You would be given up to 24 hours to decide whether you'd like to take part. You may decide to take part in the ward observations and an interview or you may choose to take part in the ward observations only, or just the interview or not take part at all. The choice is entirely up to you. If you agree to take part you would be asked to complete the attached consent form. During the study, I would not be involved with your treatment or care as I do not work for the hospital. How the study would affect you is explained below.

Ward observations and informal conversations

I would like to observe infection control practices on the ward where you are staying and talk to you about your experiences. If you consent to being observed and to informal conversations, I may write down some notes as I observe and talk to you.

Interviews

We are interested in what you think about the steps that the hospital is taking to prevent the spread of infection. If you are interested, I would explain what is involved. If you would like to have someone to stay with you during our discussion, this would be arranged.

If you agree to be interviewed, I would agree a convenient time with you. The interview would take place within the hospital and last up to an hour. If you'd prefer to be interviewed in the presence of a family member or friend, we could arrange this. A tape recorder would be used, if you agree, to ensure I don't miss any information you tell me. If you prefer not to be recorded, I would take hand written notes.

What do you need to be aware of before deciding to take part?

1. You may be concerned about the purpose of the study. The study is a research study. It is not an audit, hospital staff performance is not being monitored, and the hospital has not paid for the study to be undertaken.
2. If you agree to being observed and then feel uncomfortable about being observed later on, please tell me, and I can stop observing at any time. If you agree to being observed I would always be considerate and agree a convenient time to observe or talk to you.
3. During the interview you are free not to answer any questions that you choose. We can stop the interview at any time.
4. All information will be strictly confidential. You can drop out of the study at any time, without giving any reason.

What are the possible benefits of the study?

There is no direct benefit to you of taking part. However, we hope the study generates important knowledge and understanding about the challenges of using infection control protocols and guidelines.

Who is funding the research?

The study is being undertaken as a PhD which is being funded by the NHS Institute for Innovation and Improvement.

How would your information be kept confidential?

All identifying information would be removed from anything that you tell me or that I observe. Apart from myself, only my two academic supervisors would listen to our taped discussion or read my notes. All data collected would be kept securely for a period of five years and then destroyed.

What would happen to the study findings?

The information collected would be written up as part of my thesis. The findings would be presented to the ward, the University Health Board and the NHS Institute for Innovation and Improvement and may be presented at conferences, in journal articles or reports. If you are interested, we would send you a summary of the research.

Where can you get more information about *Clostridium difficile* infection?

Please see the enclosed government leaflet which explains about *Clostridium difficile* infection.

Who can you contact if you have any concerns, questions or complaints?

If you have any concerns, questions or complaints about the way in which the study is conducted please contact me in the first instance. If I cannot resolve your concerns please feel free to contact either of my academic supervisors. Our contact details are listed below:

Researcher: Julie Rasmussen. School of Health and Social Studies, University of Warwick
j.a.rasmussen@warwick.ac.uk or 07976 256773

Professor Kate Seers. Director of the Royal College of Nursing Research Institute
kate.seers@warwick.ac.uk or 024 7615 0614

Professor Gillian Hundt. Professor of Social Sciences in Health
gillian.hundt@warwick.ac.uk or 024 7657 3814

Thank you for reading this information sheet and considering taking part in this study.

Patient Consent Form

Title of Research Project: The use of infection control protocols and guidelines.

Researcher: Julie Rasmussen, School of Health and Social Studies, University of Warwick

Contact details:



Mobile: 07976 256773
Office: 01443 223560



Email: j.a.rasmussen@warwick.ac.uk

Please initial to confirm:

- I have read and understand the information sheet for the above study.
- I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without my medical/nursing care being affected.
- I consent to taking part in [please delete as applicable]
*The observations/informal conversations and the interview
*OR observations/informal conversations only
*OR interview only
- I give permission for any information collected about me during observations, including any notes taken or quotations, to be used in this study, subject to it being fully anonymised so that I cannot be identified.
- I agree to my interview being tape recorded.
- I give permission for any information collected about me during my interview, including the tape transcript, to be used in this study, subject to the data being fully anonymised, so that I cannot be identified.
- I agree to take part in the above study.

Name of Participant Date Signature

Researcher Date Signature

Appendix 7c: Visitor Information Sheet And Consent Form

Version Number: 2 Date: 7th June 2010

Visitor Information Sheet

We would like to invite you to take part in a research study.

Title of Study The use of infection control protocols and guidelines.

What is the purpose of the study?

We would like to find out more about what is being done in hospital to prevent the spread of infections. We are particularly interested in *Clostridium difficile* infection. One way to control the spread of infection is to ensure that certain precautions are strictly followed. Examples include hand-washing, glove and gown use and cleaning. The main purpose of the study is to understand how hospital infection control protocols and guidelines are put into practice, and how the staff find using them.

What does the study involve?

The study would take place on two wards within the hospital. Each ward would be studied for about three months, using observations, informal conversations, interviews and a discussion group. Staff, patients and visitors would be invited to take part. You are being invited to take part because the ward that you are visiting has been chosen for the study.

Taking part is voluntary

Your participation is voluntary. If you decide not to take part, this would not be a problem. If you agree to take part and later decide to withdraw, you can do this without giving a reason. Taking part would not affect the patient's medical or nursing care in any way.

What would happen during the study?

We would ask you to consider the issues in this information sheet and discuss any questions you have before making up your mind. You would be given up to 24 hours to decide whether you'd like to take part. You may decide to take part in the ward observations and an interview or you may choose to take part in the ward observations only, or just the interview or not take part at all. The choice is entirely up to you. If you agree to take part you would be asked to complete the attached consent form. During the study, I would not be involved with the patient's treatment or care as I do not work for the hospital. How the study would affect you is explained below.

Ward observations and informal conversations

I would like to observe infection control practices on the ward during visiting times. I may ask to talk to you informally about your experiences during your visit. If you consent to being observed and to informal conversations, I may write down some notes as I observe and talk to you.

Interviews

We are interested in what you think about the steps that the hospital is taking to prevent the spread of infection. If you are interested, I would explain what is involved. If you'd like to have our discussion with the patient present, this would be fine.

If you agree to be interviewed, I would agree a convenient time with you. The interview would take place within the hospital and last up to an hour. If you'd prefer to be interviewed with the patient present or with someone else, that's fine. A tape recorder would be used, if you agree, to ensure I don't miss any information you tell me. If you prefer not to be recorded, I would take hand written notes.

Version Number: 2 Date: 7th June 2010

What do you need to be aware of before deciding to take part?

1. You may be concerned about the purpose of the study. The study is a research study. It is not an audit, hospital staff performance is not being monitored, and the hospital has not paid for the study to be undertaken.
2. If you agree to being observed and then feel uncomfortable about being observed later on, please tell me, and I can stop observing at any time. If you agree to being observed I would always be considerate and agree a convenient time to observe or talk to you.
3. During the interview you are free not to answer any questions that you choose. We can stop the interview at any time.
4. All information will be strictly confidential. You can drop out of the study at any time, without giving any reason.

What are the possible benefits of the study?

There is no direct benefit to you of taking part. However, we hope the study generates important knowledge and understanding about the challenges of using infection control protocols and guidelines.

Who is funding the research?

The study is being undertaken as a PhD which is being funded by the NHS Institute for Innovation and Improvement.

How would your information be kept confidential?

All identifying information would be removed from anything that you tell me or that I observe. Apart from myself, only my two academic supervisors would listen to our taped discussion or read my notes. All data collected would be kept securely for a period of five years and then destroyed.

What would happen to the study findings?

The information collected would be written up as part of my thesis. The findings would be presented to the ward, the University Health Board and the NHS Institute for Innovation and Improvement and may be presented at conferences, in journal articles or reports. If you are interested, we would send you a summary of the research.

Where can you get more information about *Clostridium difficile* infection?

Please see the enclosed government leaflet which explains about *Clostridium difficile* infection.

Who can you contact if you have any concerns, questions or complaints?

If you have any concerns, questions or complaints about the way in which the study is conducted please contact me in the first instance. If I cannot resolve your concerns please feel free to contact either of my academic supervisors. Our contact details are listed below:

Researcher: Julie Rasmussen. School of Health and Social Studies, University of Warwick
j.a.rasmussen@warwick.ac.uk or 07976 256773

Professor Kate Seers. Director of the Royal College of Nursing Research Institute
kate.seers@warwick.ac.uk or 024 7615 0614

Professor Gillian Hundt. Professor of Social Sciences in Health
gillian.hundt@warwick.ac.uk or 024 7657 3814

Thank you for reading this information sheet and considering taking part in this study.

Visitor Consent Form

Title of Study: The use of infection control protocols and guidelines.

Researcher: Julie Rasmussen, School of Health and Social Studies, University of Warwick

Contact details:



Mobile: 07976 256773

Office: 01443 223560



Email: j.a.rasmussen@warwick.ac.uk

Please initial to confirm:

- I have read and understand the information sheet for the above study.
- I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
- I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason, and without the patient's medical/nursing care being affected.
- I consent to taking part in [please delete as applicable]
*The observations/informal conversations and the interview
*OR observations/informal conversations only
*OR interview only
- I give permission to any information collected about me during observations, including any notes taken or quotations, to be used in this study, subject to it being fully anonymised so that I cannot be identified.
- I agree to my interview being tape recorded.
- I give permission to any information collected about me during my interview, including the tape transcript, to be used in this study, subject to the data being fully anonymised, so that I cannot be identified.
- I agree to take part in the above study.

Name of Participant Date Signature

Researcher Date Signature

Appendix 9a - Topic Guide for Staff Interviews

Question: What's it like managing <i>Clostridium difficile</i> infection on the ward?	
Prompts:	Construct
Have you noticed anything that's been done on the ward to improve <i>Clostridium difficile</i> infection?	Background
What's it like using the <i>Clostridium difficile</i> protocols and guidelines?	Skills
How effective do you believe the measures are in reducing the level of infection on the ward?	Knowledge
Are there area(s) of the protocols/guidelines that are easier to implement than other areas [e.g. hand hygiene, cleaning, isolation or use of gowns, masks, gloves]?	Beliefs about capabilities [self efficacy]
Does anything prompt you to use the protocols/guidelines?	Motivation /Goals Memory/decision processes
Does the ward environment affect your use of the protocols/guidelines in anyway?	Environmental context & resources
Do other people influence your use of the protocols/guidelines in anyway?	Social influences

Version 1 – 1st May 2010

Can you think of an example of where your feelings [stress, fear, anxiety] have influenced your ability to implement the guidelines?	Emotion
Are there any consequences of failing to meet best practice recommendations on the ward?	Beliefs about consequences [self standards]
Are there any other ways of working that have influenced your ability to implement the guidelines?	Behavioural regulation / Action Planning
What changes would you like to see implemented to improve infection control practice on the ward?	

Question: What's it like being a patient on this ward?	
Prompts:	Construct
<ul style="list-style-type: none"> • Have you heard of <i>Clostridium difficile</i>, also known as <i>C.diff</i>? 	Background
<ul style="list-style-type: none"> • Have you seen any information about preventing hospital infection during your stay? 	Information
<ul style="list-style-type: none"> • Did the staff tell you anything about how to prevent hospital infection? 	Communication
<ul style="list-style-type: none"> • How do you feel about hospital bugs such as <i>Clostridium difficile</i>? 	Belief about consequences
<ul style="list-style-type: none"> • Is there anything about your stay on the ward in terms of preventing infection that has made you feel safe? • Is there anything that has made you feel less safe? 	Emotion
<ul style="list-style-type: none"> • Is there anything that you've noticed staff doing that you thought was particularly good at preventing infection? • Has there been anything that you've found not so good? 	Knowledge
<ul style="list-style-type: none"> • How do you feel about being able to protect yourself from hospital infections on the ward? 	Beliefs about capabilities

• Has the ward environment influenced the way that you feel?	Environment
• Has the way that the ward is managed influenced the way that you feel?	Environment [ward culture]
• Without naming anyone, has any type of staff role set a particularly good example to you about preventing infection?	Social influences
• Is there anything else about preventing infection on the ward that concerns you?	Other concerns
• What improvements would you like to see implemented on the ward to improve infection?	Action planning

Question: What's it like being a patient on this ward?	
Prompts:	Construct
• Have you heard of <i>Clostridium difficile</i> , also known as <i>C.diff</i> ?	Background
• Have you seen any information about preventing hospital infection during your stay?	Information
• How were you informed that you had a hospital infection? • Were you told anything about what would happen to prevent the infection spreading?	Communication
• How do you feel about having a hospital infection? • How do you think you contracted the infection?	Belief about consequences
• Is there anything about your stay on the ward in terms of preventing infection that has made you feel safe? • Is there anything that has made you feel less safe?	Emotion
• Is there anything that you've noticed staff doing that you thought was particularly good at preventing infection? • Has there been anything that you've found not so good?	Knowledge
• Is there anything about your experience that you have found difficult? • Is there anything that you've found less difficult?	Beliefs about capabilities

Version 1 – 1st May 2010 **Appendix 9bii - Topic Guide for Interviews – Patients with infection**

• Has the ward environment influenced the way that you feel?	Environment
• Has the way that the ward is managed influenced the way that you feel?	Environment [ward culture]
• Without naming anyone, has any type of staff role set a particularly good example to you about preventing infection?	Social influences
• Is there anything else about preventing infection on the ward that concerns you?	Other concerns
• What improvements would you like to see implemented on the ward to improve infection?	Action Planning

Question: What's it like visiting this ward?	
Prompts:	Construct
<ul style="list-style-type: none"> • Have you heard of <i>Clostridium difficile</i>, also known as <i>C.diff</i>? 	Background
<ul style="list-style-type: none"> • Have you seen any information about preventing hospital infection during your visit? 	Information
<ul style="list-style-type: none"> • Did the staff tell you anything about how to prevent hospital infection? 	Communication
<ul style="list-style-type: none"> • How do you feel about hospital bugs such as <i>Clostridium difficile</i>? 	Belief about consequences
<ul style="list-style-type: none"> • Is there anything about your visit to the ward in terms of preventing infection that has made you feel safe? • Is there anything that has made you feel less safe? 	Emotion
<ul style="list-style-type: none"> • Is there anything that you've noticed staff doing that you thought was particularly good at preventing infection? • Has there been anything that you've found not so good? 	Knowledge

• How do you feel about being able to protect yourself from hospital infections on the ward?	Beliefs about capabilities
• Has the ward environment influenced the way that you feel?	Environment [situational factors]
• Has the way that the ward is managed influenced the way that you feel?	Environment [ward culture]
• Without naming anyone, has any type of staff role set a particularly good example to you about preventing infection?	Social influences
• Is there anything else about preventing infection on the ward that concerns you?	Other concerns
• What improvements would you like to see implemented on the ward to improve infection?	Action Planning

Appendix 10: Examples Of The Coding Structure

Ambiguity

Theme	Category	Sub-category	Codes (examples)
Ambiguity	Diagnosis ambiguity	'being on the safe side'	Anything suspicious, even if you haven't got the result, I'd always barrier.
	Assessment ambiguity	'clearing' the patient	Everyone knows the protocols, the controlling aspect of it and the treatment. There's less awareness of how we go about managing them once they are known diagnosis, particularly in how we go about clearing somebody that is no longer infected.
	Barrier nursing ambiguity	barrier nursing uncertainty	If in doubt I'll barrier nurse someone, which causes confusion 'cos if I barrier nurse and someone comes in, they ask why am I barrier nursing because there's no reason.

Professional frustrations

Theme	Category	Sub-category	Codes (examples)
Professional frustrations	Struggling	Battling	I think we are battling it and we are...working hard and I think we are gaining good ground. I think we are working hard and battling and fighting and winning [Ward Manager 1 Interview].
	"Nurses are not cleaners"	Identity	Nurses do the cleaning but they don't have the time...I wanted to do a nursing job, not a cleaning job..otherwise I would have applied for a cleaning job [RN 2 interview]

Appendix 11: Study Findings Mapped onto Michie *et al's* (2005) Framework

Domains specified by Michie <i>et al.</i> 2005	Domains specified by Fishbein <i>et al.</i>, 2001	Constructs by Michie <i>et al.</i> 2005	Barriers identified from this study	Enablers identified from this study
Knowledge		Knowledge, schemas, mindsets	Lack of awareness Lack of protocol visibility Use of tacit/experiential knowledge	Smell/sight
Skills	Skills	Competence, ability, skills	Lack of computer skills	
Social/professional role and identity	Self-standards	Identity, boundaries, role, social/group norms, organisational commitment	Detachment, lack of ownership, accountability Loss of autonomy 'Nurses are not cleaners'	
Beliefs about capabilities	Self-efficacy	Self efficacy, control, perceived competence, confidence, empowerment, perceived behavioural control, optimism/pessimism		Protocols increase confidence
Beliefs about consequences	Anticipated outcomes/attitudes	Outcome expectancies, anticipated regret, appraisal, reinforcement/punishment, incentives, rewards, perceived risk/threat	Normalisation of infection	Seeing things work Protection from blame/threat of legal action Threat of infection

Domains specified by Michie <i>et al.</i> 2005	Domains specified by Fishbein <i>et al.</i>, 2001	Constructs	Barriers identified from this study	Enablers identified from this study
Motivation and goals	Intention	Intention, goals, intrinsic motivation, commitment, transtheoretical model and stages of change		
Memory, attention and decision processes		Memory, attention, decision making	Ambiguity Blending different types of knowledge	Use of coping strategies
Environmental context and resources	Environmental constraints	Resources, environmental stressors and interaction, knowledge of task environment	Time to read Lack of ward funds to support reading Spatial/structural constraints Poor maintenance Lack of equipment/supplies Staffing levels Skill mix Unclear responsibilities	

Domains specified by Michie <i>et al.</i> 2005	Domains specified by Fishbein <i>et al.</i>, 2001	Constructs	Barriers identified from this study	Enablers identified from this study
Social influences	Norms	Social support, norms, leadership, team working, group conformity, organisational climate/culture, social pressure, power/hierarchy, boundaries/roles, management commitment, supervision, conflict, champions, feedback, competing demands, change management, crew resource management, negotiation, learning/modelling	Poor communication Discouragement to read Lack of role models Poor leadership visibility Lack of cooperation Lack of commitment	
Emotion	Emotion	Affect, stress, anticipated regret, fear, burn-out, tiredness, anxiety/depression	Loss of fear Embarrassment Lack of an emotional cue Feeling powerless Feeling overwhelmed	Fear of blame/litigation Fear/anxiety of infection Feeling unclean Disgust Visibly dirty cues

Domains specified by Michie <i>et al.</i> 2005	Domains specified by Fishbein <i>et al.</i>, 2001	Constructs	Barriers identified from this study	Enablers identified from this study
Behavioural regulation		Goal/target setting, implementation intention, action planning, self-monitoring, goal priority, feedback, moderators of intention-behaviour gap, barriers/facilitators	Lack of reflection Unclear boundaries Lack of monitoring/supervision Reactive reminders Lack of feedback Goal conflict Staying silent	Reminders Voicing concerns
Nature of the behaviours		Routine/habit,/automatic behaviour, past behaviour, stages of change model	Familiarity	Unfamiliarity

Source: Michie *et al.*, 2005

