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UNIVERSITY OF SOUTHAMPTON

FACULTY OF HEALTH SCIENCES

**How do doctors, nurses and healthcare assistants in the Acute Medical Unit
look after patients who have diarrhoea and vomiting?**

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by

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Thesis for the degree of Doctor of Philosophy

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ABSTRACT

FACULTY OF HEALTH SCIENCES

Infection Prevention and Control in complex socio-technical healthcare systems

Thesis for the degree of Doctor of Philosophy

HOW DO DOCTORS, NURSES AND HEALTHCARE ASSISTANTS IN THE ACUTE MEDICAL UNIT ASSESS AND MANAGE PATIENTS WHO HAVE DIARRHOEA AND VOMITING?

Matsikachando Rodgers Moyo

Background: Outbreaks of infectious diarrhoea and vomiting are a worldwide problem, with detrimental human and economic costs. In the United Kingdom, despite well-publicised guidelines and a plethora of recommended infection prevention and control strategies, hospital outbreaks are problematic - affecting patients and organisational operations. At present, however, little is known about how hospital-based clinicians actually assess the infective status of patients with symptoms of diarrhoea and vomiting, whilst awaiting stool (faeces) microbiology results. Little is also known about the infection prevention and control measures that these clinicians employ in non-outbreak situations to prevent the spread of infection, when infectious causes are suspected. These gaps in knowledge impede the ability of clinical leaders to appropriately support frontline staff in order to minimise incidences of avoidable outbreaks. This study, therefore, aimed to answer this question: How do clinicians in the Acute Medical Unit (AMU) assess and manage patients with symptoms of diarrhoea and vomiting - and what factors affect these processes?

Methods: An 11-month ethnographic study was undertaken in the AMU of a local teaching hospital. Purposive sampling was used to identify relevant clinician and patient participants. Data collection methods included observations of relevant clinical activities; clinician-led photo walks; interviews with clinicians and patients; reviews of patients' notes and reviews of pertinent local

hospital infection prevention and control policies. Techniques from the constant comparative method and the framework method were used to support data analysis and synthesis.

Findings: The process of assessing the infectious status of patients with symptoms of diarrhoea and vomiting in the absence of stool microbiology results was found to be complex. It was mainly dependent on the accuracy and detail of the patient's medical history and the maturity of the assessing clinician's clinical judgement. When infectious causes were suspected, clinicians employed various infection prevention and control measures. However, the successful implementation and performance of these measures was challenging, because of the complex, multifaceted socio-technical elements in the AMU; where people interacted in different ways with the environment, policies, artefacts, tasks and each other. Although affected patients described satisfaction with the care they were receiving in the AMU, their knowledge of, and involvement in, infection prevention and control related aspects of care, was poor.

Conclusion and implications for practice: Much needs to be done to improve the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in clinical practice. Steps need to be taken to improve patient assessment practice, through developing clinicians' clinical judgement and history taking skills. Clinical leaders also need to be aware of, and account for, clinical human factors affecting patient assessment practice and the implementation and performance of infection prevention and control measures. Finally, clinicians need to consider patients as partners in infection prevention and control activities and offer them adequate information, education and support in this aspect of care.

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Publications and Conferences

Journal publications:

Moyo M. R., May C. R. and Prieto J. (2016) How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting? An ethnographic study. *Working Papers in Health Sciences* 2016 1:15 Available from:
<http://eprints.soton.ac.uk/399498/>

Conferences:

Poster presentation: How do doctors, nurses and healthcare assistants in the Acute Medical Unit (AMU) look after patients who have diarrhoea and vomiting?

Matsikachando R. Moyo, Jacqui Prieto, Carl R. May

The Health Sciences Postgraduate Research Conference - Southampton - 18 June 2014

Poster presentation: How do doctors, nurses and healthcare assistants in the Acute Medical Unit (AMU) look after patients who have diarrhoea and vomiting?

Matsikachando R. Moyo, Jacqui Prieto, Carl R. May

Norovirus in healthcare settings and beyond – a research workshop - London - 17 October 2014

Oral presentation: How do we manage patients who have diarrhoea and vomiting in the Acute Medical Unit (AMU)?

Infection Prevention Society - 2016 Annual International Conference (35 minutes)

Harrogate - 27 September 2016

Available from: <https://vimeo.com/talkingslides2/review/187015131/78237c062f>

Oral presentation: How do we manage patients who have diarrhoea and vomiting in the Acute Medical Unit (AMU)?

Infection Prevention Society - 2016 Wessex Regional Annual Conference (45 minutes)

Southampton - 8 November 2016

Oral presentation: Clinical human factors in the Acute Medical Unit (AMU) - a lesson for all hospital staff!

Infection Prevention Society - 2017 Annual International Conference (35 minutes)

Manchester - 20 September 2017

Available from: <https://vimeo.com/talkingslides2/review/235406854/58a18197a0>

Oral presentation: Clinical human factors in the Acute Medical Unit (AMU) - a lesson for all healthcare staff!

Infection Prevention Society - 2017 Wessex Regional Annual Conference (45 minutes)

Southampton - 8 November 2017

Oral presentation: Clinical Human Factors in the field: Herding SHEEP

The Royal Marsden NHS Foundation Trust - Infection Prevention in the Oncology Setting: New Challenges, New Solutions (35 minutes)

London - 8 May 2018

Oral presentation: Clinical human factors in healthcare: time for a re-think!

Infection Prevention Society - 2018 Trent Regional Annual Conference (30 minutes)

Nottingham - 17 May 2018

Academic Thesis: Declaration Of Authorship

I, Matsikachando Rodgers Moyo declare that this thesis and the work presented in it are my own and has been generated by me as the result of my own original research.

How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after (assess and manage) patients who have diarrhoea and vomiting?

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. Parts of this work have been published. Please see the Publications and Conferences page for details.

Signed: Matsikachando Rodgers Moyo

Date: Saturday, 30th June 2018.....

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Definitions of terms and phrases

Contact Precautions

These are precautions used in addition to standard precautions for specified patients known or suspected to be infected or colonised with epidemiologically important microorganisms that can be transmitted by direct contact with the patient (hand or skin-to-skin contact that occurs when performing patient care activities that require touching the patient's skin) or indirect contact (touching) with environmental surfaces or patient care items in the patient's environment. Over and above standard precautions, these precautions include single room isolation, increased use of personal protective equipment, and limited movement of affected patients outside of isolation areas. (Centers for Disease Control and Prevention, 2017; Public Health England (PHE), 2016) (See also, 'standard precautions')

Culture

'Culture is a fuzzy set of basic assumptions and values, orientations to life, beliefs, policies, procedures and behavioural conventions that are shared by a group of people, and that influence (but do not determine) each member's behaviour and his/her interpretations of the 'meaning' of other people's behaviour.' (Spencer-Oatey, 2008, p3)

An informal definition is 'the way we do things around here.' (Rosenorn-Lanng, 2015, p199)

Diarrhoea and vomiting

In this thesis, the phrase 'diarrhoea and vomiting' will be used to describe the inflammation, irritation or infection of the digestive tract, characterised by sudden onset diarrhoea and/or vomiting with or without abdominal cramps, nausea, headaches, or a fever. The causes of diarrhoea and vomiting can either be infectious or non-infectious in nature.

Field notes

Captured and preserved accounts of conversations, insights, understandings and observations of clinical activities that are pertinent to the phenomena under investigation; in this study, these accounts were captured and preserved on audio, text or pictorial media.

Human Factors

The scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design, in order to optimise human well-being and overall system performance. (International Ergonomics Association, 2018)

Infection control

The term 'infection control' was used by clinicians in this study to either refer to infection prevention and control measures (and practices) or the infection prevention team. This is because in the past, the infection prevention team at the study site used to be called the infection control team. Furthermore, it is only in recent years that the term 'prevention' has begun to be used with reference to infection control measures by infection preventionists, as they strive not only to control infections, but if possible, prevent them from occurring.

Infection prevention and control practice

Infection prevention and control is a discipline concerned with preventing the acquisition and onward transmission of healthcare-associated infections.

In this thesis, the term 'infection prevention and control practice' will be used to encompass the assessment of patients with symptoms of diarrhoea and vomiting and the implementation and performance of infection prevention and control interventions, intended to help prevent onward transmission of suspected or confirmed infectious diarrhoea and vomiting.

Isolation room

The generic term 'isolation room' was used by study participants to describe either a single room or an en-suite single room. The term is used in the same way in this thesis for reporting consistency.

Medical history

The 'medical history' is a structured assessment conducted to generate a comprehensive picture of a patient's health and health problems. It includes an assessment of the patient's current and previous health problems; current and previous medical treatment; the patient's health in general; their family's health and factors which might affect the patient's health and their response to prevention or treatment of health problems (risk factors or lifestyle issues).

Motility

‘Motility’ is a term used to describe the contraction of the muscles that mix and propel contents in the gastrointestinal tract. (International Foundation for Functional Gastrointestinal Disorders, 2015; Marieb, 2013)

Nursing staff

A term used to collectively identify registered nurses and healthcare assistants in a hospital unit/ward.

‘Point-of-admission’ settings

Clinical settings such as the emergency department and the Acute Medical Unit (AMU) which are identified as gateways into hospital wards, that is, the clinical areas in which patients are first assessed before being transferred to appropriate wards in the hospital for ongoing treatment.

Standard precautions

Standard precautions are a set of infection prevention and control practices meant to reduce the risk of transmission of blood borne and other pathogens from both recognised and unrecognised sources. They are the basic level of infection control precautions which are to be used, as a minimum, in the care of all patients. They include hand hygiene; the use of personal protective equipment; respiratory hygiene and cough etiquette; environmental cleaning; careful handling of linens and proper handling of needles and other sharps. (World Health Organization, 2007)

Abbreviations

AAU	Acute Assessment Unit
AMU	Acute Medical Unit
CASP	Critical Appraisal Skills Programme
<i>C. difficile</i>	<i>Clostridium difficile</i>
CHFG	Clinical Human Factors Group
ESRC	Economic and Social Research Council
GP	General Practitioner
HPS	Health Protection Scotland
NHS	National Health Service
NICE	National Institute for Health and Care Excellence
NQB	National Quality Board
NWP	Norovirus Working Party
PHE	Public Health England
RCN	Royal College of Nursing
RCP	Royal College of Physicians of London
SAM	Society for Acute Medicine
SICPs	Standard Infection Control Precautions
UK	United Kingdom
USA	United States of America
WGO	World Gastroenterology Organisation

Chapter 1 Introduction and background

1.1 Introduction

This thesis will take the reader through the transitional journey of a novice researcher and junior nurse, who initially explored infection prevention and control related problems in the Acute Medical Unit (AMU), to a competent researcher and charge nurse, who discovered that the socio-technical complexity of the AMU was the actual problem. According to Carayon (2006), socio-technical work systems are those that involve multifaceted interactions between humans, artefacts, policies (or rules) and the environmental elements of a workplace. As a result of this understanding - that the socio-technical complexity of the AMU was the problem - the latter part of this thesis (chapter 8), will show how a whole-system approach to understanding and addressing observed infection prevention and control related problems, was needed.

1.1.1 Project Background

The idea of this project came about as a result of a research priority identified by the matron of a local AMU, that there was a need to investigate and understand how AMU clinicians managed patients with symptoms of diarrhoea and vomiting. In particular, how did they assess the infectious status of these patients and manage the infection prevention and control related aspects of their care?

This topic was based on the matron's clinical observations and concerns, that there were some infection prevention and control related service failures and inefficiencies that were being experienced in the unit. These included the poor allocation of resources (including isolation rooms) and poor patient flow. The matron suspected that these failures and inefficiencies were as a result of poor patient assessment procedures and poor implementation of infection prevention and control measures, specific to the care of patients with symptoms of diarrhoea and vomiting. The matron's aspiration was to gain a better understanding of what was happening, in order to find ways to improve practice and minimise risks to patient safety.

In order to give the reader some background knowledge of the AMU and the nature of the matron's concerns and aspirations, this chapter will begin by describing the AMU and examining its role in hospital related infection prevention and control practice. This will be followed by a description of the anatomy of the gastrointestinal tract (the gut) and the aetiology of diarrhoea

and vomiting. This is to enable the reader to gain an appreciation of the complexity of diarrhoea and vomiting. This will then be followed by a discussion focussing on the challenges of infectious diarrhoea and vomiting on the National Health Service (NHS) and how guidelines designed to address these challenges are currently difficult to implement in clinical settings such as the AMU. Finally, the chapter will conclude by presenting the research questions that were formulated in response to the local AMU matron's request for a study that investigated how AMU clinicians managed patients with symptoms of diarrhoea and vomiting.

1.2 The Acute Medical Unit and its role in infection prevention and control

1.2.1 What is the Acute Medical Unit? A brief history

According to Scott et al (2009), AMUs are 'designated hospital wards specifically staffed and equipped to receive medical inpatients presenting with acute medical illness from emergency departments and/or the community for expedited multidisciplinary and medical specialist assessment, care and treatment for up to a designated period (typically between 24 and 72 h) prior to discharge or transfer to medical wards'. In essence, AMUs are like 'gateways' between the emergency department (and/or the community) and hospital wards. They are a point of entry for patients referred to hospital as medical emergencies by their General Practitioners (GPs) and those requiring admission from the emergency department. Appendix 1 shows a list of the synonymous names used for the AMU.

Literature would suggest that AMUs have existed in the United Kingdom (UK) as independent units since 1993 (Health Service Executive, 2013). Over the years, the success of these units in managing medical patients resulted in medical and nursing staff developing an interest in acute medicine (Dowdle, 2004). As interest grew, the Federation of Medical Royal Colleges (2000) investigated the future of the physician's role in acute medicine and in their report, encouraged the development of AMUs. The Society of Acute Medicine (SAM) was established in 2000 following publication of this report. SAM is the national representative body for staff caring for medical patients in the acute hospital setting (SAM, 2014b).

Following this development and other factors, including an increasing demand for emergency care, efforts to establish acute medicine as a speciality and develop AMUs across the UK were successful. Notably, in 2003, the Specialist Training Authority recognised acute medicine as a

subspecialty of General (Internal) Medicine for the purposes of training (Royal College of Physicians of London (RCP), 2004b). To date, there are 225 AMUs in the UK (SAM, 2018).

The major drivers behind the establishment of AMUs (with regard to how they currently function) were to facilitate an efficient, high-quality emergency admission process that reduced emergency department waiting times for hospital beds and the length of acute hospital stay for patients that could be discharged home within 24 to 72 hours (Moloney *et al*, 2005; RCP, 2007; Scott *et al*, 2009). These drivers were a result of the increasing problem of a lack of spare bed capacity that was leading to overcrowding in acute hospitals and congestion in emergency departments with resultant inefficiencies in service delivery (RCP, 2004a). Other cited problems included greater risks to patients of medical errors; hospital lengths of stay that were longer than necessary and increased risks to patients of avoidable complications and deaths (Byrne and Silke, 2011). It is reported that the establishment of AMUs has seen improvements in key quality indicators linked to patient flow, hospital length of stay and hospital mortality (Byrne and Silke, 2011; Moloney *et al*, 2007; Rooney *et al*, 2008; Scott *et al*, 2009).

Internationally, some hospitals in Singapore, Australia and New Zealand have dedicated AMUs (National University Hospital (Singapore), 2018; Providence *et al*, 2012; Scott *et al*, 2009).

Literature would suggest that these units are modelled around AMUs in the UK, but are not as well established. It is also reported that health services in countries such as the Netherlands are being encouraged to adopt the concept of AMUs, so as to improve delivery of emergency care (van Galen *et al*, 2017).

1.2.2 How do AMUs work?

In principle, AMUs are staffed by consultant-led multidisciplinary teams of medical and allied health professionals with an interest in acute general medicine. In many instances, AMUs are geographically co-located with the emergency department and key diagnostic services to ensure smooth patient flow and rapid turnaround in pathology, radiology and other clinical investigative services (Bell *et al*, 2008). According to Scott *et al* (2009), AMU admission policies generally grant entry to any patient referred from the emergency department or the community with an acute medical condition who, in most cases, does not exhibit the contra-indications to entry presented in Table 1 (next page).

- (i) haemodynamic instability requiring invasive monitoring and/or critical care facilities;
- (ii) special need patients (e.g. acute stroke, dialysis, oncology, endoscopy);
- (iii) presentations for respite or residential care;
- (iv) geriatric syndrome presentations best suited for admission to geriatric rehabilitation or dedicated elderly care units;
- (v) severely behaviourally disturbed patients best suited for mental health care.

Table 1: Contra-indications to entry into the AMU (Scott *et al*, 2009)

As AMUs offer 24-hour care throughout the week, teamwork and continuity of care are essential in the delivery of safe and effective care. In practice, this teamwork and continuity of care is complex. These complexities are discussed in the next section as part of the description of the AMU at the study site.

1.2.3 The AMU at the study site

The aim of this section is to describe the AMU at the study site, so that the reader understands its general structure, team culture and complex frontline workflow processes.

The AMU at the study site was a typical example of other AMUs in the UK in terms of design, structure and function (RCP, 2007). This was depicted in its self-portrait presented in recruitment literature, in which it was described as follows:

The Acute Medical Unit (AMU) sits within Emergency Medicine... AMU is a fast-paced 53 bedded, mixed sex acute medical ward, taking admissions directly from the Emergency Department or GP in their most acute phase.

The ethos of AMU is to treat our patients effectively with the aim to either discharge within 48hrs of admission, or to move to a speciality ward within this time. Due to this, AMU is a fast-paced, high pressured environment with many rewarding moments.

Its practice standards also reflected guidance drawn together by SAM in their collaborated document with the West Midlands Quality Review Service (WMQRS); 'Quality Standards for Acute Medical Units (AMUs)' (2012). For example, having a nominated lead consultant and nominated lead nurse responsible for ensuring implementation of the quality standards; providing information and support for patients and carers and having guidelines and protocols relating to patient admission processes. Figure 1 (next page) shows a layout sketch of the AMU.



Figure 1: Layout sketch of the AMU at the study site

At the time of undertaking the study, the AMU at the study site had 52/53 beds, 11 of which were side rooms/isolation rooms. It was divided into four areas: AMU 1 (purple area), AMU 2 (blue area), AMU 3 (pink area) and AMU Short Stay (previously AMU GP area). It had an open-plan layout in all four areas, which offered visibility for patients admitted with unstable medical conditions requiring close monitoring. The AMU's bed allocation was as follows: AMU Short Stay had 5 to 6 beds; AMU 1 had 10 beds; AMU 2 had 18 beds (6 being isolation rooms) and AMU 3 had 19 beds (5 being isolation rooms). Next to the AMU were the Acute Assessment Unit (AAU), Ambulatory Care, and the Discharge Lounge. The AAU was used for the initial assessment, observation and treatment of patients for whom care could be delivered without the need of a hospital admission. Outpatient deep vein thrombosis and cellulitis services were managed in the Ambulatory Care area and the Discharge Lounge managed patient discharges. The emergency department and key diagnostic services were also geographically co-located with the AMU.

1.2.3.1 Team culture

The collective working culture in the AMU at the study site centred on teamwork and collegiality, with the common goal of effectively treating patients with the aim of either discharging them or moving them to a speciality ward within 48hrs of admission. As there were numerous staff from various disciplines, teamwork and collegiality was advocated by leadership. This was vital as each discipline benefited from the skills and input of the other in order to deliver optimal patient care. Teamwork was evident in interdisciplinary collaborations, although it was observed that due to the numerous disciplines involved in the care of any one patient, written communication was heavily relied upon and nurses usually acted as care coordinators, with whom staff from other disciplines regularly sought an audience to deliver messages or give instructions. Roles and responsibilities were loosely defined according to discipline, for example doctors were responsible for diagnosing patient ailments and drafting appropriate treatment plans, whilst healthcare assistants were responsible for tending to patients' everyday care needs. Using the given example, although it was good that everyone knew what their responsibilities were, it also created a sense of hierarchy between groups and healthcare assistants were often heard saying, 'I am just an HCA (healthcare assistant)..' as a way of describing their lower ranking in the hierarchy.

There was a high drive in the unit to work towards either discharging patients or moving them to downstream (speciality) wards in order to facilitate patient flow from the emergency department. Staff were always in motion and worked at a fast pace. The quick turnaround of patients demanded that staff worked as rapidly as possible to treat patients whilst tending to their daily care needs.

Senior support and supervision

Owing to the pace of the AMU and the increased risk of errors and omissions, senior support and supervision were integral components of the AMU working model (Bell *et al*, 2013). For example, even though junior doctors could clerk, diagnose and set up a treatment plan for patients, no patient could be discharged from the AMU or moved to a downstream ward without a consultant formally reviewing their medical care plan. It is worth noting that although all disciplines represented within the AMU strove to provide good support and supervision to staff within their discipline, allied health colleagues had better support and supervisory processes in place than nursing and medical counterparts.

1.2.3.2 Frontline workflow

Using the work and patient flow processes presented in Figure 2 (next page), this section will present a stage by stage description of the general frontline work of only the doctors, nurses and healthcare assistants in the AMU at the study site at the time of the study. This is to help the reader have an awareness of what a typical working day was like in the AMU for these clinicians.

Work area allocation (Stages 1-2)

Clinicians arrived at work and attended a briefing where they were allocated to respective work areas (AMU 1, 2, 3, or the Short Stay). Whilst doctors had their morning briefing and handover in the multidisciplinary office within the AMU, nurses and healthcare assistants had their morning briefing in AMU 1 and received hand over at the nurses' stations in respectively assigned work areas. Due to the rotational nature of work area assignments and the need for managers to consider skill mix in different areas, it was usually at the beginning of the shift that clinicians found out where they would be working. This practice somewhat went against the ideal of continuity of care, as it meant it was possible that on day 1, 'Patient 1' would be cared for by 'junior doctor 1', 'nurse 1' and 'healthcare assistant 1'; however on day 2, the same patient would be cared for by 'junior doctor 3', 'nurse 2' and 'healthcare assistant 7'.

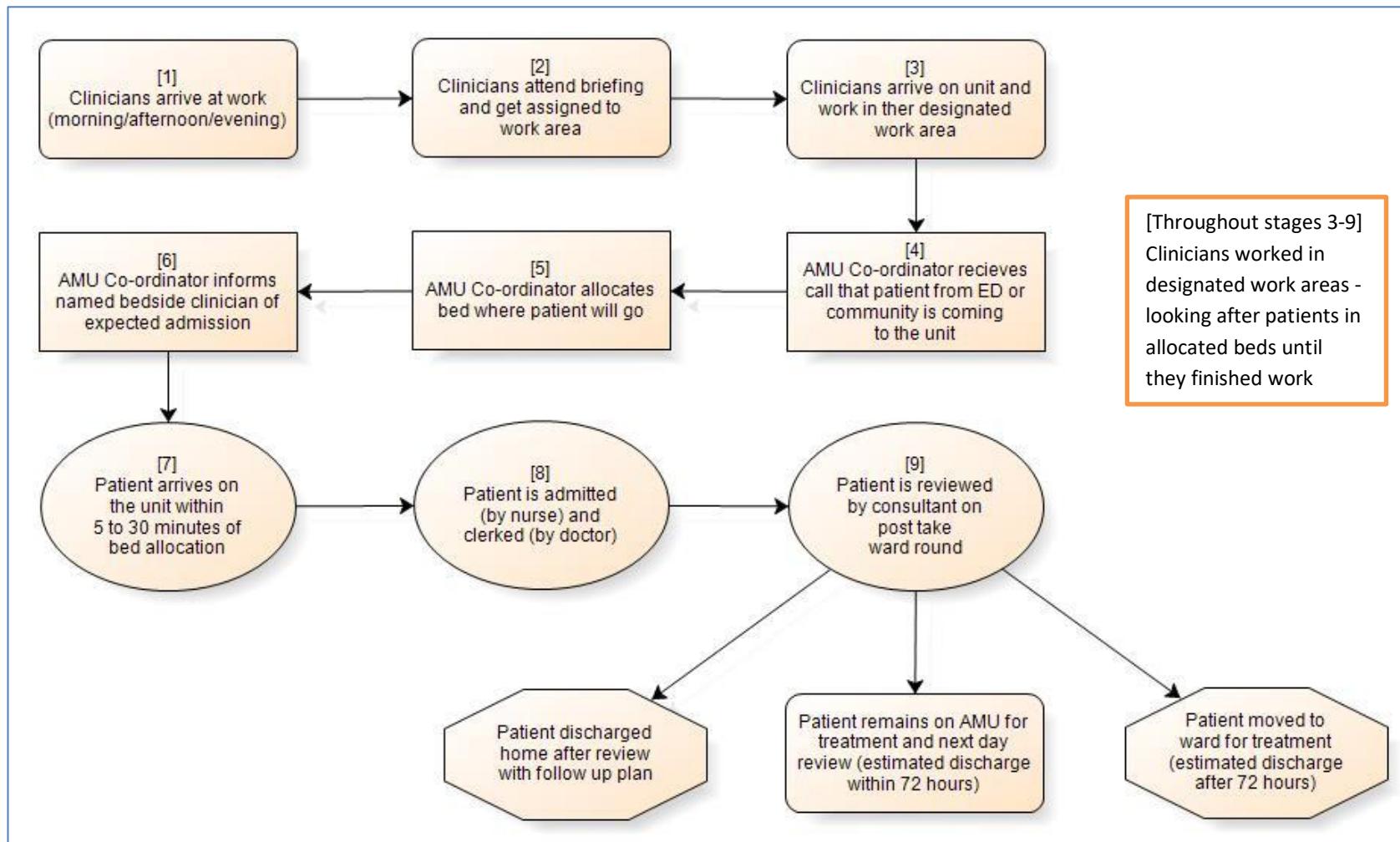


Figure 2: Summarised work and patient flow processes in the AMU at the study site

Working in AMU (Stage 3)

Working in the AMU was described as fast-paced with a relentless workload. From the moment handover was received, doctors, nurses and healthcare assistants were constantly on the move, undertaking numerous tasks and often caring for acutely ill patients who required regular attention and medical reviews. Table 2 shows a non-exhaustive summary of the tasks that AMU clinicians undertook.

Doctors	Nurses	Healthcare assistants
Number of beds*: 10-19	Number of beds*: 5-7	Number of beds*: 10-19
Routine duties/tasks		
Consultant-led patient rounds	Managing care of patients	Patient personal care
Medical reviews	Routine drug rounds	Routine observations
Treatment plans	Routine clinical observations	Downstream patient transfers
Arrange and chase up tests	Routine documentation	Supporting patient discharge
Routine documentation	Managing healthcare assistants	Sharing information with:
Downstream patient handover	Downstream patient handover	- other AMU clinicians
Supporting patient discharge	Supporting patient discharge	- patient relatives and/or carers
Sharing information with: - other AMU clinicians - patient relatives and/or carers	Sharing information with: - other AMU clinicians - patient relatives and/or carers	
Extra tasks when caring for an acutely ill patient		
Regular medical review of patient	Increased clinical observations Administering IV and oral drugs	Increased clinical observations Sitting with confused patients
Fast-tracking tests	Escalating concerns to doctors	
Increased documentation	Increased documentation	
Extra tasks when a new patient arrives		
Clerking documentation	Admission documentation	Admission clinical observations
Clerking assessments	Admission clinical observations Admission assessments	
## When the emergency buzzer is activated ##		
If the emergency buzzer is activated because someone is having a medical emergency, then all clinicians must attend as immediate emergency care (sometimes including CPR) would need to be delivered.		
<i>* number of beds allocated to a clinician did not equate to the number of patients that they looked after</i>		

Table 2: Summary of tasks undertaken by AMU clinicians

This relentless workload nature of the AMU was notorious throughout the hospital and had resulted in negative associations of the AMU as 'a hard place to work in'. This description is supported by similar reports presented in the study undertaken by Lees *et al* (2013) in which they explored various issues surrounding nursing staff working in AMUs across the UK. It is worth noting however, that this negative association had not always been the case, as working in the AMU was once regarded a good place of work with high prestige. Indeed, some of the nurses surveyed by Lees *et al* (2013) reported how they had been drawn to Acute Medicine by the acute nature of patients; the unpredictability and diversity of the medical conditions treated; the multidisciplinary nature of the team and the fast pace of the unit.

Patient turnover, clinical workload, and staff turnover (Stages 4-9)

Stages 4-9 of the presented workflow diagram, summarises the complex process which explains why working in the AMU was often described as chaotic and relentless (Lees *et al*, 2013). There was a high turnover of patients and clinicians were regularly placed under pressure to either discharge or move patients downstream. This pressure was often preceded by calls that the AMU coordinator received, informing them that a patient needed urgent admission into the unit. To maintain this patient flow, doctors and nurses were regularly required to handover current inpatients in a timely manner whilst managing other (often complex) patients. The asterisks (*) in Table 2 next to the word 'beds' are a reminder of the fact that when clinicians were allocated 10 beds for example, it did not equate to them looking after only 10 patients. This is because after a patient vacated a bed space to go downstream to another ward, another patient was allocated into that vacant space. As such, one bed space could accommodate 2 to 3 different patients over the duration of a shift.

On the arrival of a new patient, clinicians were required to undertake certain specific tasks within stipulated timeframes. For example, admission clinical observations were to be undertaken immediately after a patient arrived into the unit and had been handed over. Nevertheless, if nursing staff were busy with other patients, this handover was delayed. This often had a knock-on effect on when clinical observations and other time critical assessments were done. In reality, delays were often the case and clinicians were regularly catching up to tasks that 'should' have been done earlier. Workload pressures were often further compounded by the fact that shared resources needed for the completion of certain time critical tasks were not always readily available, thereby impacting on both nurses' and doctors' overall workload as delays by one clinician to undertake a task inevitably affected another.

As a result of these and other workload pressures, it was reported that a significant number of nursing staff were suffering from 'burnout' and seeking alternative employment in other hospital areas. These reports correlated with the findings in the study by Lees *et al* (2013), which identified nursing recruitment and retention difficulties being experienced in AMU departments across the UK. In their study, they also identified several areas in contemporary AMU departments that needed to be addressed; including a lack of professional development opportunities and career progression, poor management understanding and support, lack of resources (including equipment and staff) and capacity and patient flow issues in downstream wards, leading to bottlenecks in surveyed AMUs.

With regard to doctors, Alderson and Alladi (2014) reported similar problems relating to workload and support issues that were causing significant medical staff recruitment and retention challenges across AMUs in the UK.

1.2.4 The AMU and its role in infection prevention and control practice

For the purposes of this project, the role of the AMU in implementing infection prevention and control practices will be discussed in the context of diarrhoea and vomiting.

As previously highlighted, AMUs are like 'gateways' between the emergency department and/or community and hospital wards. Therefore, as well as being a point of entry for patients, they also serve as a point of entry to the hospital for potentially infectious micro-organisms. This means that when it comes to preventing the spread of infectious diarrhoea and vomiting within the AMU department and to downstream wards, there is a responsibility placed on AMU clinicians to undertake systematic and rigorous diagnostic assessments of patients admitted with symptoms of diarrhoea and vomiting (or those that develop symptoms as AMU inpatients). These assessments should be thorough, so as to identify the actual causes of the symptoms as they could be infectious (National Institute for Health and Care Excellence (NICE), 2013a).

In the event that infectious causes are suspected, assessments should then be followed by the setting up of suitable care plans that (1) facilitate the effective management of the patient's condition in alignment with appropriate infection prevention and control measures and (2) outline when it will be safe to discontinue the care plans (Centers for Disease Control and Prevention, 2011; Health Protection Scotland (HPS), 2013). In addition to, and as part of the care planning process, affected patients should also be involved in the decisions and activities that

relate to their care. This is important for two main reasons; (1) to enhance the patients' experience of care as stipulated by NICE (2012a; 2012b) patient experience guidelines and (2) to educate and empower patients so that they may be able to autonomously adhere to key aspects of diarrhoeal related care; such as complying with isolation measures, eating and drinking adequately, collecting stool specimens and maintaining skin health and personal hygiene (Royal College of Nursing (RCN), 2013a).

The AMU is therefore a pivotal area in hospital related infection prevention and control practice, as this is where symptomatic patients are assessed for potentially infectious symptoms. This is also where appropriate measures are implemented for those whose symptoms are suspected or confirmed to be infectious before their transfer to downstream wards. The timely and correct performance of these procedures consequently reduces the risk of diarrhoea and vomiting outbreaks within the AMU and downstream wards. This timely action is also important in preventing hospital-wide outbreaks of diarrhoea and vomiting that may be caused by patients being exposed to infection in the AMU and then being transferred to one of a number of downstream wards, where they can spread the infection.

Before venturing into a discussion about the problem and challenges of infectious diarrhoea and vomiting in current practice, it is important that the reader understands the complexity of diarrhoea and vomiting in the context of human anatomy and physiology.

1.3 Anatomy and aetiology

1.3.1 The anatomy and physiology of the gastrointestinal tract

The main purpose of the gastrointestinal tract is to digest (break down) food into nutrients which can be absorbed into the body. Some nutrients are sources of energy for life processes, while others are essential for growth and maintenance of the body (Marieb, 2013). As shown in Figure 3 (next page), the gastrointestinal tract consists of the following major organs that come into direct contact with ingested food; the mouth, most of the pharynx, oesophagus, stomach, small intestine, and large intestine. Accessory organs include the teeth, tongue (in the oral cavity), salivary glands, liver, gallbladder and the pancreas.

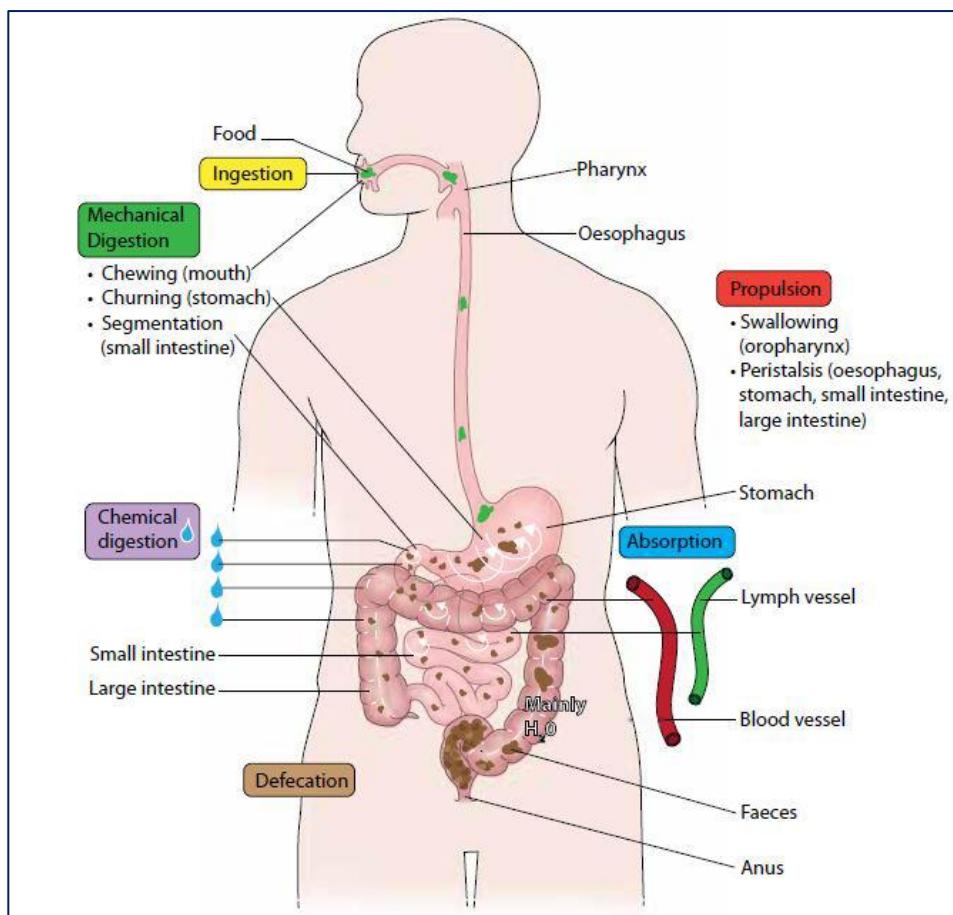


Figure 3:The gastrointestinal tract - highlighting digestion (RCN, 2013a; reproduced with permission)

The digestive process itself begins in the mouth, where food is ingested and mechanically processed (chopped and chewed) and moistened. Other functions occurring in the mouth include the fighting of infectious micro-organisms by secreted antibodies, the initial digestion of complex carbohydrates by secreted enzymes, and the absorption of small molecules such as glucose and water (Marieb, 2013). From the mouth, moistened food is then swallowed and passes through the pharynx into the oesophagus, where it is then propelled down into the stomach.

Digestion mainly occurs in the stomach and small intestine where proteins, fats and carbohydrates are chemically broken down into their basic building blocks for absorption into the body. The functions of the stomach include the short-term storage of ingested food, mechanical breakdown of food by churning, chemical break down of proteins by acids and enzymes, the killing of microorganisms by stomach acid and some absorption of substances such as alcohol. From the stomach, gastric contents are expelled into the small intestine. The small intestine (composed of the duodenum, jejunum, and ileum) performs the majority of digestion and absorption of nutrients. Partly digested food from the stomach is further broken down by

enzymes from the pancreas and bile salts from the liver and gallbladder. After further digestion, smaller molecules are absorbed into the body's blood stream.

From the small intestine, any undigested and unabsorbed material enters into the large intestine. The functions of the large intestine include the accumulation and compression of unabsorbed material to form faeces, some digestion by bacteria (it is bacteria that are responsible for the formation of intestinal gas), and the reabsorption of water, salts, sugar and vitamins. Finally, undigested material and secreted waste products that have been compressed into faecal material are excreted from the body via defecation (the passing of faeces).

1.3.2 The aetiology of diarrhoea and vomiting

In the case of gastrointestinal disease or disorders, the previously mentioned functions of the gastrointestinal tract are not successfully achieved, resulting in the development of symptoms of nausea, vomiting, diarrhoea, malabsorption, constipation or obstruction. Gastrointestinal problems themselves are very common with both infectious and non-infectious causative factors and many people will experience some of the symptoms mentioned above several times during their lives.

Diarrhoea

Diarrhoea in itself is not a disease but a symptom of an underlying gastrointestinal disturbance and can be life-threatening due to complications related to the loss of nutrients, severe dehydration and electrolyte imbalances (Mattner *et al*, 2006; Sabol and Carlson, 2007). Many authors and commentators have offered different definitions of diarrhoea but the British Society of Gastroenterology defines diarrhoea as 'the abnormal passage of loose or liquid stools more than 3 times daily and/or a volume of stool greater than 200 g/day' (Thomas *et al*, 2003).

Mechanisms of diarrhoea

The primary mechanisms of diarrhoea are categorised as either osmotic, secretory, inflammatory or abnormalities of motility (Crombie *et al*, 2013; NICE, 2013a; RCN, 2013a; Sabol and Carlson, 2007). It is worth noting that in critically ill patients, diarrhoea is commonly caused by medication.

Osmotic diarrhoea occurs when too much water is drawn into the intestines. This normally happens when soluble compounds that cannot be absorbed by the small intestine, draw fluid into the intestinal lumen (the inside space of the intestine). Examples include foods and solutions with excessive sugar or excessive salt, osmotic laxatives and liquid formula diets or enteral feeding formulas. In most cases, osmotic diarrhoea will stop if the affected person fasts or stops eating culprit foods.

Secretory diarrhoea results from active chloride secretion into the intestinal lumen, or when there is an inhibition of absorption. With regard to active chloride secretion, water follows the chloride ions, leading to excess fluid in the intestines. Secretory diarrhoea is often associated with bacterial toxins (for example, the cholera toxin) and neoplasms (an abnormal growth of tissue), which stimulate intestinal secretion via the hormones that are produced. In this type of diarrhoea, even if a person fasts, the diarrhoea will persist.

Inflammatory diarrhoea occurs when there is inflammation of the intestinal lining which leads to a passive loss of protein-rich fluids and a decreased ability to absorb the lost fluids. It can be caused by either viral, bacterial or parasitic infections, or autoimmune problems such as inflammatory bowel disease (namely ulcerative colitis and Crohn's disease).

Abnormalities in motility, refer to abnormalities in the contraction of the muscles that mix and propel contents in the gastrointestinal tract. As elucidated earlier, there are four parts/regions of the gastrointestinal tract with distinctly different functions to perform and different patterns of motility; these are the oesophagus (propelling food to the stomach), stomach (churning and mixing food with digestive enzymes), small intestine (absorbing nutrients), and colon (reabsorbing water and eliminating undigested material). Abnormal motility or abnormal sensitivity in any of these parts/regions can cause characteristic symptoms which include diarrhoea and/or vomiting. With a specific focus on the small intestine, weak contractions or unsynchronized contractions caused by intestinal muscle or nerve problems, can lead to intestinal obstruction and/or bacterial overgrowth which can result in symptoms of bloating, pain, nausea, vomiting or diarrhoea (International Foundation for Functional Gastrointestinal Disorders, 2015).

Acute diarrhoea	Chronic diarrhoea
<p>Infectious Bacterial – for example: <i>Salmonella</i> species, <i>Shigella</i> species, <i>Campylobacter</i> species, <i>Vibrio</i> species, <i>Escherichia coli</i>, <i>Staphylococcus aureus</i>, <i>Clostridium perfringens</i>, <i>Bacillus cereus</i>, <i>Yersinia enterocolitica</i>. Viral – for example: norovirus. Parasitic – for example: <i>Giardia lamblia</i>, <i>Entamoeba histolytica</i>, <i>Cryptosporidium</i> species</p> <p>Medications Broad-spectrum antibiotics, laxatives, magnesium salts, proton pump inhibitors, non-steroidal anti-inflammatory drugs (NSAIDs), bronchodilators, antihypertensive drugs, chemotherapeutic agents, Methylxanthine, Theophylline, Metformin, Cimetidine, Digoxin.</p> <p>Enteral feeding tube nutrition Infusion rate, position of feeding tube, tonicity of formula, formula contamination.</p> <p>Gastrointestinal disorders Partial bowel obstruction, Ischemic bowel, Initial attack of ulcerative colitis and Crohn's disease, diverticulitis, pseudomembranous colitis.</p> <p>Other causes Excessive alcohol ingestion, dietary indiscretion (mushrooms, unripened fruit, bran, fibre, fructose), heavy metal poisoning, acute anxiety/stress, menstruation, runners' diarrhoea.</p>	<p>Osmotic diarrhoea Malabsorption syndromes, maldigestion syndromes.</p> <p>Secretory diarrhoea Zollinger-Ellison syndrome, pancreatic cholera, neoplasm (colonic and villous adenoma), stimulant or laxative abuse, bile salt malabsorption.</p> <p>Mucosal inflammation Crohn's disease, ulcerative colitis, lymphocytic colitis, collagenous colitis, radiation enteritis.</p> <p>Motor disorders Irritable bowel syndrome, endocrine disorders (diabetic diarrhoea, adrenal insufficiency, hyperthyroidism, hypothyroidism, Addison's disease).</p> <p>Surgical procedures Obstruction repair, gastrectomy, pyloroplasty, vagotomy, antrectomy, small-bowel resection.</p> <p>Infiltrative disorders Lymphoma, scleroderma.</p>

Table 3: Causes of diarrhoea (RCN, 2013; Sabol and Carlson, 2007)

Acute nausea and vomiting	Chronic nausea and vomiting
<p>Common:</p> <p>Gastroenteritis (caused by norovirus, <i>Salmonella</i> species, <i>Shigella</i> species, <i>Campylobacter</i> species, <i>Escherichia coli</i>), non-gastrointestinal infections (for example, urinary tract infections in elderly/institutionalised patients), medications (drug reactions), food poisoning.</p> <p>Other causes:</p> <p>Pancreatitis, cholecystitis, appendicitis, small bowel obstruction, diabetic ketoacidosis, Addisonian crisis, raised intracranial pressure (usually with other neurological features), hepatitis, ingestion of irritants/allergens, dizziness, migraines, metabolic disturbances, anxiety, pregnancy.</p>	<p>Drug induced:</p> <p>Prescribed medications, alcohol, illicit drugs (marijuana, opiates).</p> <p>Gastrointestinal conditions:</p> <p>Gastro-oesophageal reflux disease, functional dyspepsia, gastroparesis, peptic ulcer disease, gastric/small bowel, Crohn's disease, intermittent internal herniation.</p> <p>General medical conditions:</p> <p>Uraemia, hyper-/hypothyroidism, hypercalcaemia, Addison's disease, cardiac failure.</p> <p>Occult malignancy:</p> <p>Pancreas, lung, endocrine, gastrointestinal.</p> <p>Neurological:</p> <p>Raised intracranial pressure, migraine, labyrinthine disorders.</p> <p>Psychiatric/functional/idiopathic:</p> <p>Depression/psychosis, anxiety, functional nausea, cyclic vomiting syndrome.</p>

Table 4: Causes of nausea and vomiting (Metz and Hebbard, 2007)

Causes and classification of diarrhoea

As earlier highlighted, although diarrhoea is largely associated with the intestines, causative factors may originate from beyond the intestines or as a result of external factors. These causes can either be acute or chronic and most experts agree that acute diarrhoea is that lasting less than 14 days, whilst chronic diarrhoea is that lasting for more than 4 weeks (Thomas *et al*, 2003; World Gastroenterology Organisation (WGO), 2012). With regard to classification, diarrhoea can be classified as either common, uncommon, or rare (RCN, 2013a). Table 3 (page 16) shows some of the causes of diarrhoea.

Nausea and vomiting

Nausea is an unpleasant sensation of unease in the upper stomach often associated with mouth-watering and an involuntary urge to vomit. Nausea occasionally precedes vomiting, however a person can suffer nausea without vomiting. Vomiting, also known as emesis, is the expulsion of gastric or intestinal contents designed primarily to expel potentially harmful substances from the body (Metz and Hebbard, 2007; Talley, 2007).

Like diarrhoea, both nausea and vomiting are non-specific symptoms. They have many possible acute or chronic causes and chronic symptoms are those lasting one month or more. These causes include viral or bacterial gastroenteritis, dizziness, migraines, food poisoning, metabolic disturbances, anxiety, pregnancy and drug reactions (Table 4, page 17).

1.4 The problem of infectious diarrhoea and vomiting in hospitals

Having established that the symptoms of diarrhoea and vomiting are non-specific with various causes, this section will now focus on infectious diarrhoea and vomiting in healthcare settings. It will discuss the challenges faced by acute healthcare clinicians in trying to diagnose the causes of diarrhoea and vomiting and managing patients' infection prevention and control related aspects of care.

From a global perspective, infectious diarrhoea and vomiting is reported as the most common cause of diarrhoeal disease in both children and adults with detrimental human and economic costs (Getto *et al*, 2011; Troeger *et al*, 2017; WGO, 2012). With about 2 billion cases of diarrhoeal disease reported worldwide every year, the greatest human and economic impact of infectious

diarrhoea and vomiting is in developing countries – largely because of poor public health infrastructure (Casburn-Jones and Farthing, 2004; Troeger *et al*, 2017; WGO, 2012). Nevertheless, despite economic wealth and better investments in public health in developed countries, the incidence of infectious diarrhoea and vomiting remains high and is a significant clinical problem (Gadewar and Fasano, 2005; Spies, 2009; Troeger *et al*, 2017).

In the UK, a prospective cohort study conducted by Tam *et al* (2012) estimated that there are up to 17 million community cases and 1 million GP consultations attributed to acute infectious diarrhoea every year. With a specific focus on outbreaks and UK hospitals, Lopman *et al* (2004) estimated that outbreaks of infectious diarrhoea and vomiting account for nearly 12.5% of the total annual cost of hospital-acquired infections in the NHS. In effect, hospital-associated outbreaks of diarrhoea and vomiting are estimated as costing the NHS £115 million each year. In practical terms, the costs to affected hospitals include ward and bay closures, loss of staff through sickness and an increased workload on laboratory and cleaning services (Piednoir *et al*, 2010). The costs to affected patients include restrictions to visitors, longer hospital stays and clinical repercussions, varying from discomfort to life-threatening disorders (Mattner *et al*, 2006).

The adverse impact of such outbreaks has led to the development of infection prevention and control strategies that are well-publicised through national guidelines and aimed at helping hospitals effectively manage the care of patients with symptoms of diarrhoea and vomiting (Department of Health, 2008, 2012b; Norovirus Working Party (NWP), 2012; Public Health England (PHE), 2013a;b). Specifically, these guidelines have focused on addressing the diagnosing, reporting and management of two clinically prevalent pathogens: *Clostridium difficile* (*C. difficile*) and norovirus. These pathogens are known to cause infectious incidents and outbreaks all year round, however the highest incidences of incidents and outbreaks occur during winter months (Barrett *et al*, 2007; Gilca *et al*, 2012; Lopman *et al*, 2009; Loveridge *et al*, 2010).

Although the mechanisms associated with this seasonality remain poorly understood, it is generally agreed that infection prevention and control strategies such as those presented in cited national guidelines can help to reduce the risk of outbreaks or shorten their lifespan (Aziz, 2010; HPS, 2013; Martinez *et al*, 2012). Table 5 (next page) summarises the recommendations presented in cited guidelines.

	<i>C. difficile</i> Infections Use of SIGHT protocol (Table 7)	Norovirus Infections
Diagnosis	Laboratory confirmation	
Surveillance	<p>In general:</p> <ul style="list-style-type: none"> - monthly recording and reporting <p>During outbreaks:</p> <ul style="list-style-type: none"> - weekly audits and reporting - weekly antibiotic reviews 	Follow local and regionally developed surveillance systems
Management and treatment	<p>Multidisciplinary team clinical reviews</p> <p>Antibiotic treatment regime</p> <p>Daily monitoring of frequency and severity of diarrhoea</p> <p>Review of prescribed medicines</p>	<p>The avoidance or correction of dehydration</p> <p>[Not routinely recommended:</p> <ul style="list-style-type: none"> - use of antiemetic medicines - use of anti-diarrhoeal medicines]
Infection prevention and control practices/strategies	<p>*Antimicrobial stewardship (<i>C. difficile</i> Infections)</p> <p>Isolation care (including visitor control)</p> <p>Ward closures (if necessary)</p> <p>Hand Hygiene (with soap and water)</p> <p>Use of Personal Protective Equipment (PPE)</p> <p>Safe management of linen</p> <p>Safe management of waste</p> <p>Routine cleaning of the environment</p> <p>Decontamination of patient care equipment</p> <p>Terminal cleaning following discharge or transfer of patient, or resolution of symptoms</p>	
(Sources: Department of Health, 2008, 2012; PHE, 2013a,b; NWP, 2012)		

Table 5: Summary of recommendations in cited guidelines

A critical review of these guidelines does however, reveal the lack of a strong evidence base upon which a majority of recommendations are based. Furthermore, the broad nature of most of the recommendations makes it likely that they will be interpreted differently by individual clinicians and hospital policy makers, or not received well at all (an example is given below in Table 6 with an accompanying explanation). With regard to the lack of a strong evidence base, the guidelines contain a majority of recommendations based on suggestive/debatable/inconclusive evidence supported by low quality studies, expert opinion and group consensus. As an example, when the NWP (2012, p38-42) used the HICPAC grading system (MacCannell *et al*, 2011) to grade the strength of their key recommendations, 32 out of their 48 recommendations were supported by

low to very low quality studies, expert opinion and group consensus. It is important to note however, that the types of studies that would be required to produce a strong evidence base in this field, may either be unfeasible or unethical (Department of Health, 2008, p68).

With regard to the broad nature of most of the recommendations, although it is understandable that guidelines are meant for a broad audience, too much breadth can lead to difficulty in translation into workable clinical practices or rejection by clinicians (Jenner *et al*, 1999). For example, the Department of Health (2008) advocates the use of the SIGHT mnemonic protocol (Table 6) when clinicians are managing patients with suspected infectious diarrhoea. At a glance, this protocol reads well. However, in the reality of frontline clinical practice, some of these steps are slightly confusing and not so easily achievable.

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

Table 6: SIGHT mnemonic protocol (Department of Health, 2008)

For example, the first step assumes that clinicians have a working definition of what the term 'no clear alternative cause for diarrhoea' means. As illustrated in section 1.3 (Anatomy and aetiology), there are various alternative causes for diarrhoea and some will appear to be 'clear alternatives', however even 'clear alternatives' such as a patient presenting with a history of chronic diarrhoea, does not mean that they are not infective. Furthermore, the second step assumes that isolation facilities are readily available. In reality however, these facilities are finite resources which are needed for other infectious conditions; some of which take priority over infectious diarrhoea and vomiting (Anathallee *et al*, 2007).

Nevertheless, to complement national guidelines and address some of the shortcomings in presented recommendations there exists a plethora of expert opinion literature (NICE, 2013c; 2013d). This literature advocates various patient assessment procedures and infection prevention and control strategies which respective authors advocate to (1) improve the patient assessment process (Casburn-Jones and Farthing, 2004; NICE, 2013c; Sabol and Carlson, 2007), and (2) reduce the spread of both airborne and contact related infectious gastrointestinal illnesses (Aziz, 2010;

Aziz and Murphy, 2009; Harris *et al*, 2010; MacCannell *et al*, 2011; Martinez *et al*, 2012). However, despite the availability of well-publicised national guidelines and numerous expert opinion literature, it is reported that over the past decade, the burden of infectious diarrhoea and vomiting has increased on the NHS (NWP, 2012). In fact, over 1650 outbreaks of infectious diarrhoea and vomiting and over 1250 ward and bay closures were reported to the Health Protection Agency (2013) from hospitals across England and Wales in the 2011/2012 season. So disruptive and costly were these outbreaks to the wider health service system, that the NWP (2012) issued outbreak management guidelines emphasising the need for hospitals to maintain a balance between the prevention of spread of infection and regular/normal organisational activity. More recently (2016/2017 season), although outbreak figures are lower than those reported in the 2011/2012 season, outbreaks remain prevalent and problematic (PHE, 2017).

1.5 Current challenges in clinical practice (guidelines 'versus' reality)

In keeping with the emphasis and underpinning principles of the above-mentioned NWP guidelines, the AMU is one department within hospital settings that is pivotal with regard to the prevention of the spread of infection and the maintenance of regular/normal organisational activity (McNeill *et al*, 2011; Moloney *et al*, 2007; Moloney *et al*, 2005; Scott *et al*, 2009). The contextual significance of this department has already been established at the beginning of this chapter as the AMU is seen as a 'gateway' between the emergency department (and/or community) and hospital wards.

There are however, two notable clinical challenges that need to be acknowledged which are related to how clinicians assess and manage the infection prevention and control aspects of patients with symptoms of diarrhoea and vomiting. These challenges include: (1) diagnosing the exact cause of a patient's incidence of diarrhoea and vomiting, and (2) implementing and performing appropriate infection prevention and control measures, when infectious causes are suspected.

With regard to diagnosis, AMU clinicians' initial challenge relates to the fact that clinicians make preliminary decisions regarding the patient's condition and infectious status, based on what they observe and what the patient and/or their family or carers report to them during history taking (Fawcett and Rhynas, 2012; Getto *et al*, 2011; Goel and Wilkinson, 2013; Wu, 2013). For patients coming into the AMU as GP referrals, the information provided by the referring GP also informs the process of history taking (and sometimes makes it possible for an isolation room to be

prepared for the patient before their arrival). In other words, a good history increases the likelihood of an accurate diagnosis, whereas a poor history significantly reduces the likelihood of an accurate diagnosis.

The next challenge relates to the numerous infectious and non-infectious causes of diarrhoea and vomiting which clinicians have to systematically exclude (Getto *et al*, 2011; NICE, 2013a; 2013d; Polage *et al*, 2012). With a specific focus on *C. difficile* and norovirus, the diagnosis of infectious conditions caused by these pathogens is further complicated by the fact that they require confirmatory testing of stool specimens in the microbiology laboratory, which takes time. Table 7 briefly describes these testing procedures. On account of the time that it takes to collect specimens and perform these tests, clinicians have to rely on other diagnostic methods, namely history taking, to determine whether or not patients should be treated as potentially infectious.

Guidelines recommend that *C. difficile* testing follow a two-step process; the first of which is a molecular test or a GDH EIA test, and the second, a toxin EIA test (Department of Health, 2012b). A fresh unformed stool specimen that has not been contaminated with urine or water is required for these tests. For norovirus, reverse transcription-PCR (RT-PCR) testing is recommended (NWP, 2012; Phillips *et al*, 2009). For this test, specimens should ideally be collected during the acute phase of illness (within 48 to 72 hours after symptoms start) while stools are still unformed.

***C. difficile* testing**

- Glutamate dehydrogenase (GDH) EIA tests detect the presence of an antigen* that is produced in high amounts by *C. difficile*. As GDH is present in both toxin producing and non-producing *C. difficile*, this test cannot be used alone to diagnose *C. difficile* infection. It can be used to rule out *C. difficile* infection in combination with a follow-up test used to determine the presence of toxins in specimens that are positive by the GDH test.
- *C. difficile* toxin enzyme immunoassays (EIA) directly detect A and B toxins in a stool specimen. They produce a result within hours but can have low sensitivity. For this reason it is recommended that these assays are only used in combination with other tests to detect *C. difficile* infection.

Norovirus testing

- Reverse transcription polymerase chain reaction (RT-PCR) tests detect norovirus antigens at low concentrations and are not greatly affected by sample quality.

* An antigen is a toxin or other foreign substance which induces an immune response in the body.

(Sources: Department of Health, 2012; NWP, 2012; Phillips *et al*, 2009)

Table 7: *C. difficile* and norovirus testing at the time of undertaking this project

With regard to the implementation and performance of appropriate infection prevention and control measures, one highly recommended measure that is challenging to implement in clinical practice is the immediate isolation of symptomatic patients (Department of Health, 2008, 2012b; HPS, 2013; NWP, 2012; PHE, 2013b). With a specific focus on 'point-of-admission' settings such as emergency departments and AMUs, that is, clinical settings in the UK that are identified as gateways into hospital wards (Scott *et al*, 2009), implementation of isolation measures is particularly difficult due to institutional challenges such as unique workload pressures (including the acute state of presenting patients), infrastructural restraints (sometimes including a lack of isolation facilities) and competing pressures on available isolation facilities (Anathallee *et al*, 2007; Aziz, 2009; Flowerdew *et al*, 2012; Vardy *et al*, 2007).

With reference to this project, it was some of these challenges that prompted the matron of the local AMU to request for a study that investigated how AMU clinicians assessed the infectious status of patients with symptoms of diarrhoea and vomiting and managed the infection prevention and control related aspects of their care. This was based on the matron's clinical observations and concerns that there were some infection prevention and control related service inefficiencies and failures that were being experienced in the unit as a result of poor diagnostic procedures and poor implementation of infection prevention and control measures associated with patients who had symptoms of diarrhoea and vomiting.

According to the matron, there were occasions when non-infectious patients were being unnecessarily cared for in sought-after isolation facilities whilst genuinely infectious patients were being missed and subsequently being cared for in general bays. Furthermore, on the occasions when infectious patients were identified, some were reported as being cared for in isolation facilities without a clear discontinuation plan. With regard to preventing the spread of infection, poor implementation of infection prevention and control measures was associated with clinicians' workload pressures which the matron believed were hindering them from successfully performing aspired infection prevention and control interventions.

1.6 Research questions

In order to address the concerns raised by the matron of the local AMU, the following research questions were formulated, so as to aid with conducting a focused literature review and subsequent research project:

1.6.1 Broad central question

How are patients with symptoms of diarrhoea and vomiting assessed and managed by Acute Medical Unit doctors, nurses and healthcare assistants - and what factors influence these processes? What are the patients' experiences and understanding of diarrhoeal-related care in the Acute Medical Unit?

1.6.2 Specific sub-questions

1. In relation to hospital-based assessments of diarrhoea and vomiting:

a. How do Acute Medical Unit doctors, nurses and healthcare assistants assess the infective status of adult patients with symptoms of diarrhoea and vomiting, in the absence of results from stool microbiology investigations?

b. What factors promote or inhibit the ability of Acute Medical Unit doctors, nurses and healthcare assistants to effectively assess the infective status of adult patients with symptoms of diarrhoea and vomiting?

[An effective assessment in this context relates to completing a thorough assessment that yields reliable information so as to enable a clinician to make a well informed decision.]

2. In relation to hospital-based infection prevention and control measures:

a. What infection prevention and control interventions do Acute Medical Unit doctors, nurses and healthcare assistants implement and perform when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting?

b. What factors promote or inhibit the ability of Acute Medical Unit doctors, nurses and healthcare assistants to successfully implement and perform aspired infection prevention and control interventions, whilst caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting?
[Successful implementation and performance in this context relates to being able to instigate desired interventions and then achieve the desired positive result of them being followed by staff and visitors alike.]

3. In relation to hospital-based infection prevention and control practices and patient involvement:

a. What are the patients' experiences and understanding of the care that they received in the Acute Medical Unit, following an incident of suspected/confirmed infectious diarrhoea and vomiting?

1.7 Chapter summary

This chapter has introduced the project by offering a description of the AMU and examining its role in hospital related infection prevention and control practice. It has offered a presentation on the anatomy of the gastrointestinal tract (the gut) and the aetiology of diarrhoea and vomiting. It has also discussed the challenges that the NHS is currently facing as a result of infectious diarrhoea and vomiting and how the guidelines designed to address these challenges are currently difficult to implement in clinical settings such as the AMU. Finally, the chapter has presented the research questions that were formulated in response to the local AMU matron's request for a study that investigated how AMU clinicians managed the infection prevention and control related aspects of care of patients with symptoms of diarrhoea and vomiting. The next chapter will offer a literature review.

Chapter 2 A literature review on the assessment and infection prevention and control management of adult patients with symptoms of diarrhoea and vomiting

2.1 Introduction

In this chapter, research evidence relating to the assessment of hospital-based patients with symptoms of diarrhoea and vomiting and associated infection prevention and control interventions will be explored in depth. The process and product of systematic literature searching will be detailed to illustrate how relevant research evidence was identified. The identified evidence will then be reviewed in two main sections; firstly, in relation to the formulated research questions, and then holistically in the form of a critical discourse, exploring both identified evidence and other influential literature in the field of hospital-associated infection prevention and control practices related to diarrhoea and vomiting. The final section of the chapter will provide justification for undertaking this project.

2.2 Approach to literature search

Literature searches relating to the formulated research questions were undertaken in four electronic databases; CINAHL Plus, EMBASE, MEDLINE, and Web of Science. These databases were chosen as they allowed for rigorous searching of healthcare related literature whilst minimising the number of irrelevant records retrieved. As exemplified in Appendix 2, initial database searches relating to the respective research sub-questions (section 1.6.2), were undertaken focusing on the AMU clinical setting. These searches retrieved a combined total of 23 articles from all the accessed databases. Of these, 8 were excluded as duplicates. The titles and abstracts of the remaining 15 were scrutinised carefully, but could not be used to answer the research questions. This is because they were either not addressing infection prevention and control practice or they addressed infection prevention and control practice that was unrelated and incomparable to the care of patients with symptoms of diarrhoea and vomiting.

After careful analysis of the searches conducted, it was acknowledged that performing the searches with an AMU specific focus had limited the results retrieved. This is because the discipline of Acute Medicine (and subsequently AMUs) is relatively young, compared to other

disciplines of Medicine and as such, AMUs have not been subject to much research relating to infection prevention and control practice (RCP, 2004a; SAM, 2014a). To address this problem and to identify other relevant empirical evidence that could be used to inform the review, it was decided to expand the parameters of the review beyond the AMU clinical setting. This was done in order to examine the diarrhoea and vomiting related infection prevention and control practices of hospital-based clinicians, regardless of setting. This involved substituting 'AMU' specific search terms with 'hospital' setting search terms, as shown in Table 8. This substitution resulted in the retrieval of numerous articles that were then limited to only those written in the English language, as preliminary title and abstract screening had identified several non-English articles. The titles and abstracts of the articles that remained after limiters were applied were then scrutinised. Decisions regarding which articles to keep for review were made according to the respective inclusion and exclusion criteria shown in Appendix 3.

Remove
Acute Medical Unit ⇒ Acute Medical Unit*.tw. OR Medical Assessment Unit*.tw. OR Acute Medical Assessment Unit*.tw. OR Acute Planning Unit*.tw. OR "Medical Assessment and Planning Unit*".tw. OR Acute Assessment Unit*.tw. OR Acute Medical Ward*.tw. OR Rapid Assessment Medical Unit*.tw. OR Early Assessment Medical Unit*.tw. OR Medical Unit*.tw.
Replace with
Hospital ⇒ exp Hospitals/ OR exp Hospital Units/ OR exp Hospital Departments/ OR unit*.tw. OR ward*.tw. OR hospital*.tw.

Table 8: 'Hospital' setting search terms used in MEDLINE

In addition to expanding the parameters of the database searches, the reference lists of pertinent retrieved articles, national policy documents and expert opinion literature, were screened. The authors of some key papers were also contacted as part of an effort to identify all relevant empirical evidence. The culmination of these comprehensive search strategies led to the identification of studies that had the potential to inform the expanded interests of the review. Figure 4 (next page) shows a summary of the search and selection process and Appendix 4 presents a list of identified papers.

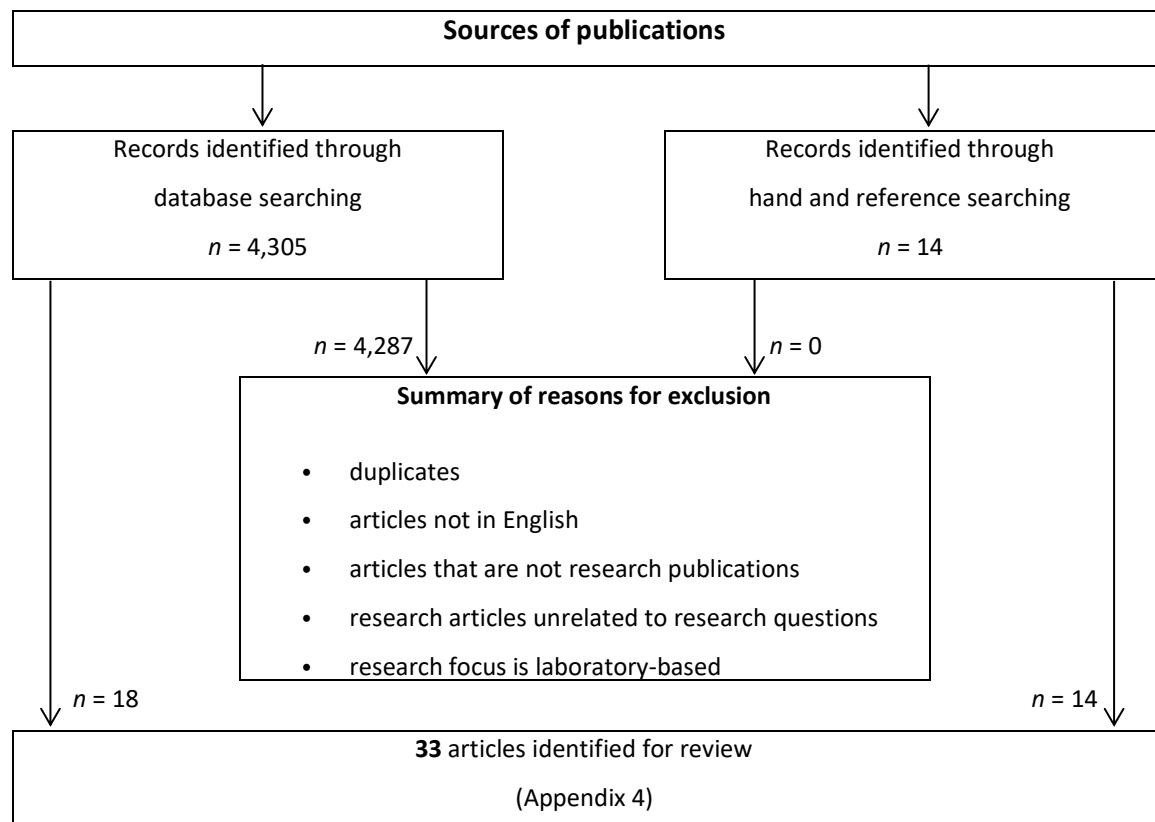


Figure 4: Summary of search and selection process

It is important to highlight that the literature searches described above which identified 33 articles for review, were undertaken in 2014. Re-run searches focusing only on the AMU were undertaken in May 2018, but yielded no new AMU specific articles to add to the review.

2.2.1 Systematic process of critique and synthesis

The evidence identified to inform this review, represented numerous data collection strategies and included case reports of individual patients, case studies of selected clinical areas, outbreak reports, intervention studies, observational studies, interview-based studies and mixed method studies. The diversity of the study designs represented in the evidence, presented a unique critiquing challenge which required the use of 3 critiquing tools.

As there are no agreed standards for the reporting of outbreak investigations of communicable diseases (Palmer *et al*, 2013), the Outbreak Reports and Intervention studies of Nosocomial infection (ORION) checklist, developed by Stone *et al* (2007), was used to appraise outbreak reports and intervention studies of nosocomial gastroenteritis. This tool was selected because it provided a framework that helped examine the methodological thoroughness and reporting

transparency of relevant studies. It also facilitated a robust assessment of the dependability of presented data and the degree to which it could be generalised to other hospital settings. The Cardiff University Information Services (INSRV) (2011) tool was used to appraise observational studies, case studies of selected clinical areas, and studies utilising mixed methods because of its amalgamation of 4 different critiquing tools (including the Critical Appraisal Skills Programme (CASP) (2013) tool for cohort studies). The amalgamated nature of the tool, provided a comprehensive framework that helped in the critique of the trustworthiness of relevant studies, their methodological validity, and the transferability (generalisability) of presented findings. The (CASP, 2006) tool for qualitative studies was used to appraise interview-based studies and it aided in the critique of the appropriateness of the designs of the studies and the credibility of their results and how transferable they were to other contexts and settings. As there are no reporting standards for case reports of individual patients, an assessment of their reporting transparency and informative value with reference to the purpose of the review was conducted instead.

2.3 Literature review

2.3.1 RQ1a. How patients with symptoms of diarrhoea and vomiting are assessed

The review identified a scarcity of primary research relating to the assessment of adult patients with symptoms of diarrhoea and vomiting. Appendix 4 (Question 1a) highlights the 8 papers that were identified to inform this section of the review. These included 1 observational study and 7 individual patient case reports, encompassing a 13-year period from 1998 to 2011.

Analysis of these papers, revealed 4 steps in the approach used by hospital-based clinicians to assess adult patients with symptoms of diarrhoea and vomiting. These steps were: (1) History taking, (2) Physical examinations, (3) Blood tests and (4) Additional diagnostic tests. These steps are similar to those recommended by NICE (2013c) and existing expert opinion literature relating to the assessment of adult patients with diarrhoea (Bushen and Guerrant, 2003; Casburn-Jones and Farthing, 2004; Farthing *et al*, 1996; Gadewar and Fasano, 2005; Jones and Rubin, 2009; Schott and Bono, 2011; Stepan *et al*, 2006).

When the identified papers were scrutinized individually and collectively, there was evidence of varied practice in relation to the assessment of patients. As an example, in their observational study alone, Kyne *et al* (1998) identified considerable inconsistent assessment practices among the clinicians they observed, which included the omission of some expected clinical assessments

such as rectal examinations. It is, however, worth noting that varied practice is not especially surprising, as every patient (or case) is different, thereby warranting case-specific procedures to be followed. Practice inconsistencies could also be attributed to the contentious and unproven nature of the existing evidence that informs practice in this field. As Sabol and Carlson (2007) highlight, there is a lack of research data that can be used to form a strong evidence base, so as to inform best practice. Indeed, scrutiny of the NICE (2013b; 2013c) guidelines that relate to the assessment of adults with symptoms of diarrhoea and vomiting, revealed that even these national guidelines are based primarily on expert opinion literature. Furthermore, these guidelines could be seen as ineffective because of the broad nature of their recommendations, which lend themselves to subjective and individual interpretation by the clinicians utilising them, thereby resulting in varied practice. Inadvertently, the prevalence of varied practice casts doubt on the efficiency and competency of hospital based clinicians, with regard to their ability to reliably assess patients with symptoms of diarrhoea and vomiting as expressed by the matron of the local AMU and authors like Gallagher (2013).

A potential solution to the problem of varied assessment practice could be the development of an evidence-based and 'clinically relevant' standardised assessment tool (Polage *et al*, 2012). To produce such a tool however, would require a stepwise developmental strategy to be followed that involved understanding (observing) current practice, developing a tool based on current best practice, testing the tool so as to make appropriate adjustments, repeating the process of testing and adjusting the tool until proven effective in practice, and finally, integrating the tool into routine practice. Unfortunately, no strong empirical evidence exists that could be used to inform the development of such a tool. Kyne *et al*'s (1998) observational study stands as the most recent formal study undertaken with an interest to assess the procedures which hospital-based clinicians use 'to investigate and eliminate the causes' of diarrhoea in adult inpatients. As a matter of concern, despite their study identifying discrepancies in assessment procedures, no follow-up studies are reported to have been conducted to explore whether the identified shortcomings had been addressed or were still prevalent, thereby requiring remedial attention. This scarcity of reliable empirical evidence that can be used to understand and review contemporary practice served to support the need for this project.

2.3.2 RQ 1b. The factors that promote or inhibit the effective assessment of patients with symptoms of diarrhoea and vomiting

No papers were identified that could be used to inform this part of the review, revealing this to be an unresearched aspect of clinical practice.

2.3.3 RQ2a. Infection prevention and control interventions implemented/Performed when caring for patients with symptoms of infectious diarrhoea and vomiting

There were 20 papers that were identified to inform this part of the review (Appendix 4, Question 2a). Although the primary focus of most of these papers was not to describe the infection prevention and control interventions that clinicians implement and/or perform, they offered the best available evidence that could be used to inform the review. The papers encompassed a 19-year period from 1994 to 2013 and included an observational case study and 19 outbreak reports (some of which were also intervention studies).

Analysis of the papers revealed 8 major themes that represent the different types of infection prevention and control interventions implemented and/or performed by hospital-based clinicians, when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting. The themes were: (1) raising staff and visitor awareness, (2) management of staff, patients and visitors, (3) implementing standard infection control precautions (SICPs), (4) adapting the care environment, (5) education of staff, patients and visitors, (6) pharmacological interventions, (7) 'aggressive' outbreak management measures and (8) protocols for the safe discontinuation of infection prevention and control measures.

These themes represented numerous individual interventions that were reported in respective papers as having been implemented. The themes themselves were similar to currently advocated outbreak management strategies outlined in national guidelines and expert opinion literature, relating to the management of patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting (Department of Health, 2008; NWP, 2012; RCN, 2013a). Despite these similarities however, the transferability of the individually represented interventions to an AMU setting was limited. This was because the clinical settings represented in the reviewed papers included medical, surgical, rehabilitation and psychiatric environments whose structure, function and characteristics of the work environment are different from those of the AMU (Cartmill *et al*, 1994; Doshi *et al*, 2013; McCall and Smithson, 2002; Tseng *et al*, 2011). Furthermore, in-depth analysis of the identified papers revealed that the term 'implement' was often used by authors to describe 'the putting into effect of aspired interventions' or 'the instigation (and/or communication) of aspired interventions'. Only a few authors were transparent in reporting whether or not these aspired interventions were actually performed. This lack of transparency in most of the reports further affected the transferability and reliability of the information contained

within them as there was little certainty that reportedly implemented infection prevention and control interventions were actually performed.

Another limitation to transferability related to the fact that a majority of the identified papers reported on outbreak scenarios. This meant that the infection prevention and control interventions reported centred around clinical activities that were performed in periods of heightened awareness to the threat of an outbreak. They did not necessarily reflect standard practice during non-outbreak periods. These limitations further supported the need for a study that observed 'real-time' clinical practice during non-outbreak periods, so as to gain knowledge of the interventions that clinicians routinely perform. Such evidence would be valuable to clinical leaders involved in infection prevention and control related service improvement initiatives, who require insight into what routine practice looks like.

2.3.4 RQ2b. Factors that promote or inhibit the successful implementation/ performance of aspired infection prevention and control interventions

There were 8 papers that were identified to inform this part of the review (Appendix 4, Question 2b). As with the preceding section, although the primary focus of most of these papers was not to investigate the factors that promote or inhibit the ability of hospital-based clinicians to effectively implement and/or perform aspired infection prevention and control interventions, they offered the best available evidence that could be used to inform the review. These papers encompassed a 29-year period from 1982 to 2011 and included an observational case study, a qualitative survey, and 6 outbreak reports.

Analysis of the papers revealed 8 major themes, representing numerous factors that promote or inhibit the ability of hospital-based clinicians to effectively implement and/or perform aspired infection prevention and control interventions when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting. The themes were: (1) leadership, management and monitoring, (2) staff attitudes, beliefs and perceptions, (3) staff education, support and awareness, (4) availability of clear, timely and tailored policies, guidelines and task sheets, (5) availability of essential facilities and equipment, (6) available human resources, (7) the social and physical environment of the practice setting and (8) workload pressures and service demands.

These themes were similar to the themes identified in studies investigating factors influencing healthcare professional's performance of, and compliance with SICPs - including hand hygiene (Backman *et al*, 2012; Backman *et al*, 2011; Efstathiou *et al*, 2011; Erasmus *et al*, 2009; Joshi *et al*, 2012). They were also similar to some of the themes identified by the Clinical Human Factors Group (CHFG) (2013) in their guide intended to raise awareness of human factors in clinical practice. These include (1) leadership, management and monitoring, (2) staff education and support, (3) availability of clear, timely and tailored policies, guidelines and task sheets, (4) the social and physical environment of the practice setting, and (5) workload pressures and service demands. Despite these similarities however, some of the papers identified to inform this part of the review were outbreak reports with reporting discrepancies and unclear audit trails that impacted on the dependability (reliability) of some of the data contained within them. Three of them in particular were reports of hospital-wide infection prevention and control activities (non-specific to any clinical area), thereby limiting the generalisability of reported barriers and facilitators to an AMU setting (Conway *et al*, 2005; Khanna *et al*, 2003; McCall and Smithson, 2002). The other papers represented inpatient orthopaedic, surgical, medical, psychiatric and elderly care wards. As Vardy *et al* (2007) elucidated in their study that investigated an outbreak of acute gastroenteritis in an emergency department, some infection prevention and control interventions developed for inpatient wards can only be partially applied within 'point-of-entry' settings. As such, some of the promoting or inhibiting factors relating to these interventions may not be applicable to the AMU.

Overall, the barriers and facilitators to implementing infection prevention and control interventions highlighted in identified papers, had limited generalisability to an AMU setting. This supported the need for an AMU specific study that investigated the factors that promote or inhibit the ability of hospital-based clinicians to implement and/or perform aspired infection prevention and control interventions, when caring for patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting. Furthermore, in their survey and non-participant observation study to examine knowledge, attitudes, perceptions and actual behaviour of adherence to contact precautions, Jessee and Mion (2013) recommended the need for studies that investigated organisational and individual barriers and motivators to adherence to evidence-based practices. This recommendation was based on findings of continued low levels of knowledge of standard precautions and adherence to evidence-based practices among clinicians in their study. This project acted as a response to this call, as it sought to identify the factors that influence the successful implementation and/or performance of aspired infection prevention and control interventions. The knowledge gained through this study may then be used by clinical

practice leaders and policy makers to either develop useful tools, or put in place appropriate support structures, that motivate implementation of aspired practice.

2.3.5 RQ3a. Patients' experiences and understanding of care following an incident of infectious diarrhoea and vomiting

There were 2 papers that were identified to inform this part of the review (Appendix 4, Question 3). These papers respectively investigated the isolation experience of patients infected with *C. difficile* (Pacheco and Spyropoulos, 2010) and the lived experience and care needs of patients infected with *C. difficile* (Madeo and Boyack, 2010). They both employed a semi-structured interview approach and thematically presented their findings with respect to the purposes of their studies.

Analysis of the findings of both studies revealed 9 themes that contained data pertinent to this part of the review. The themes were: (1) lack of control over bowel function, (2) privacy and dignity, (3) understanding of illness, (4) lack of consistency in diagnosis and test results information provided, (5) loneliness related to isolation measures, (6) uncertainty related to illness trajectory, (7) variances in understanding the infection transmission process, (8) hypervigilance of the infection transmission process, and (9) lack of consistency in the implementation of isolation protocol.

Data extracted from these themes proved useful in informing this part of the review with regard to how healthcare professionals informed and involved patients in decisions and activities relating to their care. In general, the patients interviewed (and in some cases, their families) described healthcare professionals as not being very good at either of these activities. For example, the participants in the study by Pacheco and Spyropoulos (2010) reported how bedside nurses (and sometimes doctors) provided satisfactory information regarding *C. difficile* infection and related isolation procedures, however they did not feel that these professionals were open and forthcoming with information. Furthermore, they reported how information inconsistencies were common, as well as inconsistencies in the implementation of isolation protocols.

Nevertheless, despite the usefulness of the data extracted from these studies, there were some limitations to generalisability. Firstly, the patients represented in both studies were aged between 52 and 89 years of age. This age sample was not representative of younger patients who also access the AMU and whose experiences of care could be different; as some studies suggest that a

person's age influences their perception(s) of communication with healthcare professionals (DeVoe *et al*, 2009). In terms of patient sample size and study validity, the study by Madeo and Boyack (2010) was considerably rigorous. It had a sample size of 15 patients and follow-up interviews were conducted to clarify or amend the findings of the first interview. In contrast, the study conducted by Pacheco and Spyropoulos (2010) had 5 patient/family member pairs, but no follow-up interviews, or use of alternate methods to validate their findings. This shortcoming affected the credibility and dependability of their study. The study by Pacheco and Spyropoulos (2010) represented a healthcare system different to the NHS and as such, patient-clinician relations and interactions are not directly comparable. Furthermore, both studies focused only on the experiences of patients with a *C. difficile* infection. These sample groups were therefore not representative of patients whose symptoms of diarrhoea and vomiting are caused by other pathogens.

Overall, the identified studies were not specifically investigating patient experiences of care with regard to how well healthcare professionals were at educating and involving them in the infection prevention and control related activities of their care. As a result, certain aspects of care were not probed, specifically 'patient education on infection prevention and control related aspects of care' and 'patient involvement in infection prevention and control related aspects of care.' This limitation further supported the need for this project as it aimed to discover patients' perspectives on these aspects of care, as well as obtain recommendations for service improvement so as to help clinicians meet respective patient experience standards (NICE, 2012b). Appendix 5 presents the list of patient experience standards that were considered in this project.

2.4 Critical analysis of identified papers and other relevant literature

With respect to answering the proposed research questions in Chapter 1, no studies were identified that specifically investigated how AMU clinicians assess and manage the infection prevention and control related aspects of care of adult patients with symptoms of diarrhoea and vomiting.

The expanded review that was conducted as a means of assessing existing evidence within the field of hospital-associated infection prevention and control practices related to diarrhoea and vomiting, revealed how little is known about the actual practices of hospital-based clinicians. Little is also known about whether or not related guidelines are effective or are being successfully

implemented in frontline practice. Furthermore, the transferability of the data extracted from identified papers was limited.

In addition to the limitations already mentioned, the identified papers encompassed a 31-year period of evolving healthcare practice (from 1982 to 2013) and represented 12 different countries (including developed and developing countries), whose healthcare systems and hospital support and monitoring strategies are not directly comparable. These countries included Australia, Austria, Canada, China, Costa Rica, Greece, Italy, the Netherlands, Switzerland, Taiwan, UK, and the United States of America.

Beyond revealing a lack of reliable empirical evidence, the review also identified the stagnant and disputable quality of the evidence that is currently being used to guide practice in this field (NICE, 2013c; NWP, 2012). It appears that despite the passing of nearly two decades, current recommendations for the assessment procedures and infection prevention and control interventions that clinicians are to implement when caring for adult patients with symptoms of diarrhoea and vomiting, are similar to those proposed by authors like Farthing *et al* (1996) and Chadwick *et al* (2000). In effect, this means that current practice is predominantly based on recommendations where there is no consensus on the evidence and on expert opinion that is founded on strong rationale and suggestive evidence. It is therefore unsurprising that authors such as Sabol and Carlson (2007), Koopmans (2009), MacCannell *et al* (2011), and Greig and Lee (2012) have highlighted the need for studies that contribute towards improving the quality of evidence that is currently guiding practice in this field. With a specific focus on norovirus and to add to the debate on the effectiveness of currently recommended infection prevention and control practices, Curran *et al* (2016) recently suggested that the ongoing, unrecognised transmission of norovirus in care settings may indicate that either SICPs are being inadequately performed or that SICPs themselves are inadequate to prevent norovirus transmission. It is however worth highlighting that infection prevention and control interventions are not easily tested in the form of 'gold standard' randomised controlled trials. This is because it would be unethical to withdraw interventions that are considered to be of benefit to a patient group in order to demonstrate their effect (Department of Health, 2008, p68). Nevertheless, it has been suggested that by understanding the details of the epidemiology (patterns, causes and effects) of offending pathogens, it might be possible to design better evidence-based infection prevention and control strategies (Koopmans, 2009).

With regard to study focus, although it is known that infectious diarrhoea and vomiting is usually introduced into clinical areas by infected patients, relatives or staff (Chadwick *et al*, 2000; Lopman

et al, 2005; Vardy *et al*, 2007), recent studies have not investigated how clinicians actually screen patients and manage related day-to-day infection prevention and control related aspects of care. Instead they have focused on adherence to national and local guidelines, hospital outbreak topics that relate to compliance to SICPs and the reporting of local outbreak management processes immediately before and after outbreaks have been declared (Greig and Lee, 2012; Haill *et al*, 2012; Harris *et al*, 2010; Salgado *et al*, 2009; Vonberg *et al*, 2008). In fact, within the outbreak reports themselves, there appears to be underreporting of, and/or limited knowledge about the institutional factors that might precipitate hospital outbreaks of infectious diarrhoea and vomiting (Aziz, 2010; Lopman *et al*, 2005).

Moreover, the majority of published studies have focused their investigations on general wards and intensive care units rather than on 'point-of-admission' settings, such as emergency departments and AMUs, which are the gateways into hospital wards (Scott *et al*, 2009). These settings warrant dedicated infection prevention investigations related to diarrhoea and vomiting due to their unique 'anatomy' (structure and function) and the practical challenges they face. These challenges include unique workload pressures; inevitable vulnerability to infectious illnesses (as they are initial assessment settings); infrastructural restraints (including a lack of isolation facilities) and pressures on available facilities (which are often managed through predetermined prioritisation protocols specific to each hospital; that is, protocols that outline a hierarchy of infectious risks that take first preference of existing facilities) (Anathallee *et al*, 2007; Aziz, 2009; Flowerdew *et al*, 2012; Vardy *et al*, 2007). Such investigations would help to determine how and whether hospitals translate relevant infection prevention national guidelines into effective working policies for such specialist clinical areas, as the success or failure of this translation process inevitably affects downstream wards.

2.5 Justification for conducting the project

Besides being a project based on an observed clinical need, the literature review revealed that no previous studies have been conducted that specifically investigate how AMU clinicians manage the infection prevention and control aspects of patients with symptoms of diarrhoea and vomiting. This means that little is known about the actual practice of hospital based clinicians with regard to following recommended assessment procedures and infection prevention and control interventions when caring for this patient group. Similarly, little is known about institutional factors that precipitate diarrhoea and vomiting outbreaks. Even less is known about the

effectiveness of diarrhoea and vomiting related infection prevention guidelines and how they are translated into individual hospital policies (Curran *et al*, 2016).

This project therefore, aimed to provide first-hand evidence of the procedures that AMU doctors, nurses and healthcare assistants employ in relation to the care, assessment and infection prevention and control management of adult inpatients with symptoms of diarrhoea and vomiting. It also aimed to offer insight into the factors that influence the ability of these clinicians to carry out effective patient assessments and implement aspired infection prevention and control interventions. It is hoped that understanding these aspects of care will facilitate the identification of opportunities, where infection prevention and control practice associated with this patient group can be improved and/or changed, so as to reduce incidences of avoidable hospital outbreaks.

The project also aimed to add qualitative insight into this field of hospital-associated infection prevention and control practice, and shed light into why some recommended infection prevention and control interventions might not be working as effectively as expected. It also aimed to elucidate previously unconsidered human, environmental and institutional factors that perhaps precipitate hospital diarrhoea and vomiting outbreaks. Understanding these factors could lead to the development of better patient care pathways and clinically relevant and effective infection prevention and control guidelines/policies.

Overall, it is hoped that the knowledge gained from the project will be used to develop robust evidence-based patient assessment and infection prevention and control management pathways; specific to the care of adult inpatients with symptoms of diarrhoea and vomiting. It is also hoped that it will be used to develop clinically relevant infection prevention and control guidelines, which are easily adaptable into hospital policies and realistically translatable into everyday practice. Finally, it is hoped that this project will facilitate the development of practical solutions that will be used to address the service inefficiency concerns raised by the matron of the local AMU. This may subsequently lead to the development of better local inpatient care pathways for adult patients with symptoms of diarrhoea and vomiting.

2.6 Chapter summary

This chapter has explored research evidence relating to the assessment of hospital-based patients with symptoms of diarrhoea and vomiting and associated infection prevention and control

interventions. The process and product of systematic literature searching was detailed to illustrate how relevant research evidence was identified. The evidence was then reviewed in two main sections; firstly, according to the formulated research questions in Chapter 1 and then holistically, in the form of a critical discourse that explored both identified evidence and other pertinent, influential literature. Finally, justification for undertaking this project was provided. The next chapter will offer a discussion on study methodology and methods.

Chapter 3 Methodology and methods

3.1 Introduction

This chapter will present a cogent and coherent discussion for the choice of methodology and methods selected to help answer the research questions presented in Chapter 1 and meet subsequent study aims and objectives. It will also discuss the chosen approaches and techniques to data collection and explore issues surrounding sampling, recruitment, ethics, data analysis and synthesis and study rigour.

3.2 Project working title and study objectives

Having justified the need for undertaking this project, the following became the project's working title, aims and objectives.

3.2.1 Project working title

How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after (assess and manage) patients who have diarrhoea and vomiting?

3.2.2 Study aims

1. To identify and describe how AMU doctors, nurses and healthcare assistants manage adult patients with symptoms of diarrhoea and vomiting.
2. To identify and explain the factors that influence how AMU doctors, nurses and healthcare assistants manage adult patients with symptoms of diarrhoea and vomiting.
3. To understand AMU patients' experiences and understanding of the care that they received, following an incident of suspected/confirmed infectious diarrhoea and vomiting.

3.2.3 Study objectives

In relation to hospital-based assessments of diarrhoea and vomiting:

- i. To identify and describe how AMU doctors, nurses and healthcare assistants assess the infective status of adult patients with symptoms of diarrhoea and vomiting, in the absence of results from stool microbiology investigations.
- ii. To identify and explain the factors that promote or inhibit the ability of AMU doctors, nurses and healthcare assistants to effectively assess the infective status of adult patients with symptoms of diarrhoea and vomiting.

In relation to hospital-based infection prevention and control measures:

- iii. To identify and describe the infection prevention and control interventions that AMU doctors, nurses and healthcare assistants implement and perform, when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.
- iv. To identify and explain the factors that promote or inhibit the ability of AMU doctors, nurses and healthcare assistants to successfully implement and perform aspired infection prevention and control interventions, when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.

In relation to hospital-based infection prevention and control practices and patient involvement:

- v. To describe AMU patients' experiences and understanding of the care they received, following an incident of suspected/confirmed infectious diarrhoea and vomiting and to obtain recommendations for service improvement.

In relation to improving the practice of local AMU clinicians:

- vi. To produce a report for the AMU matron and relevant clinical managers that presents the findings of the study and consequent recommendations.

3.3 Ethnography

In order to meet the project's aims and objectives, an ethnographic approach was employed (Reeves *et al*, 2008). Ethnography can be described as an in-depth study of naturally occurring events within a culture or social group (Murchison, 2010). Ethnography is used to study groups of people, in order to gain an in-depth understanding of their lives or specific aspects of their lives. It seeks to understand the relationship between context, culture and events; where culture can be described as the shared beliefs, values and attitudes of a specific group of people within a given

context (De Bono *et al*, 2014). As the study aimed to gain a contextual understanding of the factors influencing infection prevention and control practice in a complex clinical setting, an ethnographic approach was best suited for the project (Knobloch *et al*, 2017).

Although other investigative approaches could have been used, such as a prospective observational study involving active surveillance (Kyne *et al*, 1998), or a purely interview-based study (Madeo and Boyack, 2010), ethnography was chosen because it allowed for the observation and recording of ‘naturally’ occurring activities surrounding the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting. This included the detailed recording of both ordinary (routine) and unusual (non-routine) events and activities that could otherwise be ignored (or overlooked) by alternative approaches, despite the fact that they may have significant influence on the phenomena under investigation (Emerson *et al*, 2011; Goodson and Vassar, 2011; Hammersley and Atkinson, 2007). The chosen approach also allowed for the identification of associations between the clinical, cultural environment (including team ethos and pertinent hospital policies and guidelines) and various naturally occurring events and activities that influenced the ability of clinicians to effectively assess and manage patients with symptoms of diarrhoea and vomiting (Goodson and Vassar, 2011; Murchison, 2010; Ormston *et al*, 2014). Data were collected from multiple sources and various data collection strategies were employed that enabled effective triangulation of the data (that is, cross verification of data), so as to strengthen the integrity and validity of the study (Nurani, 2008; Shenton, 2004).

Another reason why ethnography was chosen was because I (the researcher) had worked in the AMU at the study site for over two years as a Staff Nurse prior to commencing data collection. I was, therefore, familiar with the unit’s physical environment, the staff and their culture. Although it could be said that such familiarity and involvement impedes objectivity, in the present study, this familiarity allowed me to collect data as an ‘expert’ participant and an observer who could go ‘behind the curtains’. Evered and Louis (1981) identified these two approaches as ‘inquiry from the inside’ and ‘inquiry from the outside’; whereby the former is characterised by the researcher’s personal involvement in the research process, and the latter, by their detachment. These positions enabled me to look at the ‘big picture’ of what was actually happening and ask pertinent, analytical questions, whilst at the same time drawing on personal, clinical experience to help make sense of the phenomena under investigation (Murchison, 2010). It was also possible to go ‘behind the curtains’ and observe events in clinical practice that were hidden from the public.

Due to its emphasis on context, ethnography offered the best approach to investigate pertinent practice issues in an uncontrollable and complex AMU clinical environment, where non-linear

interactions were the norm (Lincoln *et al*, 2018; Savage, 2006) and where no hypothesis was imposed during study design. The approach was also well suited for this study because of the nature of the research questions asked, which demanded an appreciation of multiple perspectives (realities) within the AMU (Lincoln *et al*, 2018). For example, questions relating to patients' experiences and understanding of care, invited highly subjective patient views, whereas questions relating to how assessments were undertaken, invited subjective, objective and historic clinician and organisational views. Furthermore, as Denzin and Lincoln (2018b) highlight, culture related studies cannot be contained within a single perspective or framework.

As a result of the chosen approach, the data collected were rich in context and represented diverse, subjective, objective and historic clinician, patient, researcher and organisational views (perspectives) of clinical practice in the AMU, in relation to the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting. In this study, being able to identify, characterise and understand these diverse views was crucial as they were connected to, and impacted on each other, thus contributing to the complex reality of clinical practice (Lincoln *et al*, 2018). They also had an impact on how AMU clinicians worked and interacted with each other, how they worked and interacted with other hospital staff and how they worked and interacted with patients and their visitors. Furthermore, these perspectives impacted on how clinicians, patients and visitors engaged with the research process (including the researcher) and vice versa.

With regard to the transferability (external validity) of study findings to other contexts, although it is argued that the ethnographic study design does not lend itself to generalisability (Dixon-Woods, 2003; Savage, 2000), this study investigated some clinical concepts and phenomena whose findings transcend the confines of the AMU setting (Polit and Beck, 2010). For example, this study investigated generalisable, practice related factors (human factors) that influenced the ability of clinicians to effectively assess and manage adult patients with symptoms of diarrhoea and vomiting; factors which the CHFG (2013) would argue are not isolated to one clinical setting or a geographical confine, but can be generalised to other individuals, settings and organisations.

3.4 Data collection

Data were collected over 11 months from December 2014 to October 2015 (Figure 5, next page). Over these 11 months, data collection was undertaken in 4 (2-month long) blocks that purposefully coincided with the 4 seasons of the UK's meteorological calendar, as observed by the Met Office (2014). These 2-month collection blocks were separated by month-long blocks of

preliminary interview transcription and data analysis that helped to inform successive data collection blocks. The rationale behind making the data collection blocks coincide with the meteorological calendar, was to see if there were any significant changes in diarrhoeal-related infection prevention and control practice over the 4 seasons, as there are reported correlations between seasons and outbreaks (Gilca *et al*, 2012; Lopman *et al*, 2009; Loveridge *et al*, 2010).

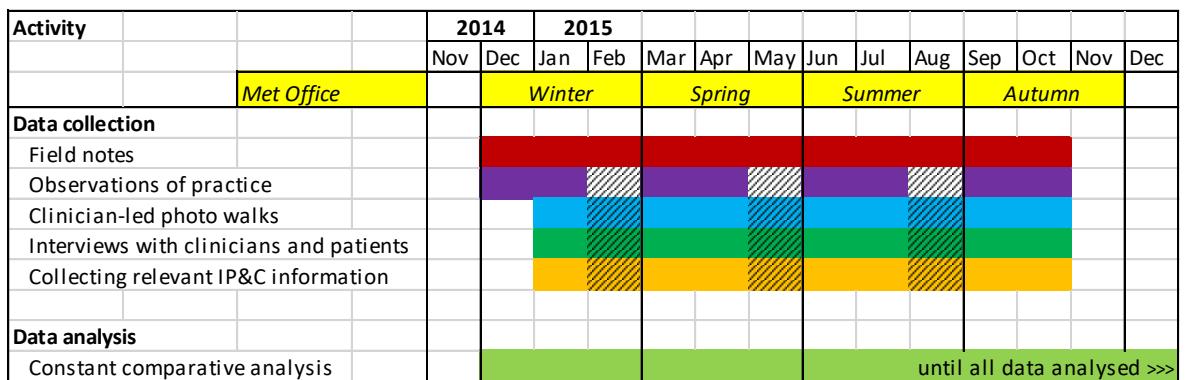


Figure 5: Data collection over 11 months

Data collection involved the following activities: observations of pertinent clinical activities; interviews with patients, doctors, nurses and healthcare assistants; reviews of eligible patients' notes; clinician-led photo walkabouts and reviews of relevant hospital policies, guidelines and infection prevention and control data. Appendix 6 presents the protocol followed during data collection.

3.4.1 Study boundaries

As data collection was to be undertaken by one researcher using a methodology that required researcher immersion into the study environment, boundaries were put in place in order to facilitate focussed observations of practice and successful performance of data collection efforts (Polit and Beck, 2011; Simons, 2009). Table 9 shows the boundaries that were applied in this project.

Setting	One Acute Medical Unit
Patients of interest	Adult patients in the unit with symptoms of diarrhoea and vomiting
Clinicians of interest	Doctors, nurses and healthcare assistants working in the unit
Primary study focus	To investigate and understand: 1. The risk assessments undertaken on symptomatic patients, and 2. The infection prevention and control management of patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.

Table 9: AMU study boundaries

3.4.2 Research awareness and staff prospective consenting

As data collection was conducted in a dynamic clinical setting and involved observations of naturally occurring clinical activities, laminated posters alerting staff, patients and visitors of research activity were displayed in key areas on the unit. These included the unit's information corridors, public notice board and staffrooms. This was the most feasible way of alerting people of research activity, as it would have been impossible for the researcher to individually inform everyone who entered the clinical area that a study was in progress. Appendix 7 shows a copy of the poster that was used. The poster highlighted the purpose of the study and what it involved.

In order to facilitate the consenting of the clinicians whose practice was going to be observed and those who would be approached with an invitation to participate in more in-depth ways, the researcher undertook a week-long period of prospective, informed consenting of as many doctors, nurses and healthcare assistants in the unit as possible. This involved group and one-to-one conversations with relevant clinicians, where the researcher introduced themselves and gave a brief verbal description of the study and what it involved. Clinicians were then given information sheets and asked to take them home and read them at their leisure. Over the course of the data collection period, the researcher then approached these clinicians to find out if they were willing to participate in the study. If they were willing to participate, signed consent was sought and appropriate records kept.

The decision to prospectively consent clinicians was mainly based on the frequency of short notice between a clerking clinician's awareness of the coming of a new patient and their actual arrival on the unit. Prospective consenting, therefore, offered the best solution to avoid approaching clinicians at busy times during their shift, when they would be ideally preparing for the arrival of new patients (Figure 2, stages 6 and 7; page 8). Furthermore, because of the rotational work patterns of AMU clinicians and the possibility that patients of interest could be cared for by more than two clinicians of the same profession during their stay, prospective consenting helped avoid the inability to observe and record real-time aspects of care, due to a lack of clinician consent.

3.4.3 Approach to sampling

Due to the specific nature of the phenomena under investigation, purposive sampling was used to identify study informants (Creswell, 2009). Altogether, 22 informants aged 18 years and older, actively participated in the study.

Inclusion / exclusion criteria

Patients were eligible for inclusion into the study if they met any of the following criteria:

1. if they were referred to the AMU because of suspected/confirmed infectious diarrhoea and vomiting; or
2. if they developed symptoms of diarrhoea and vomiting (whether expected or unexpected) during their stay on the AMU.

Only patients meeting the preceding criteria who had a good command of the English Language and did not lack mental capacity (discussed in section 3.5.3), were eligible for inclusion to participate in interviews.

With regard to clinicians, only AMU doctors, nurses and healthcare assistants were regarded as eligible for inclusion to participate in the study if they met any of the following criteria:

1. if they were involved in the admission, clerking or assessment of AMU patients with symptoms of diarrhoea and vomiting; or
2. if they were involved in the direct provision of care of AMU patients with symptoms of diarrhoea and vomiting.

3.4.4 Observations of practice

As previously discussed, one of the aims of this project was to investigate the social and cultural phenomena of the AMU so as to identify the factors that influenced infection prevention and control practice. In order to meet this aim, observations of pertinent clinical activities covering morning, afternoon and evening periods of care were undertaken within the AMU (McNaughton Nicholls *et al*, 2014, p250). This involved the researcher undertaking observations of practice in parallel timing with the shift patterns of AMU nurses who were the main 'named' bedside caregivers in the unit. These shift patterns included early shifts (07:30 to 15:30) and late shifts

(12:00 to 20:00). Time-stamped field notes relating to these observations, were captured on customised data collection sheets or an audio recorder and later transferred (or transcribed) into an electronic diary, for the purposes of analysis. As the observational data being captured was that of issues surrounding the care of a specific group of patients, the researcher regularly liaised with the AMU coordinator so as to be notified of patients of research interest, as defined by the inclusion/exclusion criteria (section 3.4.3).

With a specific focus on patient assessments, although the original plan was to capture real-time data during patients' AMU clerking, it was only possible to capture real-time data during patients' AMU nurse admissions. This was because during the time of data collection, AMU doctors were often clerking patients in the emergency department in order to stay abreast of their clerking workload. This was problematic as there was no ethical approval to observe practice in the emergency department environment. On the occasions however, when clerking did occur in the AMU, the researcher was not present.

In order to capture real-time data during the nurse admission process, the researcher first found out from the coordinator, about patients of research interest being admitted onto the unit. On acquiring this information, the researcher then approached the nurse who would be performing the nurse admission to make sure that they were still willing to participate in the study, as they had already consented. After confirming this, respective patients were then approached and their verbal consent sought for the researcher to be present in their room during their admission interview and other occasions of staff-patient interactions. This approach included the researcher introducing themselves to the patient and giving them a brief verbal description of the study that was taking place. This decision to seek verbal, rather than signed consent, was based on the fact that it was the practice of AMU clinicians that was under scrutiny and the patient's consent was being sought with respect to their privacy, dignity and the right to a private consult. Appendix 8 shows the form that was used to record proof of verbal consent being sought.

As the patients whose nurse admission interviews that were being observed had already been screened as having potentially infectious diarrhoea and vomiting prior to interviewing, observations of practice relating to their care commenced either before or after their interviews. These included observations of general events occurring within the unit, whilst particularly focusing on the activities happening around the patient and their isolation room. Especially noted, were the activities of doctors, nurses and healthcare assistants in relation to the implementation and performance of infection prevention and control interventions.

It is important to reiterate at this point, that in order for the researcher to effectively observe staff-patient interactions as an insider researcher, especially ‘behind the curtain’, it was necessary to shadow relevant clinicians, whilst assuming one of two stances. These were either (1) as a pure observer or (2) as a participant observer who availed themselves to assist the clinician with a task (Evered and Louis, 1981). The choice of stance was dependent on the situation and task at hand. As an example of the first stance, during nurse admission interviews, the researcher was present purely as an observer taking notes. As an example of the second stance, there was an incident of an emergency situation that arose during observations of practice that required the researcher to participate in the delivery of care until patient safety was ensured. All actions taken during the incident were in line with the research protocol.

Pertinent data was extracted from the medical notes of relevant patients during opportune times when they were not being accessed by clinical staff. A list of the types of data that were extracted is shown in Table 10. This data was extracted, as it was deemed useful with regard to helping triangulate similar data collected from other sources (Shenton, 2004). Infection prevention and control data relating to diarrhoea and vomiting and other relevant information from the hosting hospital’s policies and guidelines was also extracted. This was done to help understand some of the influences on observed practice and to help determine what would have been perceived as deviation from recommended practice.

Data extracted from patients' medical notes	Method of capture
<ol style="list-style-type: none"> 1. Information from doctors' clerking notes. 2. Information from doctors' post take notes. 3. Doctors' daily patient review notes relating to the care of patients with diarrhoea and vomiting. 4. Information from nurses' admission notes. 5. Nurses' and healthcare assistants' daily patient care notes relating to the care of patients with diarrhoea and vomiting. 	Handwritten notes on customised data collection sheets.

Table 10: Data that was extracted from patients' medical notes

With regard to having access to patients’ medical notes, consent was obtained from pertinent patients or their consultees. This involved approaching patients and/or their consultees and giving them a verbal description of the study before offering them the opportunity to participate in the study. Those who expressed interest were furnished with a ‘participant information sheet’ and/or a ‘consultee information sheet’. They were then given time (minimum 4 hours) to go through the information after which they were re-approached to find out if they were still willing to

participate. Questions relating to the study were answered in depth at this point. The patients who were still willing to participate, were then asked to sign a patient consent form. The consultees who were willing to act as consultees and offer advice regarding a patient's participation in the study, were asked to sign a consultee consent form. Overall, the records of 8 patients were accessed during the study.

At the end of every observation day, all audio recorded field notes were transferred onto a password protected research computer, so that the recorder would not hold any research data. During data collection, the audio recorder and all data collection sheets were kept on the researcher's person or within view at all times. When not in use, these media were locked away in a secure locker located within the hosting hospital's research facility. Over 1000 minutes of observations of practice were recorded during data collection.

3.4.5 Semi-structured interviews with patients and clinicians

Interviews are seen as staple in qualitative research and are useful in exploring individual informants' experiences in depth (Creswell, 2009; Silverman, 2014). Semi-structured interviews in particular were used in this project as they provided reliable, comparable, qualitative data across individual informants. The style allowed informants the freedom to express their views in their own words and terms, by way of deviation from the interview guide (Silverman, 2013). The style was also chosen as some participants were only going to be interviewed once and as such, interviewing with a guide that contained a list of questions and topics that needed to be covered, was most appropriate (Bernard (2011)).

Altogether, 18 informants were interviewed (n≈6 patients and n≈12 clinicians). This sample size was appropriate for the design of this project, as a small number of in-depth interviews was adequate to provide the data required for the triangulation and validation of the findings derived from other data sources (Bernard, 2011; Hammersley and Atkinson, 2007; Murchison, 2010). Although the original plan was to interview all participants twice, patients were only interviewed once and only 8 out of the 12 clinicians were interviewed twice. Patients were only interviewed once, as it was recognised that follow-up interviews would be burdensome, as most were still in an acute state of illness. With regard to clinicians, the first interviews allowed informants to describe and discuss their experiences and feelings in relation to the phenomena under investigation. The second interviews were used to discuss the transcripts of the first interviews and the researcher's preliminary interpretations of the information provided in these interviews,

so as to allow informants to either expand on, clarify, or amend any discrepancies. As common themes were emerging and the researcher's preliminary findings were being regularly affirmed as accurate, interviewing all clinicians a second time was deemed unnecessary.

Clinician interviews were conducted in a private location within the hospital, so as to encourage clinicians to openly discuss their experiences without fear of being heard. As these interviews were conducted in the clinicians' spare time, light refreshments were offered to them as a show of gratitude for taking part in the study. All patient interviews were conducted in the patients' isolation rooms in order to adhere to the hosting hospital's infection prevention and control policies. Overall, 26 interviews were conducted. Appendix 9 shows the respective interview schedules used.

After every interview, all audio recorded files were transferred onto a password protected research computer on the researcher's return to the research office. These audio files were then edited in the research office, so that only anonymised interview data was sent to a local transcription service provider for transcription. All aspects of data protection law relating to confidentiality and responsible data disposal, were adhered to by both the researcher and the transcription service provider.

3.4.6 Clinician-led photo walkabouts

Visual anthropology is widely used in research to extend and vivify individual accounts of pertinent sociocultural phenomena (Backman *et al*, 2012; Ball and Smith, 1992; Collier, 1986). Still photography in particular can be used in the creation of meaning and as a medium for social inquiry, as it gives 'voice' to persons who ordinarily would not be heard (Collier, 1986; Wang and Burris, 1994). As this project aimed to understand how clinicians viewed rarely-discussed infection prevention and control challenges relating to the care of patients with symptoms of diarrhoea and vomiting, visual anthropology in the form of clinician-led photo walkabouts was employed. In order to understand the meaning behind the photographs taken and to allow clinicians to reflect on their own practice, these walkabouts were also used as reflective exercises (Durning *et al*, 2013; Somerville and Keeling, 2004). In these exercises, clinicians were encouraged to give a title to their photographs and briefly describe and/or discuss what they portrayed (or meant) to them, with regard to the phenomena under investigation. Permission to undertake photo walkabouts in the unit, was granted prior to commencing the study (Appendix 10).

Altogether, 13 clinicians took part in the photo walkabouts. Instructions describing appropriate photographs (that is, photographs that did not breach staff, patient or visitor privacy, dignity and confidentiality) were made available to participating clinicians before commencing walkabouts (Appendix 11). Each clinician undertook two walkabout exercises; the first focused on factors (situations, things) that they determined promoted the successful assessment and management of patients with symptoms of diarrhoea and vomiting and the second focused on the factors that they determined inhibited this success. The clinicians were asked to give a title to each of their photographs and briefly describe and/or discuss what they portrayed (or meant) to them, either verbally (by dictating into an audio recorder) or in writing.

After every walkabout, all photographs and audio recordings were transferred onto a password protected research computer on the researcher's return to the research office. The research digital camera and audio recorder were kept on the researcher's person whilst in the field and locked away in a secure locker when not in use.

3.4.7 Summary of data collection efforts

Overall, over 1000 minutes of direct observations of practice were undertaken. Data pertinent to the study was also collected from the hosting hospital's relevant policies, care plans and information leaflets. Table 11 presents a visual summary of active study participants.

22 active informants	
<u>14 clinicians</u>	<u>8 patients</u>
Photo walks: 13*	Granted access to medical notes: 8
Interviewed: 12** (8 clinicians interviewed twice)	Interviewed: 6
12 + 8 (clinician interviews) + 6 (patient interviews) = 26 interviews in total	
* two clinicians who participated in photo walks did not participate in interviews.	
** one clinician who participated in interviews did not participate in photo walks.	

Table 11: Summary of active study informants

Altogether, 22 informants actively participated in the study. These included 4 doctors, 5 nurses, 5 healthcare assistants and 8 patients. With these participants, the following data collection activities were undertaken: 26 interviews, 13 photo walks and the extraction of data from the medical notes of 8 patients.

3.5 Ethics

As this study involved human participants and observations of naturally occurring activities, important ethical issues were considered during the study's design, as part of the moral principles that guide research (Economic and Social Research Council (ESRC), 2005, Table 12).

1. Research should be designed, reviewed and undertaken to ensure integrity, quality and transparency.
2. Research staff and participants must normally be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails and what risks, if any, are involved. [...]
3. The confidentiality of information supplied by research participants and the anonymity of respondents must be respected.
4. Research participants must take part voluntarily, free from any coercion.
5. Harm to research participants and researchers must be avoided in all instances.
6. The independence of research must be clear, and any conflicts of interest or partiality must be explicit.

Table 12: ESRC principles of ethical research (ESRC, 2012, p2-3)

Using the principles highlighted in Table 12 as discussion signposts, below is a discourse demonstrating how relevant ethical issues were addressed.

3.5.1 Ethical approval and study integrity

Favourable ethical approval for the study was given by the 'National Research Ethics Service (NRES) Committee South Central - Hampshire A' in November 2014. However, before this approval was granted, further information regarding the taking of photographs on the AMU and some amendments to the protocol (including amendments to consent forms and information sheets), had to be submitted. Documented approval was also obtained from the appropriate local NHS Research and Development office (Appendix 12). With regard to maintaining integrity, quality and transparency throughout the study, the researcher regularly met with project supervisors in order to report on progress and receive guidance as required.

3.5.2 Informed consent and voluntary participation

Written informed consent was obtained from relevant clinicians, patients and/or consultees, prior to active participation in the study. Patient participation in the study and the date when informed consent was obtained, were documented in each patient's medical file. Appropriate information

sheets containing sufficient information about the study, were given to all participants and consultees before consent (or consultee opinion) was sought. These included information about the purpose of the study, voluntary participation, the right to withdraw from the study and what active participation entailed (Appendix 13). Potential burdens and embarrassments of participating in the study were clearly addressed in these information sheets. The researcher was also clear in informing participants that they were undertaking the study as part of a PhD project. Appendix 14 shows the respective consent forms used.

3.5.3 Avoiding harm (including mental capacity considerations)

None of the research participants were coerced into taking part in the study and all participants were aware of their right to withdraw. In order to ensure that neither the researcher nor the participants were harmed during the study, risk assessments were undertaken with the support of project supervisors (Appendix 15). These risk assessments were in line with the Health and Safety Act 1974 and ESRC (2005, 2012) guidelines. They encompassed a wide variety of potential risks, including observing naturally occurring practice, exposure to infections, lone working and data safety. Ethical dilemmas, including those surrounding the potential of observing 'less than exemplary' practice, were also addressed in the risk assessment. They outlined an 'escalation of concerns' plan, in which escalations were dependent on the researcher's determination of the severity of observed 'less than exemplary' practice.

As highlighted in section 3.4.5, consideration was also given to potential research burden on patients. This resulted in the decision to interview patients only once. Mental capacity issues were also considered, including the acute state of illness of patients that might have affected their mental capacity (Fassassi *et al*, 2009). Judgements of mental capacity were informed by the principles of the Mental Capacity Act 2005. These judgements considered three main aspects: (1) the ability of a patient to understand the information that was presented to them, (2) their ability to retain this information and then use it as part of the process of decision making and (3) their ability to communicate any decisions that they made based on the information received. In situations where a patient's mental capacity was deemed compromised, either the patient's named next of kin or their named carer was approached for their opinion as a consultee.

3.5.4 Data protection, anonymity and confidentiality

As outlined in participant information sheets, compliance to the Data Protection Act 1998 was adhered to in this project. Anonymity was explained as 'linked anonymity'; that is to say that participants were linked to their data. However, to ensure that only the researcher was able to link data to its source, a coding mechanism was used, which only the researcher knew. As a coding system was used, only anonymised data was processed during word processing, data analysis and the production of research reports in order to maintain participant confidentiality.

With regard to the transcription of interviews, only anonymised audio files were securely delivered to a local transcription service provider. Once files were transcribed, the completed manuscripts were then delivered directly to the researcher. With regard to confidentiality, before the study commenced, the service provider supplied a non-disclosure agreement which also guaranteed the secure destruction of confidential information (Appendix 16).

During the project, all electronically held data was stored on a password protected research computer and all data held on paper was stored in a secure locker located in the hosting hospital's research facility. On completion of the research degree, research data (including paper records saved in electronic format) will be deposited into the University's repository and handled as per University's research data management policy. Redundant data will be disposed of securely.

3.6 Data analysis and synthesis

Although this was an ethnographic study, some data analysis techniques from the constant comparative method were used (Boeije, 2002; Offredy and Vickers, 2010). Rooted in grounded theory, this method seeks to generate theories regarding social phenomena by systematically examining (comparing and categorising) various data and drawing new meaning from it (Glaser and Strauss, 1999). As Fram (2013) explains, it is not unusual for researchers to use constant comparative method techniques outside of grounded theory, as was done in this project.

Furthermore, it is encouraged that an effective ethnographer should be a 'bricoleur', a 'jack of all trades', one who uses whatever tools and techniques are necessary depending on the research questions and the context (Denzin and Lincoln, 2018a, p11-12; Whitehead, 2002). As such, borrowing techniques from the constant comparative method was deemed suitable for this project in order to facilitate the generation of concepts that could help in understanding and explaining collected data. Furthermore, during data collection, borrowed techniques allowed for newly gathered data to be analysed against previously collected data, so that the resultant

findings could be used to inform ensuing blocks of data collection - a process similar to theoretical sampling (Corbin and Strauss, 2008; Draucker *et al*, 2007). In addition to the constant comparative method, some data analysis and synthesis techniques were also borrowed from the framework method (Gale *et al*, 2013). The framework method sits within a broad family of analysis methods often termed 'thematic analysis' (Gale *et al*, 2013). These combined techniques helped in organising and interpreting the large amounts of data that were collected in this project (Gale *et al*, 2013). They also offered an auditable system that facilitated robust and transparent data management (Pope *et al*, 2000; Ritchie *et al*, 2014).

Computer assisted qualitative data analysis software was used to aid the processes of coding, analysis and triangulation (cross verification) of data; namely QSR NVivo 10 and 11 software - Nvivo in short (Göransson *et al*, 2007). NVivo allowed for the convenient storage, organisation, and quick retrieval of data in various formats, as opposed to alternative manual and physical storyboarding methods, which would have been extremely time-consuming and required large amounts of physical space (Basit, 2003; QSR International, 2016). Data handling risk assessments were duly undertaken and adhered to, as per Appendix 15, so that only anonymised data was processed in NVivo.

With regard to coding, a three-step process which included open coding, axial coding and selective coding was applied. Open coding is a sense making process, which involves the organisation of data into concepts and categories. It is described as the 'line-by-line' or 'sentence-by-sentence' coding (or labelling) of concepts presented in raw data. Axial coding involved reviewing data (including re-reading text) in the light of defined concepts and categories so as to (1) confirm that defined concepts and categories accurately represented the data, and (2) explore how these concepts and categories were related. Finally, selective coding involves the developing of a story that connects the defined concepts and categories. With reference to coding reliability, the researcher developed a 'coding manual' that was regularly presented to project supervisors, so that feedback that resembled 'inter-rater coding reliability' was received. This feedback allowed for the refining of the coding manual, so that the concepts and categories derived from data analysis and synthesis processes remained reliable and credible (Saldaña, 2012).

The following is an expounded description of the data analysis and synthesis methods and procedures employed in this project. The 'glossary of terms' section (page 321), offers definitions of the specific terms that will be used in this section; charting, code, data, indexing, matrix, themes and transcript.

3.6.1 A brief description of the data analysis and synthesis procedures employed

Gale *et al* (2013) identify several procedural stages to be employed when using the framework method. Below is a brief description of how these stages were applied (customised) in this project.

3.6.1.1 Stage 1: Data organisation and preparation

Raw data from different sources was either transcribed, typed and/or copied into respective Microsoft Word documents which were compatible with NVivo. Once in Microsoft Word, the data was formatted so that it could be automatically coded into respective predefined codes (categories and groups) within NVivo.

3.6.1.2 Stage 2: Familiarisation with the data

Interview data: Once interviews had been transcribed by the appointed company and returned to the researcher, the researcher then checked the transcripts by listening to the interview audio files, whilst recording any analytical notes, thoughts and/or impressions.

Photo walk data: The researcher transcribed participant audio recorded photo walk notes and/or typed participant written notes into Microsoft Word, whilst attaching corresponding photographs.

Data from medical notes and field notes: The researcher typed medical notes and field notes into Microsoft Word and took note of analytical observations, thoughts and impressions that were recorded during data extraction and observations of practice.

3.6.1.3 Stage 3: Coding and developing an analytical framework (open coding)

Once a document was organised in Microsoft Word, it was then uploaded into NVivo where the researcher undertook ‘open coding’; that is the ‘line-by-line’ or ‘sentence-by-sentence’ coding or labelling of concepts presented in raw data. In NVivo, ‘open coding’ helped in the creation of an analytical framework that could be edited as appropriate, allowing for the review and revision of codes. NVivo also allowed for the exporting of the analytical framework into a Microsoft Excel spreadsheet, which contained all ‘parent’ and ‘child codes’ (themes and corresponding codes under each theme). This analytical framework was regularly presented to project supervisors, together with some corresponding coded extracts, so as to enable supervisory reviews that checked coding reliability (Saldaña, 2012).

3.6.1.4 Stage 4: Applying a dynamic analytical framework

As previously mentioned, data analysis techniques from the constant comparative method were used. This allowed for codes, categories and patterns to be reviewed as new data was coded and comparisons were made between new and previously coded data. Coding reliability was maintained by regularly presenting the analytical framework to project supervisors, as described above.

3.6.1.5 Stage 5: Charting data into a framework matrix (axial and selective coding)

As qualitative data is voluminous, summarising it was necessary in order to facilitate the process of analysis. To achieve this, a Microsoft Word document was used to create matrices (tables) into which data was charted. Each matrix corresponded to a research question (1a, 1b, et cetera) and contained respective data for analysis.

3.6.1.6 Stage 6: Interpreting the data (axial and selective coding)

After charting the data, the researcher then read it, so as to review and confirm (or amend) the categories in which codes were originally grouped. Through this process, patterns were identified and conceptual models developed in an inductive process.

It is however important to highlight that this stage was not necessarily a stand-alone stage, but a stage that was integrated into preceding stages. For example, throughout data collection and in all the preceding stages, the researcher was regularly jotting down impressions, ideas and their understanding of the data in front of them. These notes were an interpretation of the data that later informed what became the final findings and resultant concepts. Figure 6 (next page) shows what this inductive process looked like.

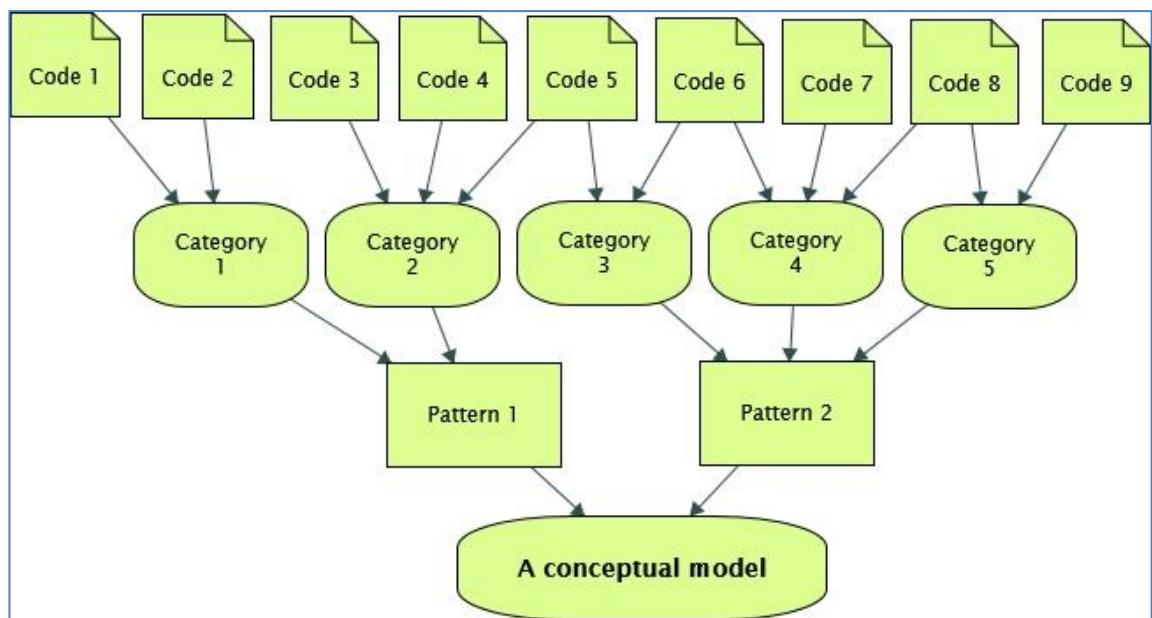


Figure 6: The inductive process

The following sections (3.6.2 to 3.6.5) illustrate how techniques from the framework method were applied (tailored) to produce the findings presented in this thesis.

3.6.2 Data preparation steps before upload into NVivo (Stages 1 and 2)

Before open coding could be undertaken in NVivo, data collected from different sources had to be transcribed or copied into respective Microsoft Word documents. Once in Microsoft Word, the data was then organised and formatted in a way that NVivo could understand, so that it could be automatically coded into the programme under (1) respective research questions (including sub-questions) and (2) respective participants. Table 13 (next page) summarises the steps undertaken to transcribe, organise and format raw data before uploading it into NVivo.

As highlighted in Table 13, data from interviews and audio notes was transcribed ‘intelligent verbatim’. This means that transcripts omitted filler words (um, uh, erm), repeats (when... when...) and irrelevant material (moments when a phone rang). Medical notes and participant photo walk handwritten titles (labels) and comments (notes) were copied word-for-word into Microsoft Word.

Interviews	Photo walks	Field notes	Medical notes
<ol style="list-style-type: none"> 1. Audio record interview. 2. Edit and send anonymised audio file for transcription by third party. 3. 'Intelligent verbatim' transcript typed and stored in Microsoft Word document by third party. 4. Researcher receives transcript from third party and checks for errors and omissions. 5. Transcript organised and formatted for Nvivo. 	<ol style="list-style-type: none"> 1. Participant takes photos and writes corresponding titles on supplied paper sheet(s). 2. Participant either writes about photo on supplied sheet(s) or dictates into audio recorder. 3. [Written notes copied into Microsoft Word document by researcher – 'word-for-word' copy (accompanying photos attached)] AND/OR 4. [Audio recorded notes transcribed into Microsoft Word document by researcher – 'intelligent verbatim' (accompanying photos attached)]. 5. Document formatted for NVivo. 	<ol style="list-style-type: none"> 1. Researcher records field notes on paper data collection sheet(s). 2. Expounded field notes typed (with accompanying reflective notes) into Microsoft Word document by researcher. 3. Document formatted for NVivo. 	<ol style="list-style-type: none"> 1. Researcher extracts data from medical notes and records it on paper data collection sheets. 2. Extracted data typed 'word-for-word' into Microsoft Word document by researcher. 3. Document formatted for NVivo.
Document uploaded into NVivo.	Document uploaded into NVivo.	Document uploaded into NVivo.	Document uploaded into NVivo.

Table 13: Data preparation steps before upload into NVivo

Field notes were often written in shorthand and required expounding when being typed into Microsoft Word. Table 14 shows an example of some field notes and how they were expounded.

<p>16:05 Patient relative was out of side room - over shoulder - Gloves & Apron tells student nurse that Mum has been sick again and I thought I'd come & tell you as we are about to go! Student nurse thanks relative for news and says we will come and see patient 16:08 Patient's buzzer ringing 16:13 (All staff busy) Patient's buzzer still ringing 16:23 Patient's buzzer still ringing 16:30 as I leave unit, patient in bed 5 shouting "help me somebody, I can't go to sleep!"</p>	<p>16:05 Patient relative was out of side room - over shoulder - Gloves & Apron tells student nurse that Mum has been sick again and I thought I'd come & tell you as we are about to go! Student nurse thanks relative for news and says we will come and see patient 16:08 Patient's buzzer ringing 16:13 (All staff busy) Patient's buzzer still ringing 16:23 Patient's buzzer still ringing 16:30 as I leave unit, patient in bed 5 shouting "help me somebody, I can't go to sleep!"</p>	<p>16:05 One of the patient's relatives who was in the room comes out of the side room to the nurses' station [no evidence of hands being washed] and informs the student nurse that "Mum has been sick again and I thought I would come and tell you as we are about to go." Student nurse thanks the relative for the information and assures the relative that she will go and see the patient as soon as possible.</p> <p>16:08 The patient's buzzer begins to ring (the relatives are still inside). Unfortunately, everyone in the unit is busy and no one attends to the buzzer.</p> <p>16:13 to 16:23 The patient's buzzer is still ringing and none of the nursing staff appear to be free to go and answer it.</p> <p>16:30 As I leave the unit (concluding my day of observations) the patient's buzzer is still ringing. And the patient in bed 5 is shouting whilst in bed "help me somebody, I can't go to sleep!"</p>
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Table 14: Example of field notes being expounded

3.6.3 Open coding and using a dynamic analytical framework (Stages 3 and 4)

The screenshot in Figure 7 (next page) shows an example of how a section of an interview transcript was open coded in NVivo. The figure shows how this section was coded multiple times with different labels using both 'line-by-line' and 'sentence-by-sentence' coding. In the screenshot, one can see text coded as describing clinicians' use of 'clinical judgement' in response to Research Question 1a; How do AMU clinicians assess the infective status of patients with symptoms of diarrhoea and vomiting in the absence of results from stool microbiology investigations?

The left-hand side of Figure 8 (next page) then shows 'clinical judgement' and other codes identified under the same topic having been transferred into a spreadsheet and grouped together into respective themes, which shaped the analytical framework. The emerging themes derived at this infant stage of the analysis process were later developed and reworded to give the final themes that are described in Chapter 5.

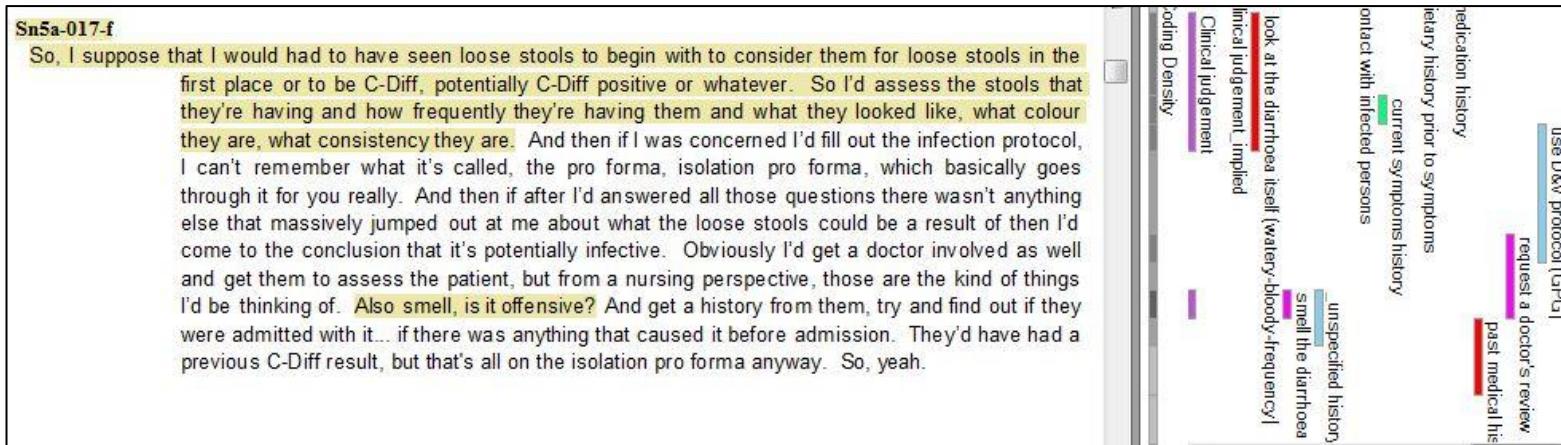


Figure 7: Open coding in NVivo

Major codes (with child codes) are highlighted in (bold) red.		Emerging themes + Analysis and synthesis notes:	
how they assess the infective status of adult patients		>> Clinical judgement.	
<u>HCA responses</u>	1	1 Err on the side of caution. - ? default approach	
assume infective until proven otherwise	2	6 Inflammatory markers (bloods). - 123	
bloods	3	3 Using clinical judgement. - smell, look, pnt story, experience etc	
Clinical judgement	4	2 Taking a patients history. - pmh, dietary hx, social hx etc	
History	5	9 Immediately request a stool specimen for testing. - this heading can be the last heading as I am more interested in how assessments are made in the absence of stool microbiology results.	
immediate request for stool micro testing	6	5 Physical examination . - abdo exam, obs, PR exam, etc	
Physical examination			
abdomen physical examination			
clinical observations			
rectal physical examination			
Team assessment (doctors, nurses, hcbs)		7 8 Unrecognised team assessment. - 123	
use D&V protocol (GPG)	8	4 Using the hospital's assessment tool. - 123	
z_abdo x-ray and CT (to rule out bowel obstruction and toxic mega colon)	9	7 Other investigations to rule out non infectious causes of diarrhoea. - 123	

Figure 8: Emerging themes and developing analytical framework

3.6.4 Charting data into a framework matrix – axial coding (Stage 5)

In this stage, data coded under the respective themes that were identified in the previous stage was summarised and charted into a matrix (in Microsoft Word), for in-depth analysis. Table 15 shows an example of a semi-filled matrix, so that the reader can have an understanding of what the matrix looked like and the headings contained within it.

1a. How do Acute Medical Unit doctors, nurses and healthcare assistants assess the infective status of adult patients with symptoms of diarrhoea and vomiting in the absence of results from stool microbiology investigations?		
		How they assess the infective status in the absence of results from stool microbiology investigations
Nvivo codes after (synthesis 1) grouping together: themes that emerged >>>	<p>Notes:</p> <ol style="list-style-type: none"> 1. Err on the side of caution. 2. Taking a patient's history. – History also informed by GP or ED referral. 3. Using clinical judgement. 4. Using the hospital's diarrhoea and vomiting assessment tool. 	<ol style="list-style-type: none"> 5. Physical examinations. 6. Inflammatory markers (bloods). 7. Performing additional diagnostic tests to rule out non-infectious causes of diarrhoea. 8. Unrecognised team assessment. <p><i>9. Immediately request a stool specimen for testing</i></p>
		<p>Reflection notes and links between the themes that have emerged: <i>(include comparisons (differences and similarities) between professions)</i></p> <p>Erring on the side of precaution is not really a method. Patients were generally treated as infectious until proven otherwise. History taking was spoken of by all clinician groups and described in more than one way. HCAs took histories informally, whilst doctors and nurses took histories as part of formal assessments. [...]</p>
Fieldnotes	<p>(non specific – supporting evidence)</p> <p>[...]</p>	
Medical Notes	<p>(non specific – supporting evidence)</p> <p>[...]</p>	
Recommendations / guidance from care plans and hospital policy	<p>Guidance from Diarrhoea and vomiting policy (v3):</p> <p>What is diarrhoea? The Bristol Stool Chart is used to identify both normal and altered stool patterns. In accordance with this chart, stool types 5 and 7 are indicative of diarrhoea. [...] Diarrhoea is defined as: Either as stool loose enough to take the shape of a container used to sample it or as Bristol Stool Chart [...] types 5 – 7 [...]</p>	
	<p>Main methods of patient assessment that were identified:</p> <ol style="list-style-type: none"> 1. Taking a patient's history, 2. Using the hospital's diarrhoea and vomiting assessment tool, 3. Using clinical judgement, 4. Utilising information supplied by other team members (Subtle peer/colleague influence), and 5. Ruling out non-infectious causes of diarrhoea. 	

Table 15: Example of framework matrix

3.6.5 Interpreting the data – selective coding (Stage 6)

As previously mentioned in the brief description in section 3.6.1, this stage was not necessarily a stand-alone stage, but one that was integrated into preceding stages. In other words, the notes taken by the researcher in preceding stages (that is, the researcher's impressions, ideas and understanding of collected data) were transferred into the 'reflection notes' sections (exemplified in Table 15) of respective matrices where they were re-read, re-reviewed and further developed.

Figure 9 shows an excerpt (screen shot) of the process of data interpretation and the development of a story that connected defined concepts and categories. Content in the excerpt was based on three emerging themes identified in stage 4 (Figure 8, page 62); taking a patient's history, using clinical judgement and using the hospital's diarrhoea and vomiting assessment tool.

Links between emerging themes

1. Knowing the patient's history informs the clinicians' 3. clinical judgement
 2. Utilising the hospital's assessment tool helps ?nurses and junior doctors as a prompt to ask key questions when 1. history taking.

Points to consider

1. Some HCAs report that they do not assess the infective status of patients with D&V. This is true on an official (paperwork) and medical assessment capacity with regard to being actively involved in making decisions as to whether a patient should be treated as potentially infectious or not. This is however not true in actual clinical practice as they often use their clinical judgement to suspect that a patient might be infective and accordingly escalate concerns to a nurse. It is because of this active process of noticing suspicious symptoms and escalating concerns to a nurse that other HCAs believe that they do actually assess a patient's infectious status.

2. Despite this reporting conflict however, most HCAs and nurses believed that HCAs should be more involved in the official (paperwork) and medical process of deciding whether or not a patient should be treated as potentially infectious or not. This is based on the fact that HCAs spend more time delivering personal care than any other clinician in AMU and would therefore identify or notice patients with suspicious symptoms quicker/sooner (including inpatients with sudden changes in bowel habits). Although no one could articulate what 'more involvement' would look like, some HCAs suggested receiving teaching about the things that doctors and nurses look at when making decisions as to whether a patient might be potentially infectious or not.

3. The hospital assessment tool for patients with unexpected/unexplained incidences of diarrhoea and vomiting is seen as a great tool in reminding nurses what key questions to ask when history taking. That being said, senior nurses report relying more on clinical judgement to determine whether a patient might be infective or not. Despite this reliance on clinical judgement, these senior nurses acknowledge that as junior nurses the tool was invaluable in helping them conduct assessments. They see it as a tool that helped them to develop their clinical judgement and they often still use it as a prompt to consider assessment markers that they may have forgotten to consider. Sometimes however filling in the tool is seen as an inconvenience that hinders prompt implementation of infection control interventions during busy periods of time when a nurse has other 'more urgent' duties to perform than filling in paperwork in order to convince bed managers that a patient might need isolation care.

Figure 9: Interpreting the data presented in Figure 8 (p62) and Table 15 (p63)

3.7 Trustworthiness (Rigour)

Debates over what concepts (and terminologies) are best to use when trying to describe and prove the scientific rigour of qualitative research, have been ongoing for many years (Long and Johnson, 2000; Porter, 2007; Rolfe, 2006). For this project, Guba's constructs of 'trustworthiness' were employed, as they offered comparative indicators to those of traditional standards used to evaluate the quality of quantitative research (Guba, 1981; Murphy and Yielder, 2010; Shenton, 2004). These constructs, presented in Table 16, are credibility, transferability, dependability and confirmability.

Traditional Terms (Quantitative Terms)	Trustworthiness (Guba's constructs)
Internal Validity >>>	Credibility
External Validity (Generalisability) >>>	Transferability
Reliability >>>	Dependability
Objectivity >>>	Confirmability

Table 16: Comparison of traditional terms and trustworthiness

'Credibility' refers to how congruent (compatible and harmonious) study findings are to the views and experiences of the participants. 'Transferability' is to do with the extent to which the findings and conclusions of one study can be applied to other contexts or settings. 'Dependability', in traditional terms, is to do with the consistency or constancy of the measuring instrument (Long and Johnson, 2000). To prove dependability, quantitative researchers employ techniques to show that if their work were repeated in the same context, with the same methods and with the same participants, similar findings would be obtained. These include 'overlapping methods' that allow triangulation of data and peer debriefing and scrutiny. Furthermore, in order for dependability to be evaluated, the provision of a clear and transparent audit trail that details the process by which findings were identified and conclusions drawn, is required. 'Confirmability', refers to the degree to which study findings can be collaborated or confirmed by the data. This focuses on study findings being the outcomes of the original data collected, whilst requiring that the researcher be aware of, and account for, individual subjectivity or bias (Murphy and Yielder, 2010).

Table 17 (next page) shows the strategies identified and applied to this project, to ensure that it was of a high quality as benchmarked by the 'trustworthiness' criteria.

Criteria	Strategies (Shenton, 2004; Murphy and Yeilder 2010; Guba, 1981)
1. Credibility	<p>1.1 Prolonged engagement between the researcher and the participants. The researcher spent 2 years working in the local AMU as a nurse before beginning formal investigations. This made it possible to gain an adequate understanding of the AMU and establish a relationship of trust with future participants.</p> <p>1.2 Provide a detailed description of the phenomenon under scrutiny. This was achieved by providing a clear background for the project (including the characteristics of the setting and participants), undertaking a systematic literature review, and detailing data collection and analysis processes. Furthermore, findings are supported by the presentation of appropriate quotations and images.</p> <p>1.3 Triangulation. Different data sources were used to triangulate (cross verify) findings. These data sources included (1) data collected using different methods (interviews, observations of practice, review of documents, photo walks), and (2) data collected from different informants (those in similar professions, those from different professions, and from service users).</p> <p>1.4 Ethical conduct. Favourable ethical approval was obtained before commencing the study and the approved protocol was followed throughout the study.</p> <p>1.5 Peer debriefing and scrutiny. Peer debriefing was achieved through regular meetings with project supervisors. Peer scrutiny was achieved through delivering presentations to other faculty colleagues and at conferences. The researcher used these forums to test developing ideas and interpretations of data and receive critical feedback. Supervisory probing helped the researcher recognise their own preferences, biases and predispositions.</p> <p>1.6 Reflexivity. The researcher kept a research diary that helped in monitoring the development of concepts.</p> <p>1.7 Member checks. Two forms of member checks were employed. The first involved interviewing some participants twice in order to verify the researcher's emerging concepts and inferences. The second involved the researcher checking all the transcription work initially undertaken by a third party.</p>
2. Transferability	2.1 Provide a detailed description of the phenomenon under scrutiny. Clear descriptions are provided throughout this thesis. These will help readers determine how findings from this study relate to their own clinical settings.
3. Dependability	3.1 Triangulation, Reflexivity, and Providing a clear audit trail. Clear, reflective audit trails presenting data collection and analysis processes are described in Chapters 3 and 4.
4. Confirmability	4.1 Triangulation, Reflexivity, and Providing a clear audit trail. (As above).

Table 17: Strategies to ensure 'trustworthiness'

Overall, in order to ensure the high quality of this project, various strategies that increased its ‘trustworthiness’ were identified and applied. These included the careful selection and application of various research methods, building relationships of trust and good rapport with study participants, being transparent by maintaining field notes and a reflective diary and utilising supervisory and peer feedback and support.

3.8 Chapter summary

This chapter has offered justification for the use of an ethnographic approach and accompanying data collection methods in supporting an investigation into the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU. Details of how participant recruitment and data collection were undertaken were provided. Discussions were also offered in relation to research ethics, the data analysis and synthesis techniques used and study rigour. The next chapter will offer the researcher’s reflexive account of the experience of undertaking research in the AMU.

Chapter 4 Findings 1 (Reflexivity): The experience of undertaking research in the AMU

4.1 Introduction

This chapter will help the reader appreciate the researcher's experience of undertaking research in the AMU at the study site. As an ethnographic piece of work, it is essential for the reader to have some background knowledge of the researcher as they are also 'the research tool' (Murphy, 2005). It is also essential for the reader to have an awareness of how the researcher and research participants conducted themselves and evolved throughout the project, as this will allow an appreciation of 'the ethnography' itself (Allen, 2004; Savage, 2006). The chapter will begin with reflections on the researcher's orientation; their personal attributes and inclinations in relation to the subject matter of this project. This will then be followed by reflections on how they engaged with study participants. Finally, it will conclude with reflections on some of the co-constructive processes experienced throughout the study. Due to the reflexive nature of this chapter, the first person will be used from this point forward in this thesis.

4.2 Researcher orientation

In qualitative research, data analysis and synthesis efforts should result in study findings that are outcomes of the original data collected. Nevertheless, the researcher's own predispositions and preconceptions will inevitably infiltrate these processes. As such, many commentators encourage researchers to be aware of, and account for, individual subjectivity or bias in an effort to maintain study credibility and confirmability (Murphy and Yielder, 2010; Shenton, 2004). To this end, below is my written self-portrait as the author of this thesis, who was also the principal investigator, data collector and analyst.

"I am a 36-year-old, working class, black male of African origin. I consider myself well-spoken and I try to present myself in a smart, casual manner. In social situations, I prefer to present myself as relaxed and approachable, with a friendly (often comic) persona. This presentation of self has led to work colleagues, patients, and many study participants describing me as 'Mr. Happy' and easy to talk to.

From a professional stand point, I am a Registered Adult Nurse with previous experience in retail management and part-time work as a healthcare assistant. Prior to commencing data collection, I worked in the AMU at the study site as a Staff Nurse for 2 years and as an Education Facilitator for 9 months. My current clinical role is as a charge nurse in infection prevention and control. I am described professionally as organised and systematic in my approach to many tasks; a quality which I attribute to my management background. I am also sympathetic to, and knowledgeable of, the nursing and healthcare assistant related aspects of hospital care because of my nursing background. I would describe my knowledge of doctor related aspects of hospital care as limited, however I am sympathetic to their work challenges based on my clinical interactions with them.

When asked to describe what I do for a living, I describe myself as a Clinical Academic Researcher; that is, a clinical practitioner who is dually employed to undertake research activity.”

4.3 The clinical academic researcher, transparency and reflexivity

Inherent with the clinical academic role are two distinct drivers and interests which had a direct impact on the research process; the clinical and the academic. Clinical academic posts are often joint appointments between a healthcare provider and a higher education institution; where one organisation holds the substantive contract of employment (Department of Health, 2012a). At the time of undertaking the study, I was employed in such a jointly appointed post. I worked three days a week undertaking research activity for the university, and two days a week working clinically for the hospital. The role attracted invaluable support from both the clinical and academic environments and made it possible to effectively undertake the project as an ethnographer with inside knowledge and easy access to the field. Clinically, support included being mentored as a member of staff and having a clinical base of work where clinical competencies and reasoning skills were developed through practice experience and in-house training. Academically, support included research training and tailored academic supervision which developed vital research skills and helped to maintain 'an element of objectivity' (the ability to have an open mind) in the field. As a result of this joint appointment, I had vital 'insider knowledge' of the AMU at the study site which impacted on the study (Allen, 2004).

4.3.1 Insider knowledge influencing study design

My detailed experiential knowledge of the clinical setting, positively influenced the way in which the study was designed. Most potential study obstacles and challenges were accounted for and

various strategies were incorporated into the research protocol in order to address them. These strategies were successful to varying degrees. For example, it was anticipated that attracting clinicians to participate in the study would be challenging. As a way of addressing this, photo walks were incorporated into the protocol. This strategy worked remarkably well in attracting the interest of junior clinicians to participate, however it was received sceptically by some senior clinicians. Junior clinicians saw it as an opportunity to air out their views, whereas some senior clinicians appeared apprehensive; possibly fearing that this was an exercise designed to expose 'less than exemplary' practice, despite assurances that this was not the case.

Besides aiding in study design, insider knowledge also facilitated my ability to ask pertinent clinical questions relating to the phenomena under investigation and determine the best way to find answers. Indeed, some of the new interview questions that I introduced during the study were directly influenced by personal clinical experience and provided insightful data (Table 18).

21/04/2015-- new research questions

4. What's your view on the Infection Prevention team and how they support you and your colleagues to assess the infective status of patients with D+V?

5. What's your view on the Infection Prevention team and how they support you and your colleagues to implement and perform infection control practices/measures when caring for patients with D+V?

Any recommendations?

Table 18: New research questions influenced by personal experience

Furthermore, whilst in the field, my knowledge of the general workflow of the unit helped in making decisions as to which activities to focus on during data collection, so as to record pertinent data in a busy environment full of interesting activity.

Nevertheless, sometimes insider knowledge had a negative impact on the study, when research obligations collided with clinical obligations and reservations. This resulted in challenging decisions being made as to which obligations to honour and compromises to accept. Anspach and Mizrachi (2006) discuss this problem in their paper and describe how researchers make decisions about what to reveal about their studies, what to conceal, which questions to ask and which topics to avoid in an effort to navigate conflicting demands and obligations. As an example, because of my awareness of some apprehensive senior clinicians, some lines of enquiry relating to

senior clinicians and leadership were not fully explored, in an effort to preserve rapport and good working relations.

4.3.2 Cultural awareness and field familiarity

Having previously worked in the AMU at the study site also meant that I had a good awareness of, and sensitivity to, the AMU team culture, local jargon and lexicon. As ethnography seeks to understand the relationship between culture and events, having this knowledge and appreciation of the team's beliefs, values and attitudes helped explain and make sense of the events (activities) and attitudes surrounding the care of patients with diarrhoea and vomiting.

As well as being aware of the collective AMU team culture, I was also mindful of the different occupational (or professional) subcultures within the collective (Davies *et al*, 2000). Being mindful of these subcultures, enhanced insight into some of the differing professional viewpoints expressed by members of individual professional groups in relation to the care of patients with symptoms of diarrhoea and vomiting. According to Hall (2005), these differing professional viewpoints are to be expected as each profession has a different 'cognitive map' developed throughout respective members' professional training. In practice, this meant that sometimes clinicians from different professional backgrounds could look at *the same* challenge (or scenario) but not see the same problem, thereby problem-solving *the same* challenge differently. Although personal (individual) perspectives also created a similar phenomenon in members of the same profession, viewpoint variances among members of the same profession were not significantly different in this study.

Nevertheless, being mindful of these subcultures did not necessarily mean knowing and understanding all of them well. As a practicing nurse, I knew and understood the 'nursing culture' of nurses and healthcare assistants more than the 'medical culture' of doctors. It was only through interviewing and spending time with doctors that I began to understand the 'medical culture'. How these subcultures influenced the way members of individual occupational groups viewed issues surrounding the care of patients with symptoms of diarrhoea and vomiting, are discussed further in ensuing chapters.

Although there were many positive aspects of having a good awareness of, and sensitivity to, the AMU team culture, at times this familiarity acted as a hindrance and barrier to research. Asselin (2003) highlights how familiarity in the field may hinder the researcher from actively noting

clinical activities of research interest as they would not appear interesting to them. The extreme case of familiarity in the field is known as 'going native' (Kanuha, 2000). This is where the researcher becomes so involved with, and sympathetic to, the group of people being studied, that objectivity is lost. Throughout this study, I wrestled with the problem of familiarity and employed various strategies to avoid 'going native'. Some of the strategies employed included not working clinically in the AMU during data collection, actively taking note of clinical activities that were otherwise seen as routine and keeping a research diary that could be used to aid self-critique and the reflexive process; including regularly examining one's assumptions and preconceptions (Greene, 2014).

4.3.3 Dealing with role confusion and gaining a new perspective

The strategy to stop working clinically in the AMU during data collection also helped in addressing the potential problem of role confusion (Dwyer and Buckle, 2009; Reed and Procter, 1995). This is where some clinicians would have found it difficult to identify me as 'the researcher' and not a Staff Nurse or an Education Facilitator. Whilst undertaking research activity in the AMU, I displayed only my university ID badge and wore clothing unrelated to either my nursing or education roles; either a plain white or blue polo shirt. These visual cues worked very well, as most clinicians would often remark, "Oh, he's doing his study thing". Nonetheless, there were occasions where role clarification was necessary through conversation; especially with agency personnel. At other times, some clinicians who were aware of my clinical role expected me to function as a clinician and offer a helping hand. The situation out of which the clinician expressed this expectation determined my response. In emergency situations, I would function in a clinical role so as to maintain patient safety, whereas in non-emergency situations, a gentle reminder of my 'research only' presence in the unit, dispelled clinicians' misplaced expectations.

The strategy to stop working clinically in the AMU during data collection also placed me in a peculiar position where I assumed an insider/outsider research role. This is described by Reed and Procter (1995, p10) as a 'hybrid' research role. This is where a practitioner undertakes research into the practice of other practitioners in a different, often unfamiliar clinical setting to their own. Like the hybrid research position described by Reed and Procter (1995), I was now a practitioner from a different clinical setting. Unlike their description however, I was very familiar with the AMU setting. This familiarity sometimes caused internal role-blending challenges within me, as it was not always clear where the researcher role ended and the clinician role began or vice versa. For example, sometimes it was difficult to 'silence' the clinician within when trying to be 'just' the

researcher; and sometimes it was difficult to ‘silence’ the researcher within when trying to be ‘just’ the clinician. This experience was good in that it produced clinically relevant questions, but problematic in that inward tensions developed at times when I was working in my clinical role, undertaking clinical practices that I was no longer sure about. Familiarity with the AMU setting and clinical activities, also caused occasional tensions when in my research role I felt the urge to intervene in certain aspects of patient care that I was observing during field work. As a solution to both internal complexes, I often actively numbed what I deemed unhelpful internal thoughts, so as to be able to effectively function in respective roles. I also relied on reflexivity and comprehensive field notes to help compartmentalise and make sense of the range of feelings associated with ‘wearing different hats.’

An unforeseen advantage of working in a different clinical environment from the AMU during data collection, was the gaining of a new perspective in terms of questioning practice. In particular, I found myself questioning clinical practices that I had once viewed as the norm and unchangeable. As Carpenter *et al* (2012) would suggest, I gained better awareness of AMU culture when I had the opportunity to compare it to the culture of another department. This was mainly caused by having been exposed to a different way of dealing with comparably similar problems. For example, why could junior healthcare assistants in the AMU not learn advanced skills such as cannulation and venepuncture, when their peers in comparable departments could do so and practice safely under supervision? This was a pertinent question to ask because allowing junior healthcare assistants to perform cannulation and venepuncture had the potential to free up some time for junior doctors; allowing them more time to invest in assessing patients.

4.3.4 The tension of being in the field and observing ‘less than exemplary’ practice

As it was anticipated that ethical dilemmas would be experienced with regard to my observing ‘less than exemplary’ practice during fieldwork, appropriate risk assessments were undertaken (Appendix 15). These risk assessments reflected tensions that would arise between my responsibilities as a nurse towards patients should I observe practice that I considered harmful to their wellbeing, and the effect I would have on the research should I challenge clinicians’ practice. In order to strike a balance between my responsibilities as a nurse and being able to undertake effective fieldwork, the risk assessments outlined an ‘escalation of concerns’ plan, in which escalations were dependent on my determination of the severity of observed ‘less than exemplary’ practice. Effective fieldwork in this context related to objectively (faithfully) recording naturally occurring events, whether reflective of good practice or not, as these events helped in answering pertinent research questions.

Although these risk assessments read well and were clear on paper, in practice they demanded much thinking through and critical reviews of real-time (unfolding) events and their surrounding circumstances. For example, during fieldwork I regularly observed breaches to the hosting hospital's diarrhoea and/or vomiting policy with regard to keeping isolation room doors closed. Based on how this was a regularly observed breach, my general response was to observe these phenomena in order to better understand the problem; including better understanding mine, the patients and other clinicians' dilemmas. Furthermore, in the second month of fieldwork, I was witness to an incident when an infection prevention and control specialist nurse visited the AMU, but did not address the issue of open isolation room doors. This surprised me and left me acutely aware of the fact that I was not best suited to challenge this particular breach in protocol, especially as during this time in my career I was a staff nurse without specialist knowledge in the subject area, and as such, not aware of all the facts. Taking some principles from Gibbs' (1988) reflective cycle, below is a description of this incident and my reflection on it.

What happened?

Observations of practice, 2nd January:

-10:33-

The infection control team liaison for AMU has just come into AMU 2. Because she is around, I decide to quickly scan all the side rooms in AMU 2 and I note that four side room doors are currently open. Two of them have green isolation door signs [probably highlighting patients with diarrhoea and vomiting], and two have no isolation signs [not even the pink one, which would highlight that the patients accommodated in the rooms are non-infectious].

Because I am surprised to see the infection control team liaison in the unit, I ask the coordinator what the nature of their visit is. I am informed that they had come to let the coordinator know that a member of the infection control team will be coming to the unit on a daily basis to review side rooms with the coordinator, in order to help determine which patients could come out of side rooms, thereby assisting patient flow.

-11:00-

I notice the infection control team liaison for AMU leaving the unit. As I did before, I quickly scan all the side rooms in AMU 2 and note that three side room doors are currently open. Two of them have green isolation door signs and one has no isolation sign. [I then wonder to myself why she hadn't addressed the issue of side room doors being open whilst she was on the unit?]

What were you thinking and feeling?

To begin with, I was surprised to see the specialist nurse at that time of the morning. This is because at the time of the study, it was unusual to have a morning visit from the infection prevention and control team. Furthermore, in my opinion, their visits were rarely casual and often related to serious infection prevention and control incidents. Assuming that whatever warranted this visit related to isolation rooms, I took note of isolation room signage and whether or not doors were closed. My expectation was that the specialist nurse would request that all rooms with green signs (housing patients with potentially infectious diarrhoea and/or vomiting), should be closed. This was based on my understanding that isolation room doors should be closed in order to minimise the risk of spreading infection to other patients and staff. This understanding was in line with what was taught in the AMU that isolation room doors were to be kept closed if they housed patients with suspected or confirmed infectious conditions. Nevertheless, to my surprise, the specialist nurse did not address 'my' perceived problem. This left me wondering whether these breaches in protocol were not as significant as I thought, or maybe I did not know all the facts. An hour later, not having fully made sense of the previous experience, I found myself in the middle of the isolation room door dilemma. Below is a description of this experience.

Observations of practice, 2nd January:

-12:00-

As I am exiting the side room after consenting the patient [as a study participant], he requests that I leave the room door open because the room is uncomfortably warm when the door is closed as the air conditioner in the room appears not to be working. I inform him that I will find his nurse and ask her if she would be ok with me leaving the door open. I exit the room, leaving it half-open in search of his nurse. As I am looking for the nurse, an agency healthcare assistant goes to the side room to close the door. As he is closing it however, the patient asks him not to close the door for the same reasons that he has told me. The agency healthcare assistant then agrees to leave the door open. As I rationalise that it is not my place to get involved in the door issue anymore, I end my period of observations and leave the unit.

What sense can you make of the situation? What conclusions can you draw?

Clearly, the protocol regarding closing the isolation room doors of patients with suspected or confirmed infectious diarrhoea was variably adhered to. At the time of undertaking the study,

although many people knew the protocol, it appeared as though there were no strong convictions within the AMU team to enforce it. This might be because clinicians empathised with patients confined in poorly ventilated rooms, as described above. These rooms were uncomfortably warm and increased the risk of both physical and psychological harm to the patient. It might also be because some clinicians knew that not all infectious diarrhoea is airborne spread. For example, bacterial infectious diarrhoea is commonly spread through direct contact with infected people, touching contaminated objects and eating contaminated food; whereas norovirus can also be airborne spread, through exposure to infectious vomit (Leuenberger *et al*, 2007; Worsley, 1998). Regardless of the reasons for non-adherence however, because there was no one actively challenging these breaches or providing guidance as to when adherence was non-negotiable for this patient group, confusion and varied practice on this aspect of care prevailed among staff and patients. Personally, at the time of the study, I resigned to the fact that I did not have all the facts at hand that could empower me to reach a conclusion as to the severity of what I perceived to be 'less than exemplary practice' on this specific aspect of care. Furthermore, with regard to the above incident, I did not feel that it was in the best interest of the study for me to undermine the clinical judgement of my clinician participants, especially where a specialist nurse had previously not intervened and where some clinicians were suspicious of the purpose of my study, as described in section 4.4.3.

4.3.5 Field access and navigation

Finally, having previously worked in the AMU helped with access and navigation during fieldwork. I held an electronic ID badge that allowed me access to key areas within the AMU where pertinent data could be collected, including the staff room and staff corridors. Having previously worked in the AMU, also meant that I could navigate around the different sections of the unit with ease and speed, in order to locate key staff and/or patients who were flagged as those of research interest. Furthermore, having this background knowledge was useful, as each section within the unit had different vantage points that I knew to situate/base myself in order to collect data without being an inconvenience by being in the way of working clinicians.

4.4 Engaging with clinicians

As described in Chapter 3, engaging with clinicians first involved a week-long period of prospectively consenting as many doctors, nurses and healthcare assistants as possible. During this period, I publicised the study through group and one-to-one conversations with as many

clinicians as possible. Laminated posters alerting staff, patients and visitors of research activity were also displayed in key areas on the unit throughout the study. These areas included the unit's information corridors, public notice board and staffrooms.

The general reception to the study was positive and some clinicians commented on the timeliness of the study. As shown in Table 19, a total of 37 clinicians were consented. Out of these, 14 actively participated. This was a good outcome, as it was hoped that at least 4 clinicians from each staff group would actively participate. The main reason cited for non-participation by those who could not actively participate, was being unable to find a convenient time. A secondary reason was my inability to follow up all the potential participants.

	Doctors	Nurses	Healthcare Assistants	
Consented clinician participants	7	20	10	37
Those who actively participated	4	5	5	14

Table 19: Breakdown of consented clinicians and those who actively participated

4.4.1 Familiarity, rapport and freedom

Among junior members of staff, my familiarity with them worked in the favour of the research. With regard to recruitment, many were willing to actively participate in the study because they wanted "to help" as good rapport already existed. Furthermore, having good knowledge of AMU clinical routines meant that I could determine opportune times to approach clinicians and either engage them in conversation or expose them to information about the research project.

Those who ended up actively participating were especially candid during interviews and photo walks; speaking freely about their clinical experiences with relation to the phenomena under investigation. In many cases, clinicians would comment at the end of interviews how they had revealed more about their experiences than they thought they would. They also felt that they had spoken in good, great depth about their experiences.

With regard to study impact, having good rapport with AMU staff and ward leaders allowed for the immediate impact of proposed practice changes and suggestions that I had made, based on preliminary study findings. Appendix 17 shows the service improvement suggestions presented to ward leaders. Presentation of these suggestions led to collaborative work with the Infection Prevention Link Nurse for AMU. The result was the development of a diarrhoea and vomiting

folder that could be used to support clinicians in the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting. Figure 10 shows the cover and contents page of the folder.

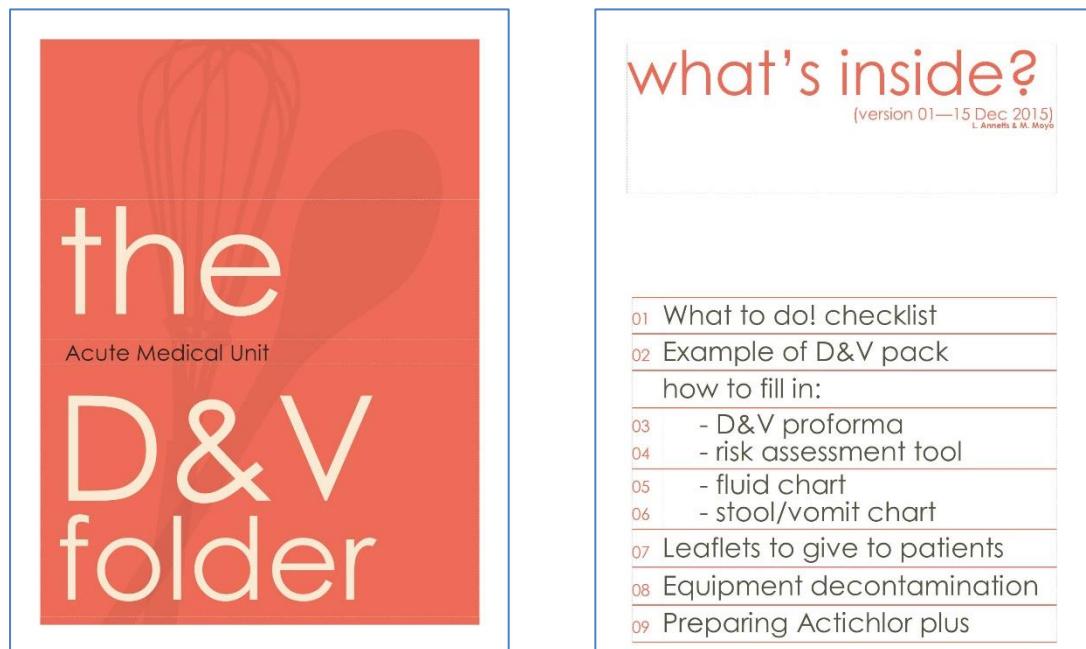


Figure 10: Cover and contents page of the D&V folder

4.4.2 Temporary escape and finding voice

When designing the study, I remembered how as a former member of the AMU team, I enjoyed opportunities of temporary escape from everyday clinical routines. As such, photo walks were intentionally included in the study's protocol as a fun, reflective exercise that offered clinicians an opportunity to temporarily escape their clinical routines. They were also used to spark the intrigue of potential participants, as I knew that in general the use of cameras in the clinical area was not allowed. In credit to myself, the photo walks did spark participant interest and also served as a welcome, temporary escape from everyday clinical routines.

What I had not fully appreciated however, was how much this exercise and ensuing interviews, were going to allow healthcare assistants and junior doctors and nurses find their voice. They found their voice in that they were willing and now able to talk about challenging issues that they otherwise felt they had no other forum to do so. This allowed them to reflect on these issues and ask questions that they had not thought of asking before. In many interviews, the statement "...I

need to know what the best practice is..." was uttered in different ways in relation to grey areas of infection prevention and control practice, where no clear solutions had been offered:

Healthcare assistant 1, Interview 1: *But I've been told you're not supposed to do that because that's not the sort of thing that goes in the orange bin. Big cardboard stuff goes in the macerator. But if it's infective do you walk with it to the macerator or do you put (it) in the (yellow) bin? We don't know because it's contradictory and sometimes I put it in there (the yellow bin), sometimes I don't. It just depends really, it's a random chance... I need to know what the best practice is. Because I've seen people do it both ways so... [Laughter] I don't know! [Laughter].*

4.4.3 Subtle resistance and the seniority complex

Among senior members of staff, subtle resistance against the study, coupled with suspicions of my intentions, was experienced. The ward sisters, managers, registrars and consultants generally hesitated to participate in the study, despite expressing positivity about it. This was likely due to the fact that throughout the 11 months of data collection, the AMU was under 'infection control special measures' for failures in adhering to infection prevention and control stipulations.

As described in the field note extract on the next page, infection control special measures meant that the AMU was receiving extra support from the infection prevention team. This extra support translated to regular visits from the team which caused AMU clinicians to be sensitive to all things related to infection prevention and control practice; including this study. As it was known that the study was investigating some elements of infection prevention and control practices within the unit, suspicions were rife amongst some clinicians that the study was seeking to expose 'less than exemplary' practice. Senior clinicians were particularly sensitive about this issue, as they were expected to lead their junior colleagues by good example.

Observations of practice, 28th January:

AMU is currently on Infection Control special measures (for 3 months). Special measures commenced in November/December 2014.

13:00 to 13:50

As part of special measures, the infection control team are conducting infection control teaching sessions for various AMU clinicians. Today I have attended the teaching session for doctors.

The session started with the infection control team representative explaining that AMU is under infection control special measures for 3 months and as such the unit is receiving intensive focus teaching to improve infection control practice...

Besides hesitations and suspicions, there was also the fact that in my previous clinical role within the unit, I was junior to these senior figures in terms of seniority. It was therefore likely that some of these senior figures felt that I had no professional power or seniority to pose questions about their practice (Nugus *et al*, 2010). It might also be that I and the research posed a threat to their seniority, as they might have been made to reveal that they did not know some things relating to infection prevention and control best practice (Daisiki, 2004). As a result, they might have feared or felt anxious about discussing moments when they themselves did not perform best practice.

In the end, whether due to innocent hesitation, suspicions, seniority complexes, or a lack of time to commit to the study, no senior medical staff or ward managers participated in the study. Only one sister and a senior education lead were interviewed. This study therefore, largely reflects the experience of junior and middle level doctors, nurses and healthcare assistants.

4.5 Engaging with patients

Engaging with patients proved to be the most difficult task in this study. Factors relating to my physical presence on the unit, the patients' acuity and mental state and the embarrassment linked to diarrhoea and vomiting, affected patient recruitment and engagement. It was however interesting to note that for most of those who managed to participate in interviews, a common theme of enjoying the experience of being interviewed was echoed, as they were not alone in their side room and had someone to interact with.

4.5.1 Researcher absence

As discussed earlier, as a clinical academic, I could only dedicate three days of the week to research activity. This limited time impacted on field work continuity. It also made it difficult for me to have enough time for patient recruitment, as I had to undertake other research activity within that time frame. This is because patient recruitment required screening, approaching, a period of deliberation before gaining consent and then finally, participation.

To resolve this time constraint and field work continuity problem, in the third cycle of data collection (June to July), after many failed recruitment attempts in the first two cycles (December to January, and March to April), I negotiated to stop clinical work for a month. This strategy worked and in the end, 8 out of a potential 35 patient participants actively took part in the study. The discourse below explores an important finding relating to patient acuity and mental capacity, which explains why so many patients could not actively participate in the study.

4.5.2 The acuity and mental capacity barrier

Table 20 shows the reasons why 27 potential patient participants did not actively take part in the study. A large proportion were either acutely ill or lacked the mental capacity to consent and participate. In fact, 40% of potential participants were cognitively impaired and 23% were acutely unwell.

Month	Dec	Jan	Mar	Apr	Jul	Totals
Potential patient participants	3	1	13	1	17	35
Cognitively impaired	1		7		6	14
Acute phase/Resting			4	1	3	8
Transferred to another hospital					1	1
Non-English speaker			1			1
Could not consent (upset with care)	1					1
Declined to participate			1		1	2
Consented + participated	1	1			6	8

Table 20: Break down of patient recruitment efforts

In terms of study design, although it was expected that there would be some patients with cognitive impairments, it was unforeseen that there would be so many. In hindsight however, symptoms of diarrhoea and vomiting are often associated with urinary tract infections and other conditions that can cause cognitive impairments and so this finding makes sense (National Clinical Guideline Centre, 2010; Sabol and Carlson, 2007). Indeed, it also explains why after having approached some patients on 'day 1' (whilst they appeared well enough to participate), by 'day 2' they were either acutely unwell, or behaving differently as their illness had progressed. In such cases, symptoms of diarrhoea and vomiting were secondary symptoms of a much bigger medical problem. Furthermore, of the 14 patients that were cognitively impaired, the majority had a history of dementia.

4.5.3 The gender and age challenge

As expected in any study that involves human participants, some people will decline to participate. In this study it was expected that some patients would decline to participate based on the embarrassing nature of the subject topic. Only 2 patients declined to participate in this study; one young white female and one older white male. Reflecting on the experience that I had interacting with the young white female, it is likely that she felt that it would have been embarrassing to talk about her experience of having diarrhoea and vomiting with a young black male researcher. This supposition is in line with the assumption of clinicians, who reckoned that young patients in general appeared more embarrassed about experiencing diarrhoea and vomiting as compared to their older counterparts. Young female patients were especially identified by these clinicians as expressing more embarrassment as compared to their male counterparts. This observation is not surprising when body image factors are considered, as young females are likely to express more dissatisfaction with their bodies than young males or older females (Furnham *et al*, 2002; Tiggemann and McCourt, 2013).

With regard to the older gentleman, he declined to participate citing that he felt too old to be helpful:

Observations of practice, 6th March:

After some thought, the patient declines to participate in the study citing that he feels too old to be helpful within the study and has so far found the care that he has received to be good. He does however, mention that the unit could have benefited with some more nursing staff but is aware that the 'whole of the NHS' is struggling with issues of staff shortages.

From the extract above it was interesting to note that even during this brief encounter with the patient, they supplied important data relating to their experience of care. In particular, they reported receiving good care, despite observing that the unit could do with more staff. With regard to both patients, racial factors might have played a part in their declining, however this is difficult to determine as most of the patients who were of research interest were white; 8 of whom agreed to participate.

4.6 The co-constructive journey

An examination into the experience of undertaking ethnographic research in the AMU, showed that a co-constructive process was experienced; where the entities (clinical environment and individuals) under investigation influenced me and the project, and vice versa. Preceding reflections have shown how my knowledge of the AMU prior to commencing the study, influenced the way in which the study was designed. In the field, some of my lines of enquiry were directly influenced and led by real-time events as they unfolded. Furthermore, as a constant comparative technique to data analysis was employed, previously collected data influenced successive data collection activities.

My influence on study participants was also evident; mainly during clinician interviews and less so in the field. As many participants reported, my style of questioning during interviews led them to explore certain sensitive topics in surprising depth; leading to lines of enquiry that made them reflect on their practice and how to improve it.

(Question: So when it comes to paperwork, what paperwork are you allowed to fill in in AMU when it comes to patients with diarrhoea and vomiting?)

Healthcare Assistant 4: *I would be quite interested to know actually if we are allowed to do that or whether that is... [pause].. I've never really thought about it.*

Researcher: *Ah you see there. A thought has just come to you. That's good. [laughs]*

Healthcare Assistant 4: *Yeah. It's a good question. I'll have to find out when we go back out there. [laughs]*

Furthermore, participants who took part in two interviews, actively engaged in a co-constructive process of data analysis. This is because second interviews were used to either validate or amend my interpretations and understanding of the information that they had supplied in previous data collection efforts. Through this process, co-constructed narratives of clinicians' experiences of looking after patients with symptoms of diarrhoea and vomiting were drawn (Ellis, 2008).

Co-construction was also experienced in that study participants benefited from the study as the study benefited from them (Bell, 2013). For example, during a photo walk, despite having worked

in the AMU for two months, Doctor 2 discovered for the first time that there were some isolation rooms in the unit without toilets. This got them to think about how isolation rooms should be better designed. As they thought out loud about potential solutions to this design flaw, they were not only informing the study, but they were also thinking about what service improvement projects to pursue in the future for their own professional development.

In the concluding stages of data collection, I re-lived the experience of working in the AMU by working two clinical shifts as an agency worker. This exercise helped me use self-reflection to explore personal experience of working in the AMU and use it to make sense of some of the cultural and situationally specific themes emerging from the data; a form of auto-ethnography (Ellis *et al*, 2010). Ellis *et al* (2010) describe auto-ethnography as an approach to research and writing that seeks to describe and systematically analyse (graphy) personal experience (auto) in order to understand cultural experience (ethno).

4.7 Discussion

The aim of this study was to gain in-depth first-hand contextual understanding of the procedures that contemporary AMU doctors, nurses and healthcare assistants employ in relation to the care, assessment and infection prevention and control management of adult inpatients with symptoms of diarrhoea and vomiting. Ethnography was chosen to facilitate this process, as it seeks to understand the relationship between context, culture and events; where culture can be described as the beliefs, values and attitudes of a specific group of people within a given context (De Bono *et al*, 2014). As such, I immersed myself into the culture of the AMU and became a research tool that could observe and analyse pertinent clinical practice 'from the inside' (as a participant) and 'from the outside' (as an observer).

Nevertheless, as the research tool, it was crucial for me to be aware of my own dispositions and potential biases, so as to regularly reflect on how these were impacting on the way that I observed, understood, and interpreted what was going on in the field. This chapter has shed light into that reflexive process and shows how I not only acknowledged my strengths and limitations, but actually capitalised on strengths and where possible, sought workarounds to overcome limitations. Being able to capitalise on strengths and account for limitations, allowed for the development and implementation of novel recruitment and data collection strategies and techniques. For example, inviting clinicians into a project that allowed them to use a camera and

offer them an opportunity to explain what they meant using their own words, proved to be both an effective recruitment strategy and unique data collection opportunity.

Being a reflexive researcher undertaking an ethnographic study also helped me appreciate the co-constructive journey that myself and study participants were undergoing. It was a privilege to facilitate the process of junior doctors and nurses finding their voice and giving them a forum to talk about the challenges they faced in clinical practice. As I acquired important data, they found a safe place to unload. As I gained new perspective, they found a forum to openly reflect. With regard to patients, those who participated in interviews spoke of how at the time of participation, they were not alone in their side room and had someone to interact with. In other words, the study provided social interaction and mental stimulation (Abad *et al*, 2010; Ono *et al*, 2011).

Overall, critically appraising myself and regularly engaging in self-reflection, helped me make sound decisions with regard to how to undertake the project and conduct myself in the field. It helped me guard against potential personal bias, so as to be as objective as possible in my two roles as 'researcher from the inside' and 'researcher from the outside' (Evered and Louis, 1981; Murchison, 2010).

4.8 Chapter summary

This chapter has given the reader an understanding of who I (the researcher) am and how I engaged with study participants. It presented a written self-portrait and offered a reflection of my experience of being in the field. It concluded with a discussion that highlighted how reflexivity throughout the study helped me to maintain objectivity, in order to produce credible work. The next chapter will present the study's findings in relation to how AMU clinicians assessed the infective status of patients with symptoms of diarrhoea and vomiting and managed their infection prevention and control related aspects of care.

Chapter 5 Findings 2: How do doctors, nurses and healthcare assistants in the AMU, assess and manage patients with symptoms of diarrhoea and vomiting?

5.1 Introduction

This chapter will present the findings of the study with regard to how AMU clinicians assessed the infective status of patients with symptoms of diarrhoea and vomiting in the absence of stool microbiology results. It will also present findings with regard to the infection prevention and control interventions that clinicians aspired to implement and perform, when infectious causes of these symptoms were suspected or confirmed. In the presentation, some analysis of both observed and reported patient assessment practices and issues surrounding the implementation and performance of infection prevention and control interventions, will be offered. In this chapter also, similarities/differences of the study's findings with relevant research and expert opinion literature are examined.

5.2 The infectious status assessment of patients with symptoms of diarrhoea and vomiting in the AMU

As described in Chapter 1, the AMU was a clinical area where patients were usually assessed for the first time, in order to determine whether their medical complaint(s) could be treated in the community or they required inpatient treatment. If their medical complaint required inpatient treatment and was also associated with potentially infectious conditions, AMU clinicians were expected to identify these infectious threats and implement necessary precautions to prevent the spread of infection to themselves, their colleagues, visitors and other patients.

As the AMU was an area of initial assessment, it meant that AMU clinicians did not have test results at hand, to prove or disprove suspicions of potentially infectious conditions. Therefore the question posed to AMU clinicians asked how they assessed the infective status of patients with symptoms of diarrhoea and vomiting in the absence of stool (faeces) microbiology results.

Observations of practice and the interviews of doctors, nurses and healthcare assistants, identified the following approaches to patient assessment:

- taking a patient's history,
- using the hospital's diarrhoea and vomiting assessment tool,
- utilising information supplied by other team members,
- performing physical examinations and diagnostic tests to rule out non-infectious causes of diarrhoea, and
- using clinical judgement.

5.2.1 Taking a patient's history

Taking a patient's history was identified by all doctors, nurses and some healthcare assistants as important in helping them assess whether or not symptomatic patients might have infectious diarrhoea and/or vomiting. The patient's history was reported as providing essential information that helped clinicians begin to formulate a plan of care; including what tests to request and precautions to follow.

The significant difference between staff groups however, was that doctors and nurses performed 'history taking' as part of their formal assessments, whereas healthcare assistants performed it informally, as part of delivering personal care. This difference was noticeable in the way that healthcare assistants described the process of 'history taking' without using the term 'history', whereas doctors and nurses often explicitly used the term. Another difference was in the end result of the assessment process if infectious diarrhoea and vomiting was suspected. If, after taking a patient's history, healthcare assistants suspected something untoward, they would escalate concerns to a nurse, whereas if doctors and nurses suspected something untoward, they requested that a patient be placed in isolation care and stool specimens be sent for investigation.

Nurse 2: ...get a history from them, try and find out if they were admitted with it... if there was anything that caused it before admission...

Researcher: ...as an HCA, how do you assess whether or not a patient has got infective diarrhoea or vomiting?

Healthcare assistant 2: Through, well, just the obvious symptoms of diarrhoea and vomiting. So whether they are actually being sick or whether they're (not) – what type of stools they've got, [...] and obviously they can explain to you if they've been sick or not, but until you've, like, seen it then you can't assess how bad it is or how frequent it is I suppose.

Based on participant responses, 'history taking' was quite broad and involved finding out about the patient's presenting symptoms, past medical history, medication history, dietary history and whether they were in recent contact with anyone having diarrhoea and/or vomiting. This breadth and depth in history taking was consistent with NICE (2013c, 2017) recommendations. Nurses in particular, reported that a good history made it possible for them to answer key questions asked in the local hospital's diarrhoea and vomiting risk assessment tool. Doctors reported that a good history helped in making decisions as to what investigations to pursue and treatment plans to implement. In both instances, a good history depended on effective interaction, the patient's ability to provide information and the clinician's ability to ask pertinent questions.

5.2.2 Using the hospital's diarrhoea and vomiting assessment tool

The hospital's diarrhoea and vomiting assessment tool was seen as useful by doctors and nurses. Junior doctors and nurses identified the tool as an invaluable resource that prompted them to ask key questions that they would otherwise not consider important to ask.

Nurse 1: I do use the pro forma, yeah, [...] I don't know any other way really as an assessment tool. Because that kind of gives you everything...

Senior doctors and nurses saw the tool as a good aide memoir, useful in helping to tease out finer history related details, but not necessarily a tool that influenced their final diagnostic impression as to whether or not a patient's incident of diarrhoea and vomiting was infectious.

Nurse 2: ...like the paperwork (tool), in some ways it's helpful, but I think it doesn't really help me decide if they've got infective diarrhoea or not, because I've probably already made that decision before I've filled it out. It's just a tick box exercise.

Doctor 1: I don't personally fill it in but if I look at it, it gives good prompts as to what I need to think about.

...like I said before, looking at a stool without a microscope is really hard to say whether there is anything infectious in it. And so you just have to go through whether they are high risk of being infectious or not... And that's what the protocol (tool) is there for really, I suppose.

Despite the value placed on the tool, filling it in was seen by most doctors and nurses as a laborious and time-consuming task in the context of other daily tasks. Furthermore, some clinicians felt that it hindered prompt implementation of infection prevention and control interventions. This is because during busy shifts, doctors and nurses reported having more important tasks to perform than filling in paperwork in order to convince AMU coordinators and bed managers that a patient was potentially infectious and as such needed to be in isolation care.

Nurse 2: *...So it takes time to fill out a pro forma. It takes time to give someone good personal care if they're incontinent [...] So factoring in time to fill out an isolation pro forma and follow all the rest of the protocols relating to it is quite a demanding thing [...] alongside looking after all the rest of your patients who may have a number of other things going on that demand more of your attention and might be seen as more of a priority over your patient that's got "potentially" infective diarrhoea.*

5.2.3 Utilising information supplied by other team members (subtle peer and colleague influence)

The assessment process involved making sense of the patient's story by drawing on information acquired from various sources, including information supplied by other clinicians. For example, it was observed how information supplied by bedside clinicians was taken seriously and relied upon by those asked to undertake assessments. The following extract supports this observation.

Doctor 4: *But, as is in AMU, you often don't know the patients that well initially... they get moved around and you often rely on what the nurses tell you, you know, (if they say,) "this patient has D&V, we presume it's infectious!" you usually listen to them before seeing the patient yourself and deciding whether you think it's infectious or not.*

It was also usual for clinicians to seek second opinions. In the context of both formal and informal assessments, second opinions were important in either affirming or disproving assessing clinician's suspicions.

Nurse 2: *Obviously I'd get a doctor involved as well and get them to assess the patient, but from a nursing perspective, those are the kind of things I'd be thinking of.*

Healthcare assistant 2: ...I will tell a nurse if I think that something's wrong, or if I think they should be isolated [laughs]. I'll just say, "That's not right." If I ever have any kind of – any alarm bells, I'll just say, "Come look at this because I don't think this is right." And if they think it's fine then it's up to them. But I will always say, "Come have a look at this, because, yeah, I don't think this is okay to be out in the ward with other people."

With a specific focus on 'peer and colleague influence', the extract below shows how a doctor's view of the clinical experience of various colleagues had an influence on their patient assessment. Their choice of words shows that they placed greater significance on referrals made by colleagues whom they determined had a good amount of clinical experience.

Doctor 1: ...depending on who had taken the stool sample, (that is, the person) who has asked for the doctor to come and look (at a patient). Depending on how many stool samples they have looked at in the past plays a part in what they have asked you to look at.

It was interesting to note however, how this 'peer and colleague influence' was sometimes spoken of as part of the assessment process and sometimes not acknowledged as such at all; hence subtle. This might partly be due to the fact that information supplied by other clinicians was usually supplied as part of patient handover, general conversation amongst colleagues, or as information shared during the raising of a concern. It was therefore not strictly viewed as a formal process of assessment, but rather a general process of information and opinion sharing.

5.2.4 Performing physical examinations and diagnostic tests to rule out non-infectious causes of diarrhoea

Doctors performed various tests to help them rule out non-infectious causes of diarrhoea during the patient assessment process. These included performing physical examinations, reviewing inflammatory markers, and in some instances, ordering abdominal x-rays and/or computed tomography (CT) scans.

Physical examinations

The physical examinations highlighted by clinicians included abdominal examinations, rectal examinations and clinical observations (namely, temperature, heart rate and blood pressure

monitoring.) In general, these examinations provided additional information to support or disprove the diagnostic impression that a clinician was forming, based on the evidence (information) acquired from the preceding assessment approaches discussed.

Doctor 3: *So if the history has suggested an infectious cause, the chances of me finding anything in the abdominal examination are pretty slim. They may have a tender abdomen, but they may just as likely not have a tender abdomen. Whereas if, for example, their history has suggested that they've been constipated in the past and actually this diarrhoea is much more likely overflow diarrhoea then I'll expect them to be tender in the left iliac fossa before I even push in the left iliac fossa.*

And you're doing that to back up; you already know what you're looking for when you look for it, and it's backing up what you're suspecting.

It has to be reiterated however, that the diagnostic journey was not clear cut. As Doctor 3 indicated, the information gained through physical examinations had to be interpreted as part of a holistic assessment. That is to say that the information gained only made sense as part of the whole assessment; including key information from the patient's own story.

Doctor 1: *So, if somebody has got loose stools and they haven't got any abdominal pain, it is just another thing that would [make you] think that maybe there wasn't an infective cause and it was just normal for them. But obviously if it (the loose stool) was new onset, then you would be more concerned.*

Reviewing inflammatory markers (undertaking blood tests)

Reviewing inflammatory markers from patient blood specimens, was another approach that doctors highlighted as helping them to determine whether a patient's incidence of diarrhoea and/or vomiting was likely infectious or not.

Doctor 4: *You know, it can be difficult but I think if their main complaint is diarrhoea with very high inflammatory markers, then it could well be infective.*

As another doctor clarified, inflammatory markers were a good way to rule out if a patient had an infection, but they were not a good way to confirm it.

Doctor 1: So, if you have got a patient who has got diarrhoea, who has got completely normal inflammatory markers, it is extremely unlikely that it is going to be infective. However, if they are raised then it might not be because of the diarrhoea, so you still don't know that the raised inflammatory markers are caused by the diarrhoea, but you would then be more suspicious. It is a good way to rule out the fact that there is an infection, but it is not a good way to confirm it.

Besides helping to determine infectious status, undertaking blood tests was seen as an essential activity to help determine the severity of patients' diarrhoeal symptoms with regard to dehydration and electrolyte loss. This knowledge helped doctors to decide which fluid treatment plans to follow.

Abdominal x-rays and/or computed tomography (CT) scans

Although it was reported that doctors did their best not to order such tests, at times urgent abdominal x-rays and/or CT scans were ordered, if sinister complications related to either infectious (*C. difficile*) or non-infectious (ulcerative colitis) causes of diarrhoea were being considered; namely toxic megacolon. On other occasions, these tests were ordered to investigate whether cancerous masses or bowel obstruction could explain the patient's symptoms. Overall, as with physical examinations, these tests gave the clinicians more information so that they could make informed conclusions/decisions.

5.2.5 Using clinical judgement

The use of clinical judgement was by far the most reported approach utilised when assessing whether or not a patient might have infectious diarrhoea and/or vomiting. However, as with taking a patient's history, doctors and nurses used this approach as part of their formal assessment, whereas healthcare assistants used it informally as part of delivering routine personal care.

Doctor 2: I don't know how to – like it's – it's like a gut feeling or like an instinct when you assess the patient and you – I can't describe it but you know, you have to use your judgement.

Nurse 3: ...We all know that a stool is a stool, it's nothing nice, it's not going to smell like roses, but you can tell when it's a normal smell and when it's strong and smells infective; just like urine [...] And that helps us get an idea if that's infective or not. Like I said, if it looks green and looks watery and it's got mucus on it, yeah, it's probably going to be infective. [laughs]

Researcher: ...as an HCA, how do you assess that somebody's got infective diarrhoea or vomiting?

Healthcare assistant 4: You don't really. If they've got loose stools we get samples and tell the nurse. That's about it really; tell the coordinator and if they're in a bay they need to be isolated, sometimes it smells a bit funky. You can tell can't you though? If someone's got C. Diff or something like that, you pick up on that pretty quickly.

As evidenced by the extracts above, clinical judgement was informed by activities such as smelling and looking at a patient's diarrhoea and/or vomit, weighing up information acquired from a patient's history and understanding the details of current symptoms. This information, coupled together with the clinician's level of clinical experience, helped them decide whether or not to treat a patient as potentially infectious.

Interestingly, one senior nurse helped to establish the fact that there was a strong link between their repeated exposure to assessing patients using the hospital's diarrhoea and vomiting assessment tool and the development of their clinical judgement. In the ensuing extract, as they described relying on their experience and clinical judgement to assess the infective status of patients with symptoms of diarrhoea and vomiting, they suddenly reflected on their humble beginnings as a novice nurse.

Nurse 2: ...like the paperwork. In some ways it's helpful, but I think it doesn't really help me decide if they've got infective diarrhoea or not, because I've probably already made that decision before I've filled it out. It's just a tick box exercise. [...] some of the questions on it that it asks [...] I would normally take into consideration anyway, like are they on laxatives? It's just common sense really to me. [pause] It probably wasn't like (that though) when I first started, and it was probably quite beneficial to me as a newly qualified nurse to have that paperwork as an aid..."

In relation to clinical experience, one doctor's account described the relationship between experience (repeated exposure to undertaking patient assessments) and proficient decision-making (clinical judgement).

Doctor 3: *"And the other thing which I maybe should have said but I didn't (is that) I'm not a consultant. I'm three years out of medical school, so my decision-making process isn't going to be as slick as a consultant's would be. So each of those stages is going to take me slightly longer than a consultant would anyway, and I'm doing all four of those stages by myself."*

With regard to healthcare assistants, some healthcare assistants did not think that they assessed the infective status of patients with symptoms of diarrhoea and vomiting. This notion was true on a formal (paperwork) and authoritative medical assessment capacity, with regard to being actively involved in making decisions as to whether or not a patient should be treated as potentially infectious. However, this notion was not true in day-to-day (actual) clinical practice, as they often used their clinical judgement to suspect that a patient might have infectious symptoms and accordingly escalate concerns to a nurse.

Researcher: *There's something you just said there (when) you were talking about (looking) at their bottom (buttocks) and you find it looks like there's something suspicious happening. What do you mean by that?*

Healthcare assistant 4: *Say, like, I've been looking after them for a couple of days. And I've been with them one day (and) they've been fine, and then the next day they've had a few episodes of loose stools. The skin normally breaks down quicker if it is diarrhoea and if it is more infective. If it's just a normal stool, their skin tends to be fine because it just sort of comes out and that's it [...] But if it's loose it goes everywhere, their skin breaks down a lot quicker. So that's when you sort of think as well, "Well, something's obviously not right. It shouldn't be doing that."*

It is because of this active process of noticing suspicious symptoms and escalating concerns to a nurse, that other healthcare assistants in the study reported that they 'did' assess a patient's infective status. Indeed, despite having reported that they did not assess patients' infective status, 'Healthcare assistant 4' later described an in-depth and unorthodox level of assessment (preceding extract) which raised the following question: 'Should we be involving healthcare assistants more in the initial assessment of patients with symptoms of diarrhoea and vomiting, whilst waiting for results from stool microbiology tests?'

5.3 The diarrhoea and vomiting related infection prevention and control interventions that AMU clinicians implemented and performed

Observations of practice, pertinent hospital documents and the interviews with doctors, nurses and healthcare assistants, identified a number of interventions that AMU clinicians aspired to implement and perform when caring for patients with symptoms of suspected or confirmed infectious diarrhoea and vomiting. Table 21 presents these interventions, using the terminology used by the clinicians at the study site.

	Aspired / implemented / performed interventions (observed & self-reported)	Method of instigation
1	Standard Precautions (as per study site policy)	Routine practice
	Hand hygiene (as directed by policy)	
	Wearing of non-sterile gloves	
	Wearing of waterproof apron (or long sleeve gown)	
	Wearing of surgical mask (with fluid repellent) **	
	Wearing of eye protection **	
2	Isolation care and/or cohorting and/or cordoning	Door signage (signage)
3	Individual precautions inside isolation rooms – careful handling of medical notes and avoiding contact with patient surroundings	<i>personal interpretation of required precautions</i>
4	Informing/educating staff and visitors and advising on precautions	Signage + conversation
5	Limiting visitors and visits from non-essential staff	Signage + conversation
6	Dedicated equipment used only for isolated patient	Labelling of equipment
7	Decontamination of shared equipment	Routine practice
8	Safe transfer and disposal of disposable equipment	Routine practice
9	Encouraging/facilitating patient personal hygiene	Conversation
10	Daily change of linen for isolated patients	Routine practice
11	Safe segregation and transfer of contaminated linen	Routine practice
12	Safe segregation and disposal of contaminated waste	Routine practice
13	Environmental cleaning and decontamination	Routine practice
	** to be worn during procedures and patient care activities that were likely to generate splashes or sprays of blood, secretions or excretions.	

Table 21: Infection prevention and control interventions that are implemented and performed

These interventions were categorised under 8 broad themes:

- Standard precautions
- Isolation care, cohorting, cordoning and related precautions
- Staff, patient and visitor awareness-raising, education and restrictions
- Equipment handling, cleaning and decontamination
- Patient personal hygiene
- Contaminated linen and garments safe handling and precautions
- Contaminated waste safe handling and precautions
- Environmental cleaning and decontamination

The following is a description and analysis of these interventions. The photographs presented in this section are presented with respect to the context in which the clinicians who took them, described what they portrayed to them.

5.3.1 Standard precautions

Standard precautions are the basic, minimum level of infection prevention and control precautions which are to be used in the care of all patients. They are meant to reduce the risk of transmission of blood borne and other pathogens from both recognised and unrecognised sources (World Health Organization, 2007). According to the policy documents in the hospital at the study site, these precautions (or interventions) included hand hygiene, wearing of non-sterile gloves, wearing of a waterproof apron (or long sleeved gown), and the wearing of a surgical mask (with fluid repellent) and eye protection during procedures and patient care activities that were likely to generate splashes or sprays of blood, secretions or excretions. The extract below shows the local hospital's description of standard precautions and additional precautions, as presented in policy documents:

Standard precautions are the principal strategy for the prevention and control of infection and when used correctly, will prevent transmission of micro-organisms that cause infection in most circumstances. However, it is necessary to take additional precautions for the care of some patients who are known or suspected to be infected (or colonised) with specific micro-organisms/infections, in order to minimise the risk of transmission. Such precautions are known as source isolation precautions.

Of all the clinicians who participated in the study, only one actually used the term 'standard precautions', whereas others only spoke of related activities; namely hand hygiene and the wearing of gloves and gowns. There were different contexts in which various clinicians spoke fervently about these precautions. Some spoke of them in the context of interventions to stop them from catching potential infection, whilst others in the context of reducing the risk of spreading infection among patients and visitors.

Nurse 1:



Figure 11: Gloves and aprons (representing standard precautions)

5.3.2 Isolation care, cohorting, cordoning and related precautions

Isolation care (or source isolation precautions) involved placing patients who were known or suspected to be infected (or colonised) with specific micro-organisms/infections in private (isolation) rooms. It was a measure taken to prevent the spread of specific micro-organisms/infections from an infected (or colonised) patient to other patients, staff and visitors (Siegel *et al*, 2007).

In general, clinicians sought to place patients with symptoms of diarrhoea and vomiting into isolation care. The policy stipulated that 'if' a clinician ordered laboratory tests to investigate whether or not a patient's cause of diarrhoea was infectious, that patient had to be placed into isolation care until the test results were known and a fully informed review undertaken. As such, many patients with symptoms of diarrhoea and vomiting were cared for in isolation rooms.

Nurse 1:

	<p>Title: Side room</p> <p>Written Comment: The side room keeps the patient isolated, therefore preventing the spread of infection.</p>
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Figure 12: Isolation room door (representing isolation care)

As a basic requirement, staff and visitors were expected to don a gown and gloves prior to entering isolation rooms. It was also expected that staff and visitors perform hand hygiene with soap and water after contact with isolated patients or their surroundings. Nevertheless, numerous incidences of non-adherence to these stipulations were observed as described in the following extract:

Observations of practice, 2 January:

-10:20-

The agency healthcare assistant returns to the patient in side room 3 with an automated observation machine, in order to take a set of observations as part of the unit's routine 10 o'clock observations. He enters the patient's room without gloves or an apron and takes a set of observations which he then records on a paper towel, as the patient does not yet have any bed side paperwork (including an observation (vital signs) chart).

After taking and recording the patient's observations, the agency healthcare assistant comes out of the side room with the observation machine, not decontaminated, and leaves it just outside the patient's room. The curtains of the side room remain closed and the side room door is left open.

In addition to following basic requirements, some doctors tasked with scribing (that is, writing in medical notes in relation to a patient's medical review) took care not to be in contact with the patient and their surroundings whilst in isolation rooms. This was in contrast to nurses and healthcare assistants who were often observed using patients' beds and tables as writing surfaces.

Observations of practice, 29 December:**- 10:45 -**

(the nurse) is currently crouching on the right side of the patient's bed, close to the foot end of the bed, using the patient's bed as a surface to lean on whilst completing the admission paperwork.

On occasions where there were no isolation rooms available or not enough rooms to accommodate all affected patients, patient cohorting and/or bedside cordoning were employed. Cohorting was the practice of grouping together patients who were infected or colonised with the same organism and confining their care to a single area, usually a bay, in an attempt to prevent the spread of infection to unaffected patients (Siegel *et al*, 2007). A senior nurse described how they had been involved in an incident where they had had to temporarily close one bay in the AMU, as some patients in the bay had become symptomatic. During the incident, as a way of preventing further spread within the AMU, hospital leaders decided to move these patients out of the AMU and cohort them in a purpose built cohort area within the hospital's isolation unit.

Bedside cordoning was reported by various staff and involved treating an area within a bay - usually a single bed space - as if it were an isolation room and requiring that staff and visitors don a gown and gloves prior to going beyond a set barrier - usually drawn curtains. Please note that 'bedside cordoning' is not an officially recognised term, however it will be used as defined in this thesis to describe practices relating to cordoned-off bed spaces. In fact, there appears to be no official term coined for this practice, despite it being a regular action undertaken in clinical practice when patients who require isolation care are being cared for in a bay area.

5.3.3 Staff, patient and visitor awareness-raising, education and restrictions

Staff, patient and visitor awareness-raising and education involved informing respective individuals of the reason why a patient was in isolation care and advising them on what precautions to take, so as not to catch the infection and/or spread it to others. Clinicians were expected to effectively communicate infection concerns to colleagues, patients and visitors and recommend appropriate precautions. These precautions included standard precautions and sometimes visiting restrictions, especially during incidences of outbreaks. Restrictions in this context, meant that non-essential staff were discouraged from visiting the rooms or bays of patients who were suspected to be infectious. Relatives were discouraged from visiting if possible and children were excluded from visiting. Furthermore, after visiting patients in isolation or

cohort care for infectious reasons, visitors were asked not to visit other patients on the ward or elsewhere in the hospital afterwards.

It was expected that infectious concerns were communicated to colleagues, patients and visitors verbally, through documentation and through the use of appropriate posters (door signs/labels) and information leaflets. The unit therefore stocked hospital-approved information leaflets relating to infection prevention and control and diarrhoeal related infections, so that clinicians could give them to affected patients and their visitors. It was observed however, that despite there being information leaflets in the unit, staff rarely ever gave them out to patients and/or visitors. It was observed and largely reported in interviews that staff tended to have conversations with patients and/or visitors. Nevertheless, as one clinician acknowledged, it was highly likely that patients and visitors would forget the details of such conversations.

With respect to documentation, clinicians were usually good at documenting the patient's infectious condition or suspected infectious condition, but rarely recommended any precautions besides isolation care. Furthermore, documentation itself was only effective if the intended staff actually read the notes.

Door posters were also utilised in the AMU to raise staff and visitor awareness, nevertheless it was identified in the study that some staff did not know what they meant. These door posters were at times misleading if they were not updated in between patients. They were also ineffective communication tools for patients and visitors, as some either did not read them or understand what they meant, especially if English was not their first language.

Doctor 3:

	<p>Title: Isolation care sign</p> <p>Verbal (dictated) comment: They are good in that they prompt you to think, 'this patient is isolated presumably for diarrhoea and vomiting and I should be gowning up to see them.' And they are bad in that they're often not up-to-date.</p>
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Figure 13: Isolation care sign (to raise staff and visitor awareness)

5.3.4 Equipment handling, cleaning and decontamination

Numerous pieces of equipment were in use in the AMU; both disposable and re-usable.

Disposable equipment included bedpans, vomit bowls and wash bowls. Re-usable equipment included commodes, bedframes, mattresses and physiological monitors. AMU clinicians reportedly endeavoured to provide potentially infectious or infectious patients with their own dedicated equipment so as to reduce the risk of onward transmission of infection to unaffected patients through shared equipment. This ideal was difficult to achieve, as there was not enough equipment for dedicated patient use. In fact, there was not enough space in the unit to hold the amount of equipment that would facilitate such an ideal. As such, because sharing of equipment between patients was largely inevitable, it was expected that re-usable equipment should be cleaned and/or decontaminated between patient use. If any equipment was being shared between potentially infectious (or confirmed infectious) patients and non-infectious patients, clinicians were required to decontaminate the equipment with a chlorine-based disinfectant between patient use.

It was observed however, that many clinicians in the AMU at the study site were not aware of policy stipulations with regard to the decontamination of equipment that had been in contact with potentially infectious patients. They were using universal sanitising wipes on this equipment, instead of a chlorine-based disinfectant. As one senior healthcare assistant reported:

Healthcare assistant 4: Yeah because it was the end of last week I had infection prevention come down as a little hour session and I found out then. I was like, "What? What?" "How have I been here for nearly three years and I don't know this?" No one knew it. It wasn't just me. No one knew. It's not been put in practice on AMU. We've been doing it wrong, which is a bit worrying, really.

With regard to disposable equipment, care was taken to safely transfer the equipment from patient isolation rooms to appropriate bins or the macerator inside the sluice (dirty room). This was because such equipment, for example bed pans and vomit bowls, contained contaminated (potentially infectious) waste. It is important to note here that clinicians expressed a lot of confusion as to what safe transfer practice of potentially contaminated disposable equipment from isolation room to sluice actually looked like. This is because different people had differing views on how this task was to be carried out. If however, clinicians felt like the potentially infected disposable equipment could be safely disposed of in the patient's room, care was taken to dispose of the equipment in appropriate clinical waste bins within the room.

5.3.5 Patient personal hygiene

Patient personal hygiene in the context of maintaining body cleanliness, was identified in the study as an infection prevention and control intervention. This included encouraging patients to wash their hands after using the toilet, having a bed bath, a shower, or at least washing their face, genitals and bottom area, and changing clothing every day. As an example, after being asked what information they had been given about diarrhoea and vomiting, one patient reported:

Patient 4: I'm not allowed to use the other toilets that the other patients are using. (I'm expected) to wash my hands and try and keep as clean as I can.

Nevertheless, as the patient highlighted further in their interview, maintaining personal hygiene was challenging when they had intravenous lines attached to them as they restricted their ability to get to the sink or shower room. Furthermore, they found that performing personal hygiene was challenging when acutely unwell and unable to muster up enough strength to adequately perform the task. According to the patient, these were significant challenges that some nursing staff did not actively consider when looking after patients whom they presumed could independently manage their own personal hygiene needs.

5.3.6 Contaminated linen and garments safe handling and precautions

Contaminated linen and garments safe handling and precautions were also mentioned by some nurses and healthcare assistants. Going hand-in-hand with personal hygiene, clinicians changed the bed linen and pyjamas (or hospital gowns) of patients in isolation care on a daily basis, usually in the morning, whether soiled or not. Changes were also performed anytime during the day when linen and or clothing got soiled. The linen and garments were handled with care and attention was paid to the potential spread of infection. Clinicians were expected to adhere to standards such as the donning of a gown and gloves when handling contaminated linen and not placing it on the floor. Hand hygiene with soap and water was also expected after handling such items.

When removing linen from the bed, care had to be taken to prevent unnecessary shaking as this increased the risk of releasing microorganisms into the air. The linen and garments were then placed into a dissolvable seam laundry bag (referred to as an 'alginic bag') and the bag was then sealed when two thirds full and placed into a plastic laundry bag for safe transfer to the laundry

area. Alginate bags prevented the need for laundry staff to handle potentially contaminated linen and garments, as they could place the bags directly into the washer.

Nurse 2:



Title: Alginate bags

Verbal (dictated) comment: Alginate bags make it easier for me to look after patients with D and V because I know if I use them then I'm disposing of dirty linen correctly. And I know that the poor people at the 'laundry' place don't have to handle the dirty linen.
So that's good.

Figure 14: Alginate bag (to aid safe linen handling)

It was however observed that there were occasions when some members of the nursing staff did not adhere to expected linen and garments safe handling requirements and precautions. As shown in the image below, Nurse 5 drew attention to a plastic laundry bag that had been carelessly left in a corridor. It was more than two thirds full with potentially contaminated linen inside it. Furthermore, the linen was not contained within the dissolvable seam laundry bag. As can be seen, wet/soiled linen was not contained within the red alginate bag as it had become crumpled at the bottom of the white laundry bag.

Nurse 5:



Title: Disposable bags/Wheelie bin

Written comment:

Disposable bags are sometimes overflowing with inappropriate items i.e. wet sheets.

Figure 15: Wheelie bin (demonstrating non adherence to safe linen handling stipulations)

5.3.7 Contaminated waste safe handling and precautions

The careful handling of contaminated waste was also identified as an infection prevention and control intervention. This involved correctly segregating contaminated waste and placing it into appropriate clinical waste bags that were safely disposed of, following the hospital's clinical waste stream disposal protocols. The waste bins were colour coded. Black bins were for domestic waste and orange bins were for clinical waste. Contaminated waste included soiled pads and sometimes waste products (faeces and vomit).

Gloves and a gown had to be worn when handling contaminated waste. On task completion, the gloves and gown had to be disposed of in clinical waste bags, after which hand hygiene had to be performed with soap and water. When items such as disposable bed pans and vomit bowls needed to be transferred from a patient's room to the macerator in the sluice area, care had to be taken to cover these receptacles so as to avoid spillages. If spillages did occur, clinicians would clear up the spillage area and then request that the cleaners in the unit disinfect the area with a chlorine-based disinfectant.

Nurse 1:

	<p>Title: Clinical Waste Bin</p> <p>Written comment: This allows you to dispose of gloves (other waste) and aprons inside room.</p>
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Figure 16: Clinical waste bin (aiding safe waste disposal)

5.3.8 Environmental cleaning and decontamination

Finally, some nurses and healthcare assistants mentioned environmental cleaning and decontamination. As it is known that contaminated surfaces play a significant role in the transmission of infectious pathogens (Dancer, 2014), it was a hospital requirement that surfaces and equipment which patients with suspicious or confirmed infections came into contact with, were appropriately cleaned and decontaminated. This involved the daily cleaning of the patient's isolation rooms (or cohort areas) and the equipment in their rooms (or cohort areas). During the

study, it was observed that clinicians and cleaning staff (ward cleaners) were not undertaking complementary cleaning practices. Whilst clinicians were wrongly using universal sanitising wipes to perform their daily cleaning of table surfaces and equipment in patients' isolation rooms, cleaning staff were using the recommended chlorine-based disinfectant on the floors and bed bases. As earlier described, clinicians were in many instances not following recommended practice, as they were not aware of policy stipulations.

Terminal cleaning of the room (or isolation area), including equipment, was undertaken after affected patients had vacated the room (or isolation area) in preparation for new admissions. Terminal cleaning, also termed 'deep cleaning' by some clinicians, was the thorough cleaning and decontamination of all surfaces and equipment in the room (or isolation area) using a chlorine-based disinfectant. The process included the disposal of single patient use items that had been in the room (or isolation area) or in contact with an affected patient during their stay. It also included the changing of bed curtains in bay areas.

Nurse 1:

	<p>Title: Cleaning trolley</p> <p>Written comment: Represents 'chlorine-based disinfectant'. This helps to clean anything that has been touched by patients with diarrhoea and vomiting. Stops to spread any infection.</p>
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Figure 17: Cleaning trolley (representing chlorine-based disinfectant)

5.4 Erring on the side of caution

Although this was neither an approach to patient assessment nor an infection prevention and control intervention, it is worth acknowledging that many clinicians reported erring on the side of caution when initially assessing patients with symptoms of diarrhoea and vomiting. In other words, they treated patients who presented with symptoms of diarrhoea and vomiting as infectious until proven otherwise and immediately sought to place them into isolation care. Although these actions were largely in line with the hospital's policy for unexpected, unexplained diarrhoea and vomiting, it became evident as the study progressed, that clinicians were not

purposefully following policy. Instead, they performed these actions based on personal rationale (clinical judgement) or in following the unit's culture. Assessing clinicians did not want to risk the safety of other acutely unwell patients whilst waiting for laboratory results to determine whether or not a patient's incidence of diarrhoea and vomiting was infectious. The extracts below, echo the general mind-set of AMU clinicians with regard to erring on the side of caution when dealing with symptomatic patients.

Doctor 4: I think there is a tendency to always be more cautious... you know. Presume that it's infectious until a stool sample is back.

Nurse 3: First things first, I would like to,.. unless there's a past medical history that shows me like there's something like ulcerative colitis or IBS or something that really tells me there's a plausible reason for this diarrhoea not to be infective, I would look into getting that person into a side room. Not just because my initial assessment might be wrong, but for the fact that we do have a lot of frail or elderly patients around which kind of like are really easy to get,.. to contract any diarrhoea and vomiting bug that might be around.

The realisation that clinicians were not purposefully following hospital policy led to the addition of a new research question at the end of the first phase of data collection. The question asked if clinicians had ever read the hospital's diarrhoea and vomiting policy. Ten clinicians were asked the question and all reported that they had never been asked to read the policy, with only one reporting having read small portions of it, out of personal interest.

5.5 Comments on findings

Study findings suggest that despite being challenging, the infectious status assessment of patients with symptoms of diarrhoea and vomiting in the absence of results from stool microbiology, followed logical complementary approaches. The findings also suggest that when infectious causes of these symptoms were suspected, clinicians implemented and performed numerous infection prevention and control interventions, albeit inconsistently. The following discourse will focus on two key areas. The first concerning the logical complementary nature of identified patient assessment approaches, and the second concerning the observed and reported inconsistencies to the implementation and performance of aspired infection prevention and control interventions.

5.5.1 The infective status assessment of patients with symptoms of diarrhoea and/or vomiting

The investigation into how AMU clinicians assessed the infective status of patients with symptoms of diarrhoea and vomiting in the absence of stool microbiology results, identified five main approaches to patient assessment. These approaches resonated with approaches described by Kyne *et al* (1998) who described clinicians in their study reviewing patients' medications, undertaking rectal examinations and performing specific gastrointestinal investigations. Some of the approaches were also in line with guidance found in expert opinion literature (Bushen and Guerrant, 2003; Casburn-Jones and Farthing, 2004; Farthing *et al*, 1996; Gadewar and Fasano, 2005; Jones and Rubin, 2009; RCN, 2013a; Sabol and Carlson, 2007; Schott and Bono, 2011; Stepan *et al*, 2006) and national guidelines (NICE, 2013c; 2013d). These included activities such as taking a patient's history and performing physical examinations and diagnostic tests to rule out non-infectious causes of diarrhoea.

The use of clinical judgement however, does not appear to be formally discussed in available literature which relates to the assessment of diarrhoea and vomiting. Nevertheless, there is a growing body of literature with a specific focus on the use of the sense of smell in identifying pathogens with a distinct smell like *C. difficile* (Arasaradnam *et al*, 2010; Bomers *et al*, 2012). As with clinical judgement, utilising information supplied by other team members does not appear to be formally discussed, however it is known that during history taking, clinicians use information gathered from various sources to help them make sense of patients' histories (Sabol and Carson, 2007, RCN, 2013). The use of hospital-based assessment tools specific to diarrhoea and vomiting is common in clinical practice, but does not appear to be explored or discussed in academic literature. In fact, various UK hospitals advocate the use of hospital specific diarrhoea and vomiting risk assessment tools. This is evidenced by the plethora of hospital specific diarrhoea and vomiting related risk assessment tools that are available on the World Wide Web.

Although these approaches are individually presented and described in this thesis, they were not distinctly separate, but rather overlapped and complemented each other. For example, taking a patient's history was the single most important activity through which a context for the patient's symptoms could be established. This context helped clinicians form an initial impression as to whether or not the patient's symptoms were infectious. Whilst clinical judgement primarily helped in making sense of all available information (contextual and other), the other approaches primarily helped to either prove or disprove the initial impression that had been derived from the patient's story (their history). As such, good (adequate) history taking and developed (matured)

clinical judgement were central tenets to an effective assessment. Figure 18 presents a conceptual model of the patient assessment process.

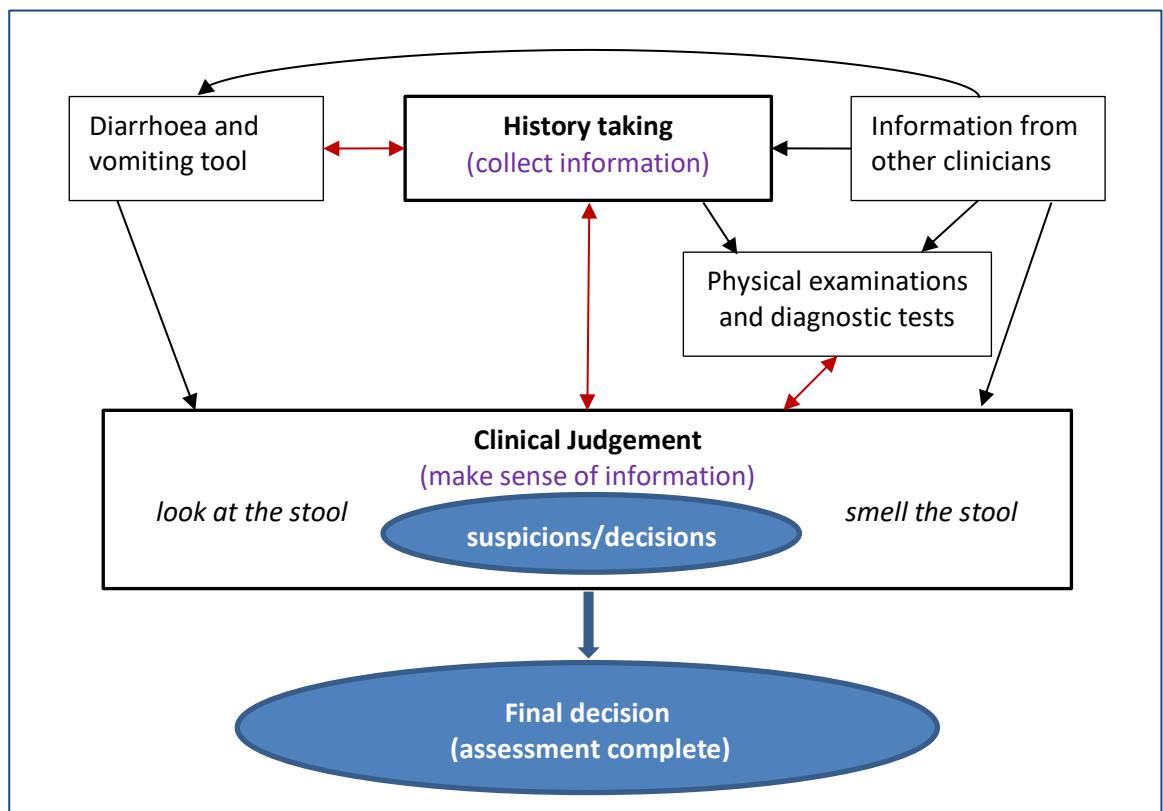


Figure 18: Conceptual model of the patient assessment process

History taking was quite broad and provided clinicians with information that helped them to formulate care plans, including determining what tests to request and precautions to follow (Sabol and Carlson, 2007; RCN, 2013). It was a complex process that involved encouraging the patient to tell their story and was dependent on effective interaction and the ability of the clinician to ask the right questions (Ahmed, 2002; Price *et al*, 2011). It was also reliant on the patient's understanding of the clinician's questions and their willingness and ability to tell their story. Where patients could not provide a history, history related information was sought from the clinicians that had referred the patient, or from the patient's carers and/or relatives. This is an approach in contemporary clinical practice known as taking a collateral history (Dyer *et al*, 2017).

Using the hospital's diarrhoea and vomiting assessment tool, helped clinicians get a clearer picture of the patient's history by teasing out finer history related details. The tool also had an algorithm designed to help clinicians arrive at a conclusion as to whether or not to treat patients' symptoms as infectious. Utilising information supplied by other team members, allowed clinicians to gather as much information as possible from varying perspectives, so as to allow for well informed decisions/conclusions. This information was useful, as it informed the history taking

process, including completion of history related sections within the hospital's diarrhoea and vomiting assessment tool. Performing physical examinations and diagnostic tests, provided further information that either proved or disproved initial impressions. This activity also ensured that other important issues highlighted during history taking, were investigated.

As information about the patient was being collected and collated, clinicians had to make sense of what they were hearing, seeing and reading, in order to decide whether or not a patient might have infectious diarrhoea and vomiting. This is where clinical judgement was instrumental. Clinical judgment was the process by which clinicians decided on what information was to be collected about a patient, made interpretations of the information, arrived at a diagnosis and identified appropriate actions to take (Phaneuf, 2008). The process involved problem-solving, decision making, and critical thinking and was influenced by the clinician's previous personal and professional experience upon which they could reflect and transfer knowledge or learning between cases/experiences. In effect, based on previous personal and professional experience, a critique of gathered information and pattern recognition, clinicians would arrive at a conclusion as to whether or not they believed that patients' symptoms of diarrhoea and vomiting were due to infectious reasons.

5.5.2 Improving diarrhoea and vomiting related patient assessment practice in the AMU

With a specific focus on practice development, as clinical judgement and history taking were identified as central tenets to an effective patient assessment, developing clinicians' expertise and skills linked to these two tenets may improve patient assessment practice in the AMU. With regard to clinical judgement (that is, the process of problem-solving, decision making and critical thinking), findings suggest that this was influenced by the clinicians' previous personal and professional experience. With respect to junior clinicians, findings also suggest that the repeated use of the diarrhoea and vomiting assessment tool developed their clinical judgement, with regard to assessing the infective status of patients with symptoms of diarrhoea and vomiting. Indeed, if a clinical reasoning model were applied to the study's findings in this area, both intuitive (Type 1) and rational (Type 2) processes of clinical reasoning would be applicable, with respect to how clinicians arrived at decisions about the infective status of symptomatic patients (Croskerry, 2009; Croskerry and Nimmo, 2011). Type 1 reasoning is very fast, often instinctive and based largely on recognising patterns. This is often used by experts. Type 2 reasoning is slower, deductively weighs a number of options and is more cognitively demanding. Table 22 (next page) summarises these processes.

Type 1 (Intuitive) reasoning is very fast and used by experts most of the time.

Type 2 (Rational/analytical) reasoning is slower, deliberate and more reliable. It focuses more on hypothesis and deductive clinical reasoning (Hypothetical-Deductive Reasoning).

Repetitive use of **Type 2** leads to the development of **Type 1**

(as one sees more cases and uses **Type 2** reasoning effectively, they will build their own illness scripts and their ability to use **Type 1** reasoning in clinical practice will improve).

Type 1 reasoning can override **Type 2** (known as, dysrational override).

Type 2 reasoning can override **Type 1** (known as, rational override).

Table 22: Summary of the Two-Process Model of Clinical Reasoning (Croskerry and Nimmo, 2011)

Utilising the same model, if the hospital's diarrhoea and vomiting assessment tool represented Type 2 reasoning, and clinical judgement represented Type 1 reasoning, then the link between the repeated use of the tool and the development of clinical judgement becomes clearer. That is, the effective repeated use of the tool by novice clinicians, led to developments and improvements in their clinical judgement in this subject area (section 5.2.5). Furthermore, as with clinical judgement, clinicians' history taking skills, specific to the clerking or admitting of patients with symptoms of diarrhoea and vomiting, developed and improved over time (with experience and repeated exposure to the assessment process).

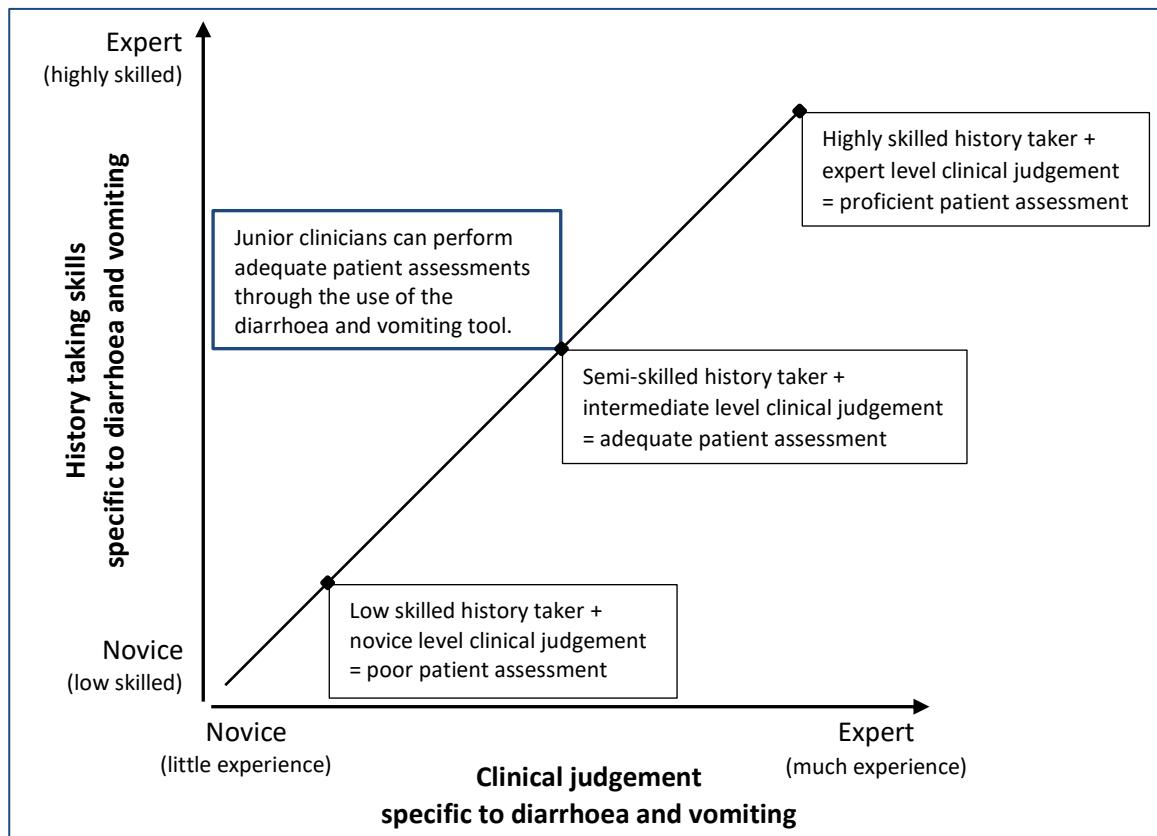


Figure 19: History taking skills, clinical judgement and patient assessment (proficiency trajectory)

Figure 19 (previous page), presents a conceptual patient assessment proficiency model, showing the relationship, over time, between history taking skills, clinical judgement and patient assessment proficiency. The model also highlights the present study's findings that with adequate training, junior/novice clinicians could perform adequate patient assessments through the use of the diarrhoea and vomiting assessment tool. This finding supports the view that the use of structured patient assessment frameworks, enhances clinician performance of patient assessments (Munroe *et al*, 2013). Having established these relationships, it could be concluded that patient assessment practice in the AMU can be improved through the development of assessing clinicians' clinical judgement and history taking skills. One approach to achieving such development, could be through encouraging clinicians to utilise the diarrhoea and vomiting assessment tool, whenever they assess patients in daily practice. This would be natural development through daily practice. Another approach could be through the use of simulated exercises that utilise the diarrhoea and vomiting assessment tool (Janda *et al*, 2004; Stevens *et al*, 2006). This would be assisted development through simulated experiences of assessing patients in a safe/controlled environment, in which feedback is also given and received.

5.5.3 The infection prevention and control interventions that AMU clinicians implemented and performed

The investigation into the infection prevention and control interventions that AMU clinicians implemented and performed when caring for patients with symptoms of diarrhoea and vomiting, identified numerous interventions that these clinicians aspired to implement (instigate) and perform. Clinicians exhibited good knowledge of the basic interventions that they were expected to perform, many of which were part of what was described as routine practice, with a few being unique to individual clinicians' perception of how best to perform 'infection control'. These interventions were categorised under the following 8 themes: (1) standard precautions; (2) isolation care, cohorting, cordoning and related precautions; (3) staff, patient and visitor awareness-raising, education and restrictions; (4) equipment handling, cleaning and decontamination; (5) patient personal hygiene; (6) contaminated linen and garments safe handling and precautions; (7) contaminated waste safe handling and precautions and (8) environmental cleaning and decontamination.

The interventions described within these themes resonated with recommended outbreak management interventions described in national guidelines (Department of Health, 2008, 2012b; NWP, 2012; PHE, 2013a; 2013b). They also resonated with interventions identified in outbreak

management literature (Cartmill *et al*, 1994; Doshi *et al*, 2013; McCall and Smithson, 2002; Tseng *et al*, 2011). These interventions included restricting staff and visitor movement, isolating or cohorting symptomatic patients, equipment and environmental decontamination using chlorine-based disinfectants, and requiring that staff and visitors don disposable gloves and an apron when visiting affected patients. This was a positive finding, as it showed that the clinicians at the study site endeavoured to implement and perform stringent infection prevention and control practices in non-outbreak situations, as part of routine practice. Nevertheless, despite the fact that clinicians displayed good basic knowledge of the interventions that they were expected to perform, there were many incidences of observed and reported practice inconsistencies, including non-adherence to policy stipulations. Some of the multifaceted factors that were identified as contributing towards incidences of inconsistent practice and non-adherence to policy stipulations, are described below.

Findings suggest that differences in clinical roles and a lack of shared knowledge among staff meant that clinicians from different professional groups often prioritised, and were more aware of interventions that were directly related to their daily clinical tasks. Nurses and healthcare assistants usually tended to patients' daily care needs, whilst doctors focused on diagnostic and treatment plans which they documented in patient's medical notes. As such, only nurses and healthcare assistants identified patient personal hygiene, safe linen handling and environmental cleaning and decontamination, as infection prevention and control interventions to be performed. In contrast, only doctors identified cautious handling of medical notes when making use of them whilst seeing patients in isolation rooms. These differences specifically highlighted interventions also highlighted gaps in knowledge between professional groups and differing levels of situational awareness to potential infectious threats (Leonard *et al*, 2004). In order to address this problem of lapses in situational awareness, various commentators recommend that clinicians have shared mental models (Leonard *et al*, 2004; Robson, 2016; Rosenorn-Lanng, 2015). This concept is discussed in Chapter 8.

A lack of policy awareness among staff was also identified. This lack of awareness, coupled with the number of interventions that needed to be performed (many of which staff did not always consider), negatively impacted on overall compliance to policy stipulations and the performance of recommended interventions. Findings suggest that inconsistent practice was common in the AMU, as staff performed what they individually presumed to be best practice. Using the example of standard precautions, although the term was used in a number of infection prevention and control related hospital policies, only one nurse in the study actually used the term. When asked to explain what they understood about the term, it was clear that their understanding was not

the same as that portrayed in policy documents. In fact, based on observations of practice, it was observed that various members of staff did not adhere to the basics of hand hygiene and the wearing of gloves and gowns when attending to potentially infectious patients. This finding supports the view shared by Curran (2015b) that at present, in many health care settings, standard precautions are anything but standard. Curran (2015b) suggests that there is a need for healthcare workers to agree on what the standard should be so that common language is spoken. Once consensus is reached, there will then be a need to educate staff on agreed and expected standards, so that performed practice is uniform.

5.6 Chapter summary

This chapter has presented the findings of the study with regard to how AMU clinicians assessed the infective status of patients with symptoms of diarrhoea and vomiting and the interventions that they aspired to implement and perform, when infectious causes were suspected or confirmed. Findings suggest that despite being challenging, the process of assessing the infectious status of patients with symptoms of diarrhoea and vomiting was logical and fairly consistent among clinicians tasked with undertaking formal patient assessments. This was unlike the infection prevention and control related management of these patients, where many incidences of practice inconsistencies, including non-adherence to policy stipulations, were observed and reported. It was also identified that there was a lack of shared knowledge and policy awareness among staff. These issues were contributory factors affecting compliance to policy stipulations and the performance of recommended interventions. The next chapter will present the study's findings in relation to patients' experiences and understanding of care they received in the AMU, following incidences of suspected or confirmed infectious diarrhoea and/or vomiting.

Chapter 6 Findings 3: Patients' experiences and understanding of infection prevention and control related aspects of care in the AMU

6.1 Introduction

This chapter will present the findings of the study with regard to patients' experiences and understanding of the care that they received in the AMU, following incidences of suspected or confirmed infectious diarrhoea and/or vomiting. It will describe these findings and offer some analysis of patients' perspectives on infection prevention and control practices in the AMU, as well as how well AMU clinicians involved patients in infection prevention and control related aspects of care. It will specifically focus on the following topics: 'patient's general perception of care received in the AMU'; 'patient education on, and understanding of, infection prevention and control related aspects of care' and 'patient involvement in infection prevention and control related aspects of care.' Also in this chapter, resonances of the study's findings with relevant research literature are examined.

6.2 Findings

Patient interviews identified that patients' experiences and understanding of infection prevention and control related aspects of care in the AMU, were diverse and yet contained similar themes. Altogether, six patients were interviewed. These patients ranged from 56 to 86 years of age. The following is a description and analysis of patients' experiences and understanding of care received in the AMU, following incidences of suspected or confirmed infectious diarrhoea and/or vomiting.

6.2.1 Patients' general perception of care received in AMU

As a way of gaining an understanding of patients' overall experience of care in the AMU, general questions were asked, based on patient experience standards (NICE, 2012b; Appendix 9.3). These questions were not specific to infection prevention and control practices, but rather related to patients' general satisfaction with the care that they were receiving in the AMU and their perception of patient-clinician relations and interactions.

All interviewed patients described being satisfied with the care that they were receiving in the AMU. Patient satisfaction is used as an indicator of how well patients are treated; where 'how well' refers not only to the quality of care, but also patients' contentment with care/treatment received (Department of Health, 2009; Prakash, 2010; The Health Foundation, 2013b). In the present study, satisfaction was linked to various aspects of care, including clinicians' show of care and concern, good interpersonal skills, attitudes of service and willingness to answer questions.

It was reported that where concerns were raised with aspects of care, clinicians were responsive; that is, they tried to resolve matters or find solutions promptly. For example, one patient described not being happy with the unit's housekeeping, however he noted how responsive staff had been with regard to addressing the concern.

Patient 2: *The staff themselves I would say are brilliant, all of them, the nurses and the doctors and generally the cleaning staff too to be honest with you [laughs], as far as I can see - working assiduously all over the place. So from that point of view I'm happy with the medical care, put it that way. But I'm not too happy with the housekeeping.*

Researcher: *...in terms of the cleaning, do you feel like since you made the comment that the cleaning needed to be a bit better [...], have there been any improvements or what's your view on that at present?*

Patient 2: *I think within ten minutes of my making the comment, the cleaner was in here sorting the place out. So I think that's response with a capital R. [laughs]*

In relation to patient-clinician relations and interactions, most patients felt that clinicians displayed good communication skills. All interviewed patients described clinicians as supportive and understanding. Furthermore, all patients described not feeling embarrassed about talking to clinicians about their incidences of diarrhoea and/or vomiting. These positive experiences were attributed to clinicians' professionalism, approachability, respectful conduct, displays of empathy, friendliness, good sense of humour and patience. Clinician patience in this context was often linked to dealing with verbally abusive and challenging patients.

Patient 5: *...sometimes you get the odd one that really pushes the limit. Pushes their (nurse's) patience. And they've got to stay calm which I can imagine being really, really hard. Or sometimes they go out and somebody else comes in and deals with whichever situation. I couldn't deal with it. [laughs]. I know I couldn't.*

Nevertheless, negative experiences of patient-clinician relations and interactions were also described. These negative experiences were in relation to occasions when clinicians either did not speak with patients when delivering care, spoke sharply, trivialised discomfort, or did not allow patients enough time to ask questions and/or discuss care plans.

Patient 5: *But some nurses- I mean they don't even speak to you while they're doing anything. They just do what they got to do and out they go.*

And that's how I feel about doctors as well. And I know they're busy people and I appreciate that. It must be very difficult to have all the answers to everybody but they don't spend an awful lot of time. And I don't think they ask you what you think. Well I've never known a doctor to ask what you think.

Although patients reported overall satisfaction with the care that they were receiving, and described clinicians as supportive and understanding, both positive and negative experiences of patient-clinician relations and interactions were reported. With a specific focus on the negative experiences, the reasons behind clinicians' behaviours that were responsible for reported negative experiences were not investigated in the present study. Nevertheless, similar negative experiences were described by patients in a study by McCabe (2004) investigating nurse-patient communications. In their study, it was suggested that nurses' behaviours responsible for reported negative experiences were as a result of nurses being predominantly task-oriented in their approach to care.

6.2.2 Patient education on, and understanding of, diarrhoea and vomiting and related infection prevention and control measures

When asked about what information clinicians had given patients in relation to diarrhoea and vomiting and how to help prevent the spread of infection, four patients reported not receiving any information. In correlation with earlier findings that clinicians rarely gave patients or visitors leaflets relating to 'infection prevention and control' and 'diarrhoeal related infections', none of the patients mentioned ever being given an information leaflet.

Researcher: *...did anyone talk to you about how to help prevent the spread of diarrhoea and vomiting?*

Patient 1: *No, [pause] no.*

Researcher: *And what things did the doctors, nurses or healthcare assistants in the unit ask you to do in order to help prevent the spread of diarrhoea in the hospital?*

Patient 3: *Well I don't know how to prevent it. Just, you know, "Oh it is diarrhoea, therefore so you've got it. We've got to deal with it!" and that's it.*

Two patients mentioned being asked to stay in their isolation rooms and not use communal toilets as a way of not spreading infections. Of these two, one also mentioned hand hygiene and personal cleanliness, as infection prevention and control measures. The fact that only one patient (out of all six) mentioned hand hygiene was quite startling, as it was expected that all interviewed patients would have reported being advised to perform regular hand hygiene. This is because hand hygiene is a key infection prevention and control standard whose performance should be actively encouraged (Pittet *et al*, 2009). It was however noted through conversation, that neither patients understood how these measures - staying in isolation, hand hygiene, personal cleanliness and not using communal toilets - actually reduced the spread of infection. Furthermore, they exhibited a lack of understanding of what isolation care entailed. This particular lack of understanding was expressed in their reports of how they had asked various members of staff to leave their isolation room doors open. It also did not help matters when some members of staff obliged these requests, whilst others did not. This gave mixed messages and caused confusion about isolation care protocols.

Researcher: *What do you understand by isolation (care)?*

Patient 5: *I don't know. No windows! [laughs] I don't like that. I'm not used to sleeping with the door shut and I'm not used to not having windows. And in the night a couple of times, one of the nurses did let me have my door open a little bit, but one of the other nurses closed it. And I just assume I'm supposed to be staying away from other people. But I don't know what.. I have to put my hand up, I don't know what it means.*

With regard to non-adherence to isolation care protocols, three reasons were identified in the present study why patients wanted the isolation room doors left open. The main reason was the need to feel connected to the outside world. The isolation rooms in the AMU at the study site did not have windows facing outside the hospital building. Most had windows facing inside the unit and some had no windows at all. None of the rooms had hospital entertainment units or clocks within them. As such, some patients reported time disorientation, loss of connection to the outside world and boredom, leading to the brink of depression. According to some patients, having the door open, or at least a window that allowed observing what was happening in the

unit, served as the best alternative to maintaining some form of connection to the outside world. Another reason for wanting the door open, was poor ventilation in the room. Some patients described isolation rooms getting warm or not having any fresh air circulating within them. This therefore compelled patients to request that doors were kept open.

Patient 4: *And some of them (staff) - although some of them are saying, "Oh, we have to shut the door," others, like the doctor this morning, went out and left the door open and that's nice because you can feel a bit of fresh air coming in (because) it does get quite warm in here which makes it worse really.*

Finally, one patient who was paralysed and had limited function in one hand described wanting the door open so as to be able to call out for help, as they could not always reach the call buzzer.

It is worth noting at this point that in the present study, discussions around isolation care yielded similar positive and negative findings to those presented by Pacheco and Spyropoulos (2010) and Madeo and Boyack (2010) with regard to patients' experiences and understanding of isolation care. Isolation care negatively impacted on patients' psychological wellbeing. Patients described feelings of anxiety, abandonment, depression, loneliness and disconnection from the outside world. On the other hand, patients identified some positive implications of being in an isolation room, including having quick and easy access to their own toilet or commode, having privacy that alleviated embarrassment and being in an environment quieter than the general clinical area.

Overall, patient education on diarrhoea and vomiting and related infection prevention and control practices on the AMU, was sporadic and poor. This led to patient non-adherence to isolation protocols, as they either did not know them or fully understand the rationale behind them. Furthermore, the chances of non-adherence increased when isolation rooms had poor ventilation or patients had a great need to feel connected to the world; either for general psychological well-being or needing to get staff attention.

6.2.3 Patient involvement in infection prevention and control related aspects of care

Similar to patient education on, and understanding of, diarrhoea and vomiting and related infection prevention and control practices, patient involvement in infection prevention and control related aspects of care was equally sporadic and poor. At best, patient involvement in

infection prevention and control related aspects of care was instructional compliance. That is, patients did what they were told to do with little or no explanation why they should do it.

As described earlier, only one patient (out of six) talked about hand hygiene, after being asked what information clinicians had given them in relation to diarrhoea and vomiting. What is pertinent to this section about this patient's account, was their lack of appreciation about the importance of hand hygiene to themselves, as revealed by how they described not understanding why they had to adhere to this stipulation whilst in isolation care. Their account encapsulates how patient involvement in infection prevention and control related aspects of care was instructional compliance, with little or no understanding.

Researcher: And what information have you been given whilst in this unit about diarrhoea and vomiting?

Patient 4: Well, obviously I've got to stay in here. I'm not allowed to use the other toilets that the other patients are using. (I'm expected) to wash my hands and try and keep as clean as I can. That's all the theory, but it's not that easy when you're stuck on machines because I've only just come off of that one (the monitor) this morning. [...]

Basically, because I'm in here (in isolation) anyway - I mean, I do know about how to restrict the spread of sickness and diarrhoea - but because I'm in here anyway, I don't really have to worry about what's going on out there (I don't have to worry about how not washing my hands affects them), if you see what I mean - because I'm not out there.

A possible reason why patient understanding was poor can be found in another patient's description of how clinicians were generally good at "telling things", but not as good at explaining them. It was reported how some clinicians were not attentive to the need to explain things to patients, and nurses were described as more likely to offer an explanation as opposed to doctors.

Patient 2: ...they do come and tell you things. They don't explain it but they just tell you "We're going to do this. We want to have this test and that test," but they don't say why. Well, they do in a way but you don't understand why.

With a specific focus on patients with symptoms of diarrhoea and vomiting who needed rehydration and replacement of electrolytes, their involvement in, and compliance to, infection prevention and control related aspects of care was either difficult or impossible, as a result of intravenous lines and monitor cables. These lines and cables created physical barriers and

limitations to performing routine tasks such as hand hygiene. As some patients reported, sometimes clinicians forgot to consider patients' limitations, such as general tiredness due to ill-health or being connected to lines when encouraging them to perform routine tasks. The account by Patient 4 (previous page) evidences this oversight and is echoed in the following account:

Researcher: *So the saline drip you're connected to is making you feel restricted, is it?*

Patient 6: *Yes. I mean for example, I managed to get to that sink this morning but I could only rinse one hand and I'd had to go like this with the other to just give them a quick wash. And I'd only just managed to reach the sink.*

As patients did not receive sufficient information, education or guidance on infection prevention and control related aspects of their care, they were not in a position to be actively involved in these aspects of care or support others who sought guidance. Patients were instead, in some reported cases, perplexed observers of the way in which AMU staff sometimes carried out infection prevention and control measures in a confused and inconsistent way.

Patient 4: *And then the lady at lunchtime came in, put the tray down, and I said to her, "Can you leave the door ajar a little bit to let some fresh air in?" and she said, "Oh no, I'm not allowed to do that." And I thought, "Well, you've just walked in with the tray." [laughs] It was quite funny because then when they came in and picked the tray up, [laughs] the lady that picked the tray up said, "How am I supposed to do this?" She said, "I've got an apron and my gloves on, I've got to leave the apron and gloves in your room because they're not allowed to go out there. But I've got to put the tray on the trolley that's out there." So I said, "I don't know." [laughs] So it does get a bit silly, but that's no one's fault. [giggles] But it does make you laugh a little bit.*

Overall, AMU clinicians were not providing patients with adequate information, education or support, in relation to infection prevention and control related aspects of their care. Furthermore, some staff working in the AMU were themselves in need of education and support with regard to how to implement and perform infection prevention and control measures.

6.3 Comments on findings

Findings from the investigation into patients' experiences and understanding of care received in the AMU, following incidences of suspected or confirmed infectious diarrhoea and/or vomiting, suggest that clinician involvement of patients in infection prevention and control aspects of care was poor. Clinicians were not providing patients with adequate information, education or support with regard to infection prevention and control measures to follow in order to prevent the spread of infection to staff, visitors and other patients in the hospital. In so doing, clinicians were not empowering patients to be partners in infection prevention and control related aspects of care. In other words, patients were not empowered to work together with clinicians and contribute in performing and promoting infection prevention and control aspects of care. Furthermore, there was a lack of consistency among AMU staff with regard to the implementation and performance of infection prevention and control measures.

These findings resonated with the findings of Pacheco and Spyropoulos (2010) in their study that explored the isolation experience of *C. difficile* positive patients and their families. They found that there was a lack of consistency in information provided to patients and their families with regard to *C. difficile* and related isolation measures. Similarly, in their study exploring patient's perspectives on infection prevention and control, Wyer *et al* (2015) found that due to communication deficits between clinicians and patients, patients were largely unaware of the risks and preventative measures for healthcare associated infections, meaning that their capacity for contributing to infection prevention and control aspects of care was limited. Furthermore, all the patients in Wyer *et al*'s (2015) study noticed inconsistencies in clinician adherence to infection prevention and control practices, and Pacheco and Spyropoulos (2010) found that there was a lack of consistency with regard to staff implementation of isolation protocols.

In contrast however, unlike the patients in Madeo and Boyack's (2010) study, who described feeling embarrassed about talking to clinicians about their incidences of diarrhoea, patients in the present study described not feeling embarrassed about having such talks with clinicians. In fact, patient-clinician relations and interactions were described as largely positive and clinicians were described as being supportive and understanding. This finding demonstrates that patients and clinicians were engaging with each other with regard to talking about diarrhoea and vomiting, however the content and quality of conversations relating to associated infection prevention and control practices needed to be improved.

Overall, despite pushes for patient engagement in infection prevention and control (The Health Foundation, 2013a; World Health Organization, 2009, 2011), the present study demonstrates that much work still needs to be done with regard to involving patients in this aspect of care. For this improvement to be achieved, Wyer *et al* (2015) suggest that clinicians start to consider patients as active contributors to infection prevention and control, not just passive recipients of care. This should begin with offering patients adequate information, education and support in relation to infection prevention and control related aspects of their care. Furthermore, for support to be effective, clinicians need to pay attention to patients' feedback in relation to physical and psychological challenges to engaging in infection prevention and control activity. Such feedback may broaden clinicians' understandings of patients' infection prevention and control related risks and behaviours and can also assist clinicians to support appropriate patient self-care behaviour (Madeo and Boyack, 2010; Wyer *et al*, 2015).

6.4 Chapter summary

This chapter has presented the findings of the study with regard to patients' experiences and understanding of the care they received in the AMU, following incidences of suspected or confirmed infectious diarrhoea and/or vomiting. Findings suggest that clinician involvement of patients in infection prevention and control related aspects of care was poor. Despite pushes for patient engagement in infection prevention and control related aspects of care, clinicians were not empowering patients to be partners and contributors in this aspect of care. As a result, patient's understanding of infection prevention and control protocols was poor. Furthermore, their ability to support others who sought guidance was limited. The next chapter will present the study's findings in relation to the factors that were identified as affecting the infectious status assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU.

Chapter 7 Findings 4: The factors that affected the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU

7.1 Introduction

This chapter will present the findings of the study with regard to the factors that were identified as affecting the infectious status assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU. It will begin by describing the process through which the themes of the findings that are presented in this section were derived. This will be followed by a description and some analysis of the factors that were identified as affecting the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU. Also in this chapter, resonances of the study's findings with relevant research and expert opinion literature are examined.

7.2 How the themes of the findings presented in this chapter were developed

This section will briefly describe the process followed in developing the themes of the factors identified as affecting the infectious status assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU. This description is offered here because a different framework matrix was used as compared to the one described in Chapter 3 (section 3.6.4). To help the reader appreciate the breadth of the findings presented in this chapter, a detailed account is presented in Appendix 18.

To begin with, the factors that were identified as either promoting or inhibiting clinician ability to effectively assess the infective status of patients with symptoms of diarrhoea and vomiting were respectively collated into two tables. One table contained promoting factors, the other contained inhibiting factors. Within these respective tables, three broad categories were formulated, under which related factors could be grouped and analysed. These broad categories were (1) system and

organisational factors (including culture), (2) factors relating to the physical environment and the equipment/resources within that environment and (3) factors to do with teamwork and being human. Having accomplished this task, steps were then taken to group the factors contained within respective tables into themes that could be easily described. Subsequently, 12 themes were identified that encompassed the factors that were observed and reported as promoting effective patient assessments, and 14 were identified that encompassed the factors that were observed and reported as inhibiting effective patient assessments. These themes were collated into a table for the purpose of comparison and amalgamation. This process yielded 18 overarching themes of the factors identified as affecting the infective status assessment of patients with symptoms of diarrhoea and vomiting. These themes are presented below (Table 23).

1. The quality of a patient referral from the emergency department or community doctor
2. The diarrhoea and vomiting assessment tool
3. Support and prompts from senior (or expert) colleagues
4. Second opinions from members of the multidisciplinary team
5. The cognitive state of patients and their willingness and ability to communicate essential information
6. Access to pertinent patient medical information
7. The presence of a prime cause of diarrhoea and how well clinicians knew the patient
8. The quality of patient monitoring (adequately completed, versus absent or incomplete assessment patient charts/records)
9. When the patient is being cared for in an isolation room
10. Deficiencies in the history that was taken
11. Different definitions and understanding of the term 'diarrhoea'
12. Not having enough resources to aid the assessment process
13. Competing workload priorities and constant interruption
14. Time wasted looking for resources to help perform assessments
15. Waiting for the next episode (misunderstanding policy guidelines)
16. Subcultures and subordinate cultures (some clinicians not feeling able to communicate or challenge initial diagnosis impressions/suggestions)
17. Poor communication between staff, regarding the need for an assessment
18. Timely performance of essential tests assessment investigations

Table 23: The factors affecting the infective status assessment of patients with symptoms of diarrhoea and/or vomiting in the AMU

A similar process of grouping, analysing and amalgamation was applied to the factors that were identified as either promoting or inhibiting clinician ability to successfully implement and/or

perform infection prevention and control interventions in the AMU. This process yielded 21 overarching themes of the factors identified as affecting the implementation and performance of infection prevention and control interventions in the AMU with respect to the care of patients with symptoms of diarrhoea and vomiting. These themes are presented below (Table 24).

1. The quality of a patient referral from the emergency department or community doctor
2. Communication between staff, regarding diagnosis and recommended precautions
3. Support and prompts from senior (or expert) colleagues
4. Unit layout and design (including the design of isolation rooms)
5. Availability and access to essential physical resources (including human resources)
6. Availability and location of essential equipment and assistive resources
7. The fear of catching an infection
8. Reflection in/on practice and being organised when delivering care
9. Reminders - Refresher sessions and education boards
10. Visual cues and posters (including door signs and the door itself)
11. The cognitive state of patients and their willingness and ability to perform interventions
12. Potentially infectious patients being cared for in bays and areas accessible to the public
13. Deficiencies in admission/initial assessment
14. Guidelines and protocols not readily accessible
15. Poor staff training and awareness or understanding of policy
16. Unclear or mixed guidance regarding scenarios/situations not addressed in guidelines
17. Competing workload priorities and constant interruption (cutting corners to save time)
18. Prioritising patient acuity over infection prevention and control interventions
19. Not actively involving patients in infection prevention and control related aspects of care
20. Relatives not adhering to recommended precautions
21. Broken clinical and mounted equipment inhibiting best practice

Table 24: The factors affecting the infection prevention and control management of patients with symptoms of diarrhoea and/or vomiting in the AMU

The respective overarching themes of the factors affecting patient assessment practice and those affecting the implementation and performance of infection prevention and control interventions, were then collated into a table for final comparison and amalgamation. This process yielded 13 broad themes of factors identified as affecting infection prevention and control practice in the AMU, with respect to the assessment and management of patients with symptoms of diarrhoea and vomiting. Table 25 (next two pages) shows this collation.

Factors that promote or inhibit effective patient assessments	Factors that promote or inhibit successful implementation and performance of infection prevention and control interventions
Quality and effectiveness of history taking	
<ul style="list-style-type: none"> The quality of a patient referral from the emergency department or community doctor Deficiencies in the history that was taken The diarrhoea and vomiting assessment tool 	<ul style="list-style-type: none"> The quality of a patient referral from the emergency department or community doctor Deficiencies in admission/initial assessment
Cues and reminders in the clinical environment	
	<ul style="list-style-type: none"> Visual cues and posters (including door posters and the door itself)
Beliefs, values and attitudes	
<ul style="list-style-type: none"> The presence of a prime cause of diarrhoea and how well clinicians knew the patient Different definitions and understanding of the term 'diarrhoea' 	<ul style="list-style-type: none"> The fear of catching an infection Prioritising patient acuity over infection prevention and control interventions
Staff knowledge, training and education	
<ul style="list-style-type: none"> Waiting for the next episode (misunderstanding policy guidelines) 	<ul style="list-style-type: none"> Poor staff training and awareness or understanding of policy Unclear or mixed guidance regarding scenarios/situations not addressed in guidelines Reminders - Refresher sessions and education boards
Time pressures, competing priorities, interruptions and cognitive workloads	
<ul style="list-style-type: none"> Competing workload priorities and constant interruption 	<ul style="list-style-type: none"> Competing workload priorities and constant interruption (cutting corners to save time) Reflection in/on practice and being organised when delivering care
Systems, culture(s) teamwork and communication	
<ul style="list-style-type: none"> Poor communication between staff regarding the need for an assessment Subcultures and subordinate cultures (some clinicians not feeling able to communicate or challenge initial diagnosis impressions/suggestions) Timely performance of essential assessment tests and investigations 	<ul style="list-style-type: none"> Communication between staff regarding diagnosis and recommended precautions

Senior, expert and multidisciplinary team support and prompts	
<ul style="list-style-type: none"> Support and prompts from senior (or expert) colleagues Second opinions from members of the multidisciplinary team 	<ul style="list-style-type: none"> Support and prompts from senior (or expert) colleagues
Availability and access to essential information, equipment and resources	
<ul style="list-style-type: none"> Access to pertinent patient medical information Not having enough resources to aid the assessment process Time wasted looking for resources to help perform assessments 	<ul style="list-style-type: none"> Availability and access to essential physical resources (including human resources) Broken clinical equipment inhibiting best practice - 1/2 Availability and location of essential equipment and assistive resources Guidelines and protocols not readily accessible
Unit and isolation room design and layout (including placement of clinical items)	
	<ul style="list-style-type: none"> Unit layout and design (including design of isolation rooms) Broken mounted equipment inhibiting best practice - 2/2
Patient location during inpatient admission	
<ul style="list-style-type: none"> When the patient is being cared for in an isolation room 	<ul style="list-style-type: none"> Potentially infectious patients being cared for in bays and areas accessible to the public
The cognitive state of patients and their willingness and ability to engage with staff and the care process	
<ul style="list-style-type: none"> The cognitive state of patients and their willingness and ability to communicate essential information 	<ul style="list-style-type: none"> The cognitive state of patients and their willingness and ability to perform interventions
Patient and visitor engagement and involvement in infection prevention and control practices	
	<ul style="list-style-type: none"> Not actively involving patients in infection prevention and control related aspects of care Relatives not adhering to recommended precautions
Quality and effectiveness of patient monitoring	
<ul style="list-style-type: none"> The quality of patient monitoring (adequately completed versus absent or incomplete assessment patient charts/records) 	

Table 25: A collation of the themes of factors identified as affecting infection prevention and control practice in the AMU with respect to the care of patients with symptoms of diarrhoea and vomiting

7.3 The factors identified as affecting diarrhoea and vomiting related infection prevention and control practice in the AMU

The following is a description of the factors that were identified as affecting infection prevention and control practice in the AMU with respect to the assessment and management of patients with symptoms of diarrhoea and vomiting. Due to the intertwined nature of some of these factors to each other and to preceding findings, some similar themes will be presented under different descriptors in order to offer faithful descriptions of identified factors. The photographs presented in this section are presented with respect to the context in which the clinicians who took them, described what they portrayed to them.

7.3.1 Quality and effectiveness of history taking

Clinicians identified a number of quality and effectiveness related factors to do with history taking and associated processes that affected effective patient assessments and subsequent implementation of infection prevention and control interventions. Quality in this context was to do with the breadth and depth of the history taken, and effectiveness was to do with how successful at providing useful information the history taking process was.

The quality of a patient's referral

To begin with, the quality of a patient's referral from the emergency department or community doctor was identified as crucial in the history taking process. This was because the referral typically outlined the patient's relevant medical history and their pertinent medical complaint, which the referrer believed needed to be addressed in the AMU. Clinicians identified how a good referral enabled the AMU team to prepare for the patient's arrival by allocating them an isolation room if infectious symptoms were suspected. Of equal importance to a good referral, was good information transfer from the referrer to the AMU team. In this context, information transfer was usually both oral (via telephone) and written (via a letter or formal history taking form). A good referral included information on past medical history, when current symptoms began, and any relevant information to either support or disprove suspicions relating to the infectious status of a patient's symptoms of diarrhoea and/or vomiting. The extract below shows an example of a community doctor's referral.

Medical notes of Patient 5: [...] Unwell for past 48hrs with rigors, abdo pain, back pain and vomiting. Her catheter has been leaking on and off over the past 3 weeks since it was last changed. She started co-amoxiclav from home yesterday but has been much worse overnight. [...] Likely urosepsis.

Such pre-hospitalisation and/or pre-AMU admission information was particularly valuable when the patient being transferred into the unit was not able to provide an adequate history for whatever reason; usually due to cognitive impairment.

Thoroughness of patient assessment and clerking

After receiving the patient in to AMU, clerking was then undertaken by doctors whilst nurses undertook an admission assessment. Both activities involved taking a patient's history; albeit in varying depth. Clinicians described a number of factors that contributed to incidences of taking a deficient history at this stage. These included clinicians not asking the right questions; clinicians being shy to ask personal questions; patients misunderstanding questions or giving different answers to different clinicians and patients being embarrassed to answer certain personal questions and/or providing misleading information.

Doctor 2: *Maybe they (the referring clinicians) didn't take a thorough history. But also sometimes patients tell histories differently. It's nothing against them, but sometimes it's really embarrassing when you take a history from a patient and it's all beautiful and then your consultant goes and takes a history from the patient and (it's different).*

Sometimes you know you might not have taken a proper history and you might not have asked the right questions, but sometimes the patients change their answers! And sometimes I don't know whether in retrospect they might remember it differently? I'm not quite (sure) – I don't know. But sometimes you get a little bit of – well, they say what they think is important to you and don't say what they don't think is important to you unless you ask. And some people might not ask.

Deficiencies in admission assessments and clerking, negatively impacted on overall patient assessment and sometimes resulted in delays or failures in implementing appropriate infection prevention and control interventions. Delays and failures usually occurred when clues indicative of potential infection were missed, or pertinent information was not obtained.

The diarrhoea and vomiting assessment tool

As an aid to promoting an effective assessment and the history taking process, clinicians identified the hospital's diarrhoea and vomiting assessment tool as a useful resource, when assessing the infective status of patients with symptoms of diarrhoea and vomiting. For junior clinicians in particular, the tool was seen as a robust checklist that prompted them to ask patients key questions that they might not remember to ask. Senior clinicians on the other hand, viewed it more as an aide memoire.

Nurse 1:

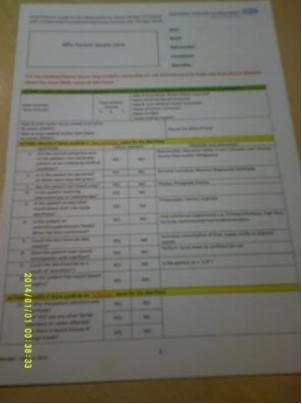
	<p>Title: <i>Isolation Pro Forma</i></p> <p>Written comment: <i>The isolation pro forma helps to risk assess patients who have diarrhoea and vomiting and identify those with infective diarrhoea.</i></p>
--	--

Figure 20: Assessment tool for diarrhoea and vomiting

The questions in the tool helped in enriching the quality and effectiveness of the history taking process, as they covered a broad range of topics in good depth. When completed correctly, the information obtained from the use of the tool, allowed for a well-informed patient assessment. If criteria for potentially infectious symptoms were met, the algorithm within the tool also prompted the implementation of specific infection prevention and control interventions.

7.3.2 Cues and reminders in the clinical environment

The AMU clinical environment was often busy with numerous tasks for staff to perform. This meant that staff often got engrossed in tasks, and sometimes forgot to adhere to recommended precautions. It was also observed that staff were often not available to instruct visitors on recommended precautions to follow when they came to visit patients who were in isolation care. On these occasions, visual cues and reminders in the clinical environment - especially on isolation room doors - played an important role in prompting, reminding and instructing staff, patients and visitors on what precautions to follow.

These cues and reminders included isolation care posters, the isolation room itself and the physical barrier of a door.

Observations of practice, 1st December:

- 14:10 -

A consultant and an accompanying doctor (who is holding a set of notes) come to undertake a review on the patient in side room 2. On arrival to the patient's side room door, the consultant notices the green door sign and asks the nursing staff close by, whether the patient has diarrhoea and vomiting. The nursing staff reply, "Yes, she has."

Whilst outside the side room, the consultant then puts on gloves and an apron before entering the room.

Nevertheless, these cues and reminders were only effective when they were used correctly, noticed and understood. With regard to correct use, the rooms and doors only served their purpose when doors were actually closed and posters were useful if they communicated accurate information. With regard to posters, the hospital had four different coloured isolation care posters, which presented different instructions and precautions to follow. If the wrong set of instructions were displayed on the door, inadequate precautions were likely to be taken.

Nurse 2:

	<p>Title: Isolation care signs</p> <p>Verbal (dictated) comment: These patient signs make it easier for me to look after patients in side rooms with D and V because if I come onto the ward and I don't have a handover I don't know why a patient is isolated unless they've got an isolation care sign on the side room door. But then I guess it could be negative if it's not been done properly.</p>
---	--

Figure 21: Isolation care sign (misleading if the wrong sign is displayed)

With regard to being noticed, posters had to be seen in order to be read, and there had to be a conscious awareness of isolation rooms and doors, so that people did not just walk in and out of rooms, as was often observed when doors were left open. With regard to being understood, posters needed to be read in order for people to know what needed to be done. Nevertheless, these posters assumed that the reader had a basic understanding of the English language and

could read and follow instructions. This assumption was however not always a correct one, as according to government statistics, around 15 per cent, or 5.1 million adults in England can be described as 'functionally illiterate' (Department for Business, Innovation and Skills, 2012, p34).

With a specific focus on isolation rooms, significant breaches to recommended infection prevention and control precautions often occurred as a result of cues and reminders being either incorrectly used, unnoticed, or misunderstood. The following extract from field notes, shows how one clinician's error in leaving a door open, gave way to incidences of isolation precautions not being followed. The extract also shows staff not washing their hands with soap and water, as advised on the displayed door poster, likely because the poster was not read.

Observations of practice, 2nd January:

- 10:05 -

The medical student exits the side room closing the room door behind her. She removes her gloves and apron outside the side room and goes off to search for something. She returns to the side room with some tape, opens the door, and hands over the tape to the medical assistant inside the room. She then walks away leaving the side room door partially opened.

I observe as the medical assistant finishes the blood taking procedure, take off his gloves and apron, and exit the room without washing his hands. As he is about to close the door behind him, the patient asks him to leave the door open. The medical assistant then explains that the door needs to be closed for infection control purposes, to which the patient informs him that the door had been left open before. The medical assistant then decides to leave the door open, as per patient request.

10:10 - The patient's buzzer starts ringing.

- 10:12 -

An Agency HCA responds to the buzzer. He peeps through the side room door and asks the patient how he can help. The patient responds by requesting a urine bottle. The HCA walks off to the sluice and returns with a bottle. He puts on a pair of gloves (no apron) and walks into the room to give the patient the bottle. Before leaving the room, the HCA closes the curtains, takes off his gloves and disposes of them inside the room. He exits the side room without closing the door. [My initial reaction to this, is disbelief at the fact that the HCA does not think to close the door for privacy and dignity reasons].

7.3.3 Beliefs, values and attitudes

Clinician and patient beliefs, values and attitudes, both positively and negatively affected infectious status assessment practice and the implementation and performance of infection prevention and control interventions. For example, individual beliefs regarding what the term 'diarrhoea' meant led to variations in practice and sometimes, departure from recommended practice. With regard to values, greater value was placed on activities related to responding to medical emergencies and patient reviews. With regard to attitudes, individual dispositions led to variations with regard to how clinicians treated patients with conditions that predisposed them to diarrhoea. Corporate values also affected infection prevention and control related practice. For example, the hosting hospital described its core values as putting patients first, working together and always improving. The value of 'putting patients first' was described in the context of valuing patient safety; that is, focusing on improving safety and eliminating harm. As such, and as earlier highlighted, great value was placed on activities related to responding to medical emergencies and patient reviews. The following were some of the factors identified under the broad theme of beliefs, values and attitudes.

The fear of catching an infection

Some clinicians described how the fear of catching an infection prompted them to perform aspired infection prevention and control interventions. This fear was linked to their own susceptibility of catching infections.

Doctor 1: *Definitely if I think that they do have D&V, I'll come to them with apron and gloves on because I really don't want to catch it.*

Researcher: *Is it something that really bothers you..?*

Doctor 1: *What? Catching D&V?*

Researcher: *Yes.*

Doctor 1: *I seem to get it a lot. Like, I wash my hands far more than most of my colleagues. [pause]. I just have a really terrible immune system. And I don't want to spend days off not being able to work because I've got D&V or any other infectious disease that I can't come to work for. So yeah, it does bother me from that respect.*

Some clinicians also described a sense of concern about catching an infection and having to be off work. This concern was linked to staffing and the experience of having an increased workload

when other colleagues did not attend work, due to sickness. These clinicians therefore did not want to catch an infection, as they would end up being off sick themselves, resulting in an increased workload for their colleagues.

Prioritising patient acuity over infection prevention and control interventions

On many occasions and in various ways, clinicians described how activities related to responding to medical emergencies and patient reviews, were often prioritised over many other clinical duties and tasks. In other words, patient safety activities in the context of patient reviews and responding to medical emergencies, often took precedence over activities such as assessing the causes of patients' symptoms of diarrhoea and vomiting and/or the performance of some infection prevention and control interventions.

Nurse 3: Sometimes it feels like even with the medical team and even the nursing team as well, diarrhoea and vomiting is something that is not really taken as serious sometimes as it really should be. Sometimes getting a review on a patient that's simply... like people say, "simply having diarrhoea or vomiting," (when) there's this many to be clerked, and there's this many to be reviewed – it seems like diarrhoea and vomiting is something that you put down the line (list).

Doctor 1: So if you've got somebody who's really, really sick and somebody comes up to you and is like, "This patient has just had an episode of loose stools, can you come and assess them?" and I'm like, "Well, actually I know infection's bad and we don't want to spread it, but my sick patient is going to take priority over this!" and then people get really upset that you're not immediately jumping up and down and isolating someone. So that's a problem as well. Maybe (there is a need for) education around the fact that although D&V is important, (ensuring a patent, patient) airway is slightly more important than that.

Anecdotally speaking, it was difficult to consider infection prevention and control interventions when a medical emergency was taking place. During observations of practice, a medical emergency involving a patient with symptoms of diarrhoea took place. The following is an extract describing what happened.

Observations of practice, 29 December:

- 13:25 -

I am sat at the nurses station not really paying attention to what is going on in 'side room 9' when I suddenly hear HCA F2 calling out my name with urgency, asking me to come into the

side room with her. I am startled as I try to figure out why she is calling me with such urgency. At a quick glance I notice her quickly putting on gloves and going into the side room without a yellow apron. I stand up from behind the nurses' station and peek into the side room and notice that the patient is fitting whilst lying across the bed with his head pushing against the bed rails. As I deem this to be an emergency situation (especially because of the position of the patients head), I rush into the side room (no gloves or apron) and quickly support the patient's head whilst lowering the bed rails. Assessing his position on the bed and noticing that the patient is having a full body seizure, I tell HCA F2 to pull the emergency buzzer so that extra staff can come into the side room to assist us.

HCA F2 pulls the emergency buzzer and within a short space of time other members of staff within the unit make their way into the side room quickly putting on gloves but not aprons.... As soon as there are a good number of staff in the room, we reposition the patient so that he is lying correctly on the bed and we put on him a non-rebreathe mask delivering 15 litres of oxygen. I then remove the head board of the bed so that I can perform the 'head tilt, chin lift' manoeuvre to help maintain the patient's airway. At this point, the patient has stopped visibly fitting. As I look around the room, I notice that someone has brought the resuscitation trolley into the room. The doctor in the room begins to ask me and the other staff in the room questions about the patient, trying to find out if the patient is a known epileptic and how long his current fitting episode had lasted for.

As described in the extract above, the urgency of the situation required that staff work quickly to minimise patient physical harm and maintain the patient's airway. None of the staff involved could afford to wear the full recommended personal protective equipment. Furthermore, the resuscitation trolley (housing equipment required for a medical emergency) was brought straight into the room and some kit was used from the trolley, to help maintain the patient's airway. In this instance, patient safety took precedence over precautions, as there was no time to only pick the equipment that was needed from the trolley in order for it to remain outside the room. With regard to research etiquette, study protocol was followed by assuming a clinical role, until patient safety was ensured.

Different definitions and understanding of the term 'diarrhoea'

Differing individual definitions and understanding of the term 'diarrhoea' were identified as inhibiting effective patient assessments and timely implementation of infection prevention and

control measures. This is because what the hospital defined as diarrhoea, some clinicians and patients saw as 'normal' stool.

It is important to highlight here, that the problem of differing definitions of what is seen as diarrhoea, is a long standing issue in healthcare, as reflected in existing literature where many different definitions have been suggested over the years (NICE, 2013b). To this end, the British Society of Gastroenterology defines diarrhoea as 'the abnormal passage of loose or liquid stools more than 3 times daily and/or a volume of stool greater than 200 g/day' (Thomas *et al*, 2003). This is the widely accepted definition quoted in existing guidelines. Nevertheless, despite its wide acceptance in guidelines, its translation for use in clinical practice is challenging, due to the fact that clinicians and patients have different understandings of the term 'loose or liquid stools'. In an attempt to resolve this problem, resources such as the Department of Health's (2008) guide on the management of *C. difficile* refer to visual tools and define 'loose or liquid stools' as Type 5 to 7 stools as per Bristol Stool Chart (Lewis and Heaton, 1997). It was this visually-based guidance that was also in use in the hosting hospital at the time of the study.

Extract from the hosting hospital's diarrhoea and vomiting policy:-

'Diarrhoea is an increased frequency and increased fluidity of faeces. Descriptions of diarrhoea can vary from person to person, based on what is normal for them. The Bristol Stool Chart is used to identify both normal and altered stool patterns. In accordance with this chart, stool types 5 to 7 are indicative of diarrhoea.'

Diarrhoea is defined as: *Either as stool loose enough to take the shape of a container used to sample it or as Bristol Stool Chart types 5 – 7.'*

As described below, clinicians generally viewed the Bristol Stool Chart as a useful tool in helping them identify diarrhoea, as defined in the hosting hospital's policy.

Nurse 1:

	<p>Title: Bristol Stool Chart</p> <p>Written comment: Allows staff (nurses, HCA's, etc) identify what diarrhoea actually is.</p>
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Figure 22: Bristol Stool Chart (useful tool in helping to identify diarrhoea)

Nevertheless, despite the use of this tool in the local AMU, many AMU staff and patients did not see Type 5 stools as diarrhoea and as such, incidences of Type 5 stools were not always reported or investigated. On the occasions when they were investigated, delays in beginning investigations were usually experienced as a result of delayed reporting; a delay that was often linked to a failure in acknowledging that Type 5 stools were indeed, diarrhoea.

The presence of a prime cause of diarrhoea

This factor produced stark contrasts between clinicians. A majority of clinicians reported how it was difficult for them to determine whether a patient's cause of diarrhoea was likely to be infectious or not, if the patient had a prime cause for diarrhoea. A few however, reported how it was easier for them to determine the likely infective status, if the patient had a prime cause for diarrhoea. Prime causes of diarrhoea were described in scenarios where patients either had medical conditions that predisposed them to having diarrhoea, for example, ulcerative colitis, or they had undergone procedures that could cause diarrhoea.

Although the general approach to assessment was to treat all diarrhoeal presentations as potentially infective (that is, to err on the side of caution), some clinicians described medical conditions such as Crohn's disease, ulcerative colitis and irritable bowel disease as indicative of non-infectious diarrhoea.

***Nurse 2:** If I'm confident that somebody's got a condition that causes them to have chronic diarrhoea, I don't see the point in isolating them.*

In contrast however, a majority of clinicians expressed how difficult it was for them to determine whether a patient's incidence of increased frequency of diarrhoea was due to an infection or a 'flare-up' of their condition. Some senior clinicians that were interviewed, reported placing such patients in isolation rooms until either their stool specimen results returned negative, or reviewing doctors had concluded that the patient's symptoms were due to a 'flare-up' of their condition.

***Nurse 4:** Like, (for) example, coming to us, we don't know if that is infective (diarrhoea or not) unless we send the stool sample (especially) because (having diarrhoea) is their normal pattern...*

Doctor 2: ...stool cultures were sent which I knew weren't going to be positive, but had to be done to rule out infective cause. And even if he had (exacerbation of) Crohn's, it could well have been infection overlying it, so he had to be side-roomed first, until proven non-infective.

In instances where in-patients suddenly developed symptoms of diarrhoea, it was observed that clinicians unwittingly reported finding it easier to arrive at a decision regarding a patient's infectious status, if they had cared for them over a period of time and knew them well. For example, clinicians would suspect infectious diarrhoea caused by *C. difficile* if an in-patient suddenly developed diarrhoea after commencing or finishing a course of antibiotics. Conversely, clinicians would suspect non-infectious causes of diarrhoea, if an in-patient developed diarrhoea after having a gastroscopy (upper gastrointestinal endoscopy), or a colonoscopy (lower gastrointestinal endoscopy).

7.3.4 Staff knowledge, training and education

The study identified many issues to do with poor staff training in relation to infection prevention and control practices, and a lack of awareness and/or understanding of policy relating to diarrhoea and vomiting. In fact, ten clinicians who were asked whether they had ever read the hospital's diarrhoea and vomiting policy, reported that they had never been asked to do so and only one reported having read small portions of it, out of personal interest. With a specific focus on knowledge, many clinicians reported not knowing some of the processes and procedures to be followed when dealing with patients with symptoms of diarrhoea and vomiting. For example, what cleaning agent to use when decontaminating equipment used on symptomatic patients, and what isolation care processes and procedures to follow, with regard to the correct use of personal protective equipment and the transportation of infectious waste. With a specific focus on training and education, there were reports of mixed messages/guidance being received from various sources on what clinicians were expected to do. These mixed messages from multiple sources were causing confusion, leading to individual staff doing what they thought to be best practice.

Healthcare assistant 4: ...No one has a clue, because someone came out of the side room with their gloves and apron on and I was like, "You should take that off before you come out!" and she was like, "No, no because I haven't touched anything!" and someone had told her that that was okay.

So everyone is – no one really has a clue what's going on, I don't think. We all think we do, until we all start saying different things and then it's just a bit like... [pause]
I think all Infection Control (personnel), everyone! needs to have a meeting and agree on what they're telling us because it is ridiculous. It is ridiculous. I just do what I think is better. But then if you see (someone from) Infection Control on the ward you think, "Crap, what should I be doing then?"

Training and education on the use of essential tools

The study identified that training and education on the use of essential tools such as the stool and vomiting chart, the diarrhoea and vomiting assessment tool and the isolation risk assessment tool, were needed. Notable confusion was observed among nurses with regard to how to use the hospital's diarrhoea and vomiting assessment tool. This was because there were two sections within the tool, one to be filled in by nurses and the other by doctors. Respective sections helped nurses and doctors determine whether or not to treat patients as potentially infectious. According to a guidance note at the end of the tool, a doctor's review was not mandatory to determine whether or not patients required isolation care; meaning that nurses' reviews, using the tool, were sufficient to prompt the request for isolation care for patients who met the criteria. Nevertheless, some AMU nurse coordinators and bed managers were reported as requiring that the doctors' section be also filled in, before they would accept nurses' requests for patients to be placed into isolation care.

Nurse 4: ...we were told before (that) before you isolate [...] (ask for a) review first, and then after the doctor reviews the patient, they will decide whether (they are) for isolation or not. I don't know if there's a guideline for that, but I know that's been happening with us...

Waiting for the next episode (misunderstanding of policy)

A number of incidences were reported, where delays in assessing patients with symptoms of diarrhoea and instigating infection prevention and control interventions were experienced as a result of senior clinicians waiting for patients to have more than one episode of diarrhoea. Nurses and healthcare assistants in particular, reported how they found it difficult to undertake or instigate an effective patient assessment, because senior nurses managing the shift regularly disregarded patients' first/initial incidences of diarrhoea. It was reported that these senior nurses

rationalised that these first incidences were likely 'one off' occurrences and as such, encouraged junior colleagues to wait for the next episode before commencing a formal assessment.

Healthcare assistant 4: *If (patients) have an episode, (they should be isolated) within two hours. But then half the time they (the senior nurses) are like, "Well, this is only the first episode so we'll see if they have another episode." - which could be two and a half hours later. And then you've got to wait another two hours. So that's a load of rubbish...*

Although this was not a policy stipulation, what actually hindered an effective assessment in such cases, was the belief that some senior nurses' had, that sending off a stool specimen to the laboratory, meant that they also had to 'immediately' place affected patients into isolation care. As such, at times when isolation rooms were in demand, some senior nurses often disregarded the first episode of patients' incidences of diarrhoea, in the hope that there would not be subsequent episodes which would require a stool specimen to be sent off to the laboratory and thus, the 'immediate' placement of affected patients into an isolation room.

This action was an error in practice and a breach of policy, catalysed by a misunderstanding of policy, regarding the isolation of affected patients. The policy stipulated that stool specimens of affected patients should be collected and sent off to the laboratory as soon as possible. The secondary stipulation then stated that either before or after the collection of these specimens, clinicians were required to 'initiate' the process of placing affected patients into isolation care. Notice here that the stipulation was not to 'immediately' place patients into isolation care. There was in fact, a two-hour window allowed between the occurrence of the first episode of diarrhoea and the actual placement of affected patients into isolation rooms. A secondary problem of delays in escalation of concerns as a result of clinicians waiting for the next episode was also identified. The extract below describes this problem.

Doctor 3: *But they're often the patients that you get asked about in the middle of the night saying, "Doctor, did you know this patient has had diarrhoea three times today?" "No, I had no idea because no one's told me-" because you can't ask the patient themselves. And then the first time it happens someone sorts it all out and doesn't say anything to you because it's just a 'one off'. And the second time it happens someone says "Oh, that's a bit odd, it's happened twice. Now, I'll mention it to the nurse." And the nurse goes, "Oh, did it really? Has it happened again?" And eventually after four or five times it filters up through the Chinese whispers and I hear about it.*

These incidences of delays in escalating concerns, not only impeded infectious status assessments, but they also risked patient safety if problems relating to dehydration were not identified and dealt with in a timely manner.

Rejected stool specimens

Although the focus of the study was on how assessments were made in the absence of stool microbiology results, the inhibiting factor of the laboratory rejecting stool specimens was quite important. Clinicians reported how specimens were usually rejected for two main reasons, either the test request card did not contain sufficient details to justify the requested test, or the specimen did not contain sufficient loose stool to run the requested test. Both reasons reflected poor staff training on how to complete request cards and how to collect specimens.

***Doctor 1:** I've known some of the stool samples that have been sent off have been too small, and they've only been a tiny bit because they've been like, "I couldn't spoon it in!" which makes my life more difficult when the lab goes, "Sample rejected."*

Whatever the reason, a rejected specimen inhibited an effective assessment, as all infectious diarrhoeal conditions required laboratory confirmation of the causative organism. The knowledge of the causative organism in turn, affected the patient's management and treatment plan.

Reminders, refresher sessions and education boards

Refresher sessions and education boards were identified as potential solutions to the problem of poor staff training, education and policy knowledge. At the time of undertaking the study, refresher sessions were being offered by the infection prevention team, whilst the education boards were maintained and updated by designated AMU nursing staff. The sessions and boards were seen as providing helpful reminders of best practice. The sessions also provided forums where questions could be asked.

***Nurse 1:** When they had those sessions, having the boards and going through them... like a focus week. I thought they were quite helpful. I thought they made you kind of like focus on stuff. And it's like a reminder because I didn't think I would be like that. I didn't think I would forget stuff, but I think you do! Because you're so, it's just so busy and like you kind of forget these little things. And I think these little focus weeks of infection control... well, for me*

personally, they kind of reminded me. They jogged my brain. I was like, I should, I need to be doing this properly. Yeah.

Observations of practice, 3 March

- 17:10 -

Whilst walking through the corridor to the staff room I notice the updated 'Infection Prevention' notice board:

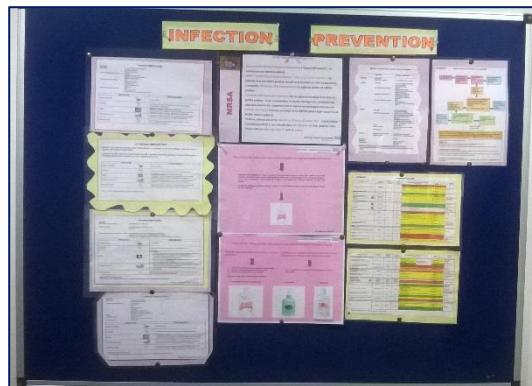


Figure 23: Infection Prevention notice board

It was however observed that although refresher sessions were being offered by the infection prevention team, they were not always well attended. This was mainly because from the top-down, a higher priority was placed on getting work done during work hours than proactively investing in, or carving out some time for teaching. Furthermore, updates to the 'Infection Prevention' education and updates board were never publicised. It appeared as though staff were expected to notice that the board had been updated without any prompting. One doctor described craving to receive some teaching, as they felt like life in the AMU was all about work. They also described opportunities to receive teaching in the AMU as 'hit-and-miss' affairs.

Doctor 2: *I think it'll be quite nice to actually have (some) sort of educational sessions, to refresh (one's knowledge about) the causes of diarrhoea and vomiting. You know? Like norovirus is so current but I must say I don't know much about norovirus.*

[...] it's quite nice to have a bit of teaching sometimes. It's really sad when you're working so much and you feel like, 'Am I here just for service provision?' (So much) that you kind of crave teaching. You know? Any nugget of teaching, you actually crave. But it's always hit-and-miss, especially in AMU, it's just hit-and-miss. It's a busy job, but yeah, I think it's something that would be necessary, slash important.

7.3.5 Time pressures, competing priorities, interruptions and cognitive workloads

The busyness of the AMU environment, in the context of competing priorities (as a result of heavy workloads and constant interruptions), was described numerous times in relation to inhibiting effective patient assessments and the implementation and performance of infection prevention and control interventions. With regard to time pressures and competing priorities, clinicians mainly reported how critically ill patients took precedence over patients with diarrhoea and vomiting, when it came to having infectious status assessments undertaken.

Nurse 2: *Time's always a massive factor because it does, you know, as small as it may seem, it does take time to draw those curtains, have that conversation with that patient, get that trolley with the gloves and aprons on it at the bedside, explain to the patient that they're going to have to have the curtains closed or whatever, explain to all the other staff around, "I think this patient's got infective diarrhoea. Just make sure that you're aware that you're using the right PPE," alerting the nurse charge - all (that) takes time. And filling out the pro forma takes ages, especially if you don't have a free computer to access... It's hard to complete the pro forma without any interruptions and promptly. And it's hard to instigate a medical review as well when there's other priorities for doctors who are very busy.*

In relation to performing infection prevention and control interventions, clinicians reported how at times corners were cut in order to have time for other tasks.

Doctor 4: *Yeah, so usually soap dispensers are full and there are gloves and aprons... But then I think it's such a busy place that sometimes you're a bit short of time and I imagine that corners are cut and people's hands aren't washed for as long as they should be and so forth, because of time pressures.*

Nurse 1: *I did try and I did find the cleaner, and for a while, I did do that (use the chlorine-based disinfectant). But yeah, it's just... again, time saving, isn't it? That's how you're meant to actually clean (equipment) and I don't think many people (use the chlorine-based disinfectant on) anything when they come out of the side rooms when patients have D&V.*

As indicated above in the extract from Nurse 2, when clinicians had many tasks to accomplish in a day, patient infectious status assessments were often a lower priority on the list of tasks to perform. Thorough assessments were also inhibited during busy periods of time, as some

clinicians treated paperwork completion as a 'tick box' exercise instead of fully engaging with patients and the process.

Nurse 1: *I just don't feel like I have ... I don't think I have enough time to make an assessment. (Sometimes) the pro forma is done like really quickly and I just await the stool sample.*

With regard to constant interruptions and cognitive workloads, clinicians reported trying to undertake one task (for example, assessing a patient), but then being constantly asked to focus on another task (for example, prescribe fluids, or give advice, or review a critically ill patient). These interruptions, which demanded that clinicians focus on other tasks, coupled together with heavy workloads, inhibited timely patient assessments and often caused clinicians to either forget or ignore to perform recommended infection prevention and control interventions. They also often forgot to carefully reflect on what they were doing, or were about to do. This would also result in them being disorganised and not gathering essential resources, before performing tasks that involved potentially infectious patients.

Nurse 1: *it's really busy on the ward? It's really, really busy and you've got so much to do and you just don't, you don't have-, you just think, "Oh, I'm only going in for a second. I don't need to gown-up really." Yeah. I think that's it. It's kind of those (issues), particularly on AMU, (the) busyness, acuity, and like maybe people not being, sort of, educated.*

Nurse 4: *Because some of them, they will go inside the side room, but they will come out with the same PPE (apron and gloves), isn't it? (They know that the rules are) you need to remove it first before you go out of the side room, but... you can see that practice. It's like (they think), "Okay, I'll just run and get some pads." (And then) it's like, "Oh, we already touched the patient." [Laughter] But it's too late, yeah, (as they have already left the room).*

7.3.6 Systems, culture(s), teamwork and communication

Systems (ways of working) and cultures (both collective and individual) within the system, had significant positive and negative impacts on how clinicians communicated, conducted themselves and functioned as a team. The following is a description of system, cultural, teamwork and communication related factors that were identified as affecting infection prevention and control practice in relation to the care of patients with symptoms of diarrhoea and vomiting in the AMU.

Positive work system processes

With regard to the work system, clinicians identified system processes, such as rapid referrals to diagnostic services, as contributing to incidences of timely performance of requested tests and investigations which positively affected patient assessment processes. This was because referrals from patients being cared for in either the emergency department or the AMU, were usually prioritised above those from other ward areas. Having tests and investigations performed in a timely manner, meant that test/investigation results were available in time for patients' next scheduled medical reviews/assessments. It is important to highlight here, that the timely performance of certain diagnostic investigations, such as x-rays, was also due to the geographic co-location of the AMU with key diagnostic services.

Doctor 2: *Erm, I think that was,- not bragging, but that was a case managed well in the sense that everything got done promptly. His stool samples sent, he had abdominal pain, you know, he'd got abdominal X-rays, CT was done, surgical team involved. Everything while he was in the side room.*

Despite these positive attributes of the system, there were also issues within the system to do with heavy workloads, subcultures, teamwork and communication, that were negatively impacting on infection prevention and control practice. Issues to do with heavy workloads within the system have already been described. The following sections will focus on cultures, teamwork and communication within the AMU.

Cultures and teamwork in the AMU

AMU clinicians strove to achieve the common goal of effectively treating and managing patients and either discharge them home, or move them to speciality wards for ongoing treatment within 48 hours of admission. This collective goal, formed the foundation of a unified way of working in a multi-professional team of clinicians. Nevertheless, despite there being a common goal and a collective AMU work culture, the diversity of clinicians from different professional backgrounds, with variant professional and individual cultures, gave rise to various subcultures within the AMU. Table 26 (next page) shows some of the cultures observed in the AMU. These included a collective task-oriented work culture, a medical professional culture, a nursing professional culture, a nursing team culture, professional subordination cultures and various ethnic cultures.

AMU COLLECTIVE CULTURE		
AMU collective working culture (task-oriented)		
inter-professional working culture to achieve a common goal: <i>diagnose - treat or manage - and discharge or transfer</i>		
PROFESSIONAL and SUBORDINATE CULTURES		
Medical team culture	Nursing team culture	
Medical staff professional culture - hierarchy (seniority) - diagnostic planning - care/treatment planning - rotational work across specialities	Nursing staff professional culture - hierarchy (seniority) - managing care and care plans - nurses' nursing culture based on country of training: Filipino vs. Portuguese vs. Spanish vs. UK trained	Nurse subordination culture (not explicitly acknowledged) ----- Healthcare assistant subordination culture (acknowledged) - tending to personal care needs
ETHNIC CULTURES		
Individual staff member cultures as influenced by upbringing		
Cultures identified: African (Southern/West), Asian (Chinese/Filipino), British (English/Irish/Scottish), Caribbean, European (Spanish/Portuguese/Polish)		

Table 26: Cultures (subcultures) observed within the AMU

The medical culture was characterised by hierarchy and a focus on diagnosing patient ailments and developing treatment plans. The nursing culture was characterised by hierarchy and a focus on managing patients' personal care needs, whilst carrying out and managing the treatment plans developed by doctors. Within the nursing culture were subgroups of nurses who had trained and qualified either abroad or in the UK. The nursing team culture was characterised by nurses and healthcare assistants sharing morning handovers, supporting each other to tend to patient personal care needs and sharing the same staff room. Professional subordination cultures were expressed in two forms; nurses' subordination to doctors and healthcare assistants' subordination to nurses and doctors. Nurse subordination was characterised by nurses being the managers of the treatment plans developed by doctors. There was also an element of 'looking up' to doctors as being medical experts, and as such nurses defaulted to doctors' clinical judgement and sought their opinions or authorisation before carrying out some interventions. Healthcare assistant subordination was characterised by healthcare assistants viewing themselves as being at the bottom of the AMU team hierarchy. They described themselves as the default individuals, tasked with undertaking menial and often undesirable tasks. Finally, ethnic cultures were characterised

by an element of tribalism, where clinicians (often nurses) of similar ethnic origins, often spoke together in their local languages and congregated together during and outside work hours.

Professional subcultures (medical team culture and nursing team culture) had both positive and negative impacts on AMU teamwork. For example, the different perspectives of clinicians from different professional and training backgrounds, led to a diverse knowledge-base that enriched the team. Nurses and healthcare assistants as primary bedside caregivers, had greater personal knowledge of patients and were best placed to manage their treatment plans and daily care needs, whereas doctors had greater knowledge of conditions and how to diagnose and treat them. On the other hand, “us” and “them” mentalities, led to tensions, conflict and polarised subgroups within the team, which sometimes resulted in poor collegiality and communication. At times this included poor communication regarding potential infectious risks. As one healthcare assistant described:

Healthcare assistant 1: I was a bit surprised when I first started working in the hospital. I had no experience at all in healthcare, and it was noticing the divide between doctors, nurses and HCAs and that sort of thing. I know HCAs and doctors don't really usually communicate at all, but it seems there's a bit of a divide between nurses and doctors, like the only time they communicate is, “Oh, we've just had the chest X-ray and it shows this,” but other than that it's pretty much two separate entities really.

Problems with team cohesion among medical and nursing staff were also reinforced by the fact that some doctors in the hospital rotated between specialities. As one doctor described it, each rotation was stressful and it took them a few weeks to settle down and get used to a new environment, new people, new systems and new processes.

Doctor 3: And my partner just said, ‘Well you’re settling in now aren’t you? You’re back into your swing of things.’ I said, ‘What do you mean?’ She said, ‘It always takes you two months to get into a new job.’ She just said it and that’s from her watching me at home, but she could see (it) as the pattern of us changing jobs. I change jobs, my stress level goes up, I’m a different person for the first (month), and I slowly settle down. By the end of the job I’m enjoying it. But the first month I hate every new job I start. And I’ve never realised that. [...] She reckons it’s 6 to 8 weeks regularly and that’s just me as a person. It takes me that long to get into a new environment, new people, new systems, new processes. And I had never appreciated that before.

Subordinate cultures were experienced and expressed, both inter-professionally and among clinicians of the same profession. As an example of inter-professional subordination, healthcare assistants described how they were 'just healthcare assistants', of a lower status than other members of the multidisciplinary team, doing all the dirty jobs. In the study's context, as the subordinate group, they were disempowered from participating in formal patient assessments and sometimes their infection prevention and control related concerns were trivialised.

Healthcare assistant 4: And we're just HCAs to some people, aren't we? So they just think "Oh well, whatever." Like we haven't got the ability to make that judgement, but we have because we're the ones that are always in there, we're the ones that see how quickly it happens. Most of the time we do every turn, every wash, everything! They don't even know. They ask us, "Oh, what's the skin like?" They don't know. They don't ever actually come in and be like, "Oh, can I just double check?"

With regard to subordinate culture among clinicians of the same profession, junior clinicians described not feeling able to challenge the initial diagnostic impressions of potentially infectious diarrhoea suggested by senior colleagues; even when they had reservations. Although this precautionary stance was linked to clinicians' tendency to err on the side of caution, it was also evident that junior clinicians felt disempowered to carry out effective assessments of their own that could overturn initial impressions suggested by senior clinicians. The extract below describes this feeling of disempowerment and acceptance of the status quo.

Nurse 1: Because they (the patients) are already put in the side room, what do they (the senior nurses) need from me then? Apart from just to get a stool sample, [laughs] and send it off? That is all I'm doing though, isn't it? I'm collecting a sample and sending it off.

Overseas nurses in the AMU

The ethnic diversity in the AMU, especially among nursing staff, presented its own opportunities and challenges. This diversity was noticeable, largely because the hospital had recruited a large number of nurses from Europe to help fill vacancies across the hospital. As the AMU had many vacancies, the unit had received a large cohort of Portuguese and Spanish nurses. These nurses had trained in a different healthcare system, often spoke to each other on the unit in their native languages, and mainly socialised within native peer groups. This did create an "us" and "them" atmosphere and occasional discord, despite the fact that other clinicians described the nurses as valuable, hardworking members of the AMU team. Furthermore, there were issues to do with working in a new healthcare system, communicating in a second language and understanding

English medical lexicon that were all contributing to problems (Philip *et al*, 2015). Some interviewed clinicians described instances where the overseas nurses would not follow some UK standard practices, including some infection prevention and control practices. This was mainly because they would default to undertaking tasks based on how they were trained in their native countries. There were also incidences described of breakdowns in communication as a result of misunderstandings; either caused by language barriers (both professional and social) or not knowing expected practices and processes to follow (including what medical equipment to use or what it was called). Nevertheless, communication challenges within the AMU were not only attributable to differences in culture and native languages.

Communication in the AMU

Communication in the AMU was achieved through face-to-face interaction, over-the-phone interaction and written media (electronic and handwritten). The effectiveness of these modes of communication in the AMU was variant and difficult to measure. Nevertheless, owing to the large multi-professional composition of the team, there was a heavy reliance on written media; especially as this was also the recognised legal media for good record keeping. Written media was good, as it could be stored and accessed multiple times. It was effective when accessed, read and understood, as intended by the target audience. Nevertheless, there was a significant problem identified with regard to written media, which related to the fact that doctors recorded information in patients' medical notes, whereas nurses and healthcare assistants often recorded information in nursing notes. This was problematic in that although the information documented in these separate records was beneficial to the multidisciplinary team, doctors were not in the habit of checking nursing notes and vice versa. As a result, there were many incidences of poor/ineffective communication regarding the need for patient assessments and/or poor sharing of information in relation to patients' infectious status and recommended precautions.

7.3.7 Senior, expert and multidisciplinary team support and prompts

Support related factors identified as affecting infection prevention and control practice in the AMU with regard to the care of patients with symptoms of diarrhoea and vomiting were described in three contexts. The first concerning junior clinicians receiving support and supervision from senior colleagues, the second concerning the infection prevention team supporting AMU clinicians and the third concerning members of the multidisciplinary team supporting each other.

Senior colleague support

Junior clinicians cited senior colleagues as invaluable resources that promoted effective patient assessments. This was mainly due to the fact that, like the diarrhoea and vomiting assessment tool, senior colleagues prompted them to pursue certain lines of enquiry they had either forgotten or not considered. Furthermore, senior colleagues, especially those on the nursing side, often prompted junior colleagues to correctly perform recommended infection prevention and control interventions.

Whilst on the topic of senior colleague support and patient assessments, it is worth highlighting that senior clinicians were generally regarded as experts in patient assessments, based on their many years of clinical experience and pattern recognition of patient presentations. In other words, as a result of the many cases that they had dealt with in the past, they often asked the right (pertinent) questions.

Doctor 3: *...it's not just being as slick (at patient assessments) at the level of the consultants, but it comes back to that pattern recognition thing again, and being able to weigh up what's important and what's not [...] And that partly comes with experience, and that partly comes with more knowledge, and it partly comes with previous mistakes.*

There was however an acknowledgement that senior support was not always available when needed, mainly because they were often busy performing various tasks. Matters were not helped by the fact that over a three year period (2012-2015), the AMU had had four different matrons. With each matron change, there came changes in ways of working that had impacted on various aspects of clinical practice, including turnover among senior nurses. As the extract below shows, at the time of undertaking this study, nursing staff skill mix was an issue in the unit and there were not many senior nurses available to provide adequate support and mentoring to new and junior nurses and healthcare assistants.

Nurse 4: *I think we've got a low morale. I think because of the- It's always the issue isn't it, staffing problems? You get agency (staff). And then the pressure. Like for me, as a sister, pressure for me during the day (is enormous). I don't have senior Band 5s. I only got juniors and all the seniors are doing nights. I want to support the junior (staff) because sometimes you will see them, they're not coping. You see it, but I can't support them all the time because I'm also doing beds. So I sometimes, I really feel frustrated. [...]*

So I think we need to support them more. (We need better) skill mix as well. You don't have seniors, see. You only get a junior and then you have the senior Band 5s who are like, most of them are doing nights. So you can't support them (the juniors). I'm trying my best to support them, but I can't do it all the time. It's really frustrating sometimes.

Infection prevention team (expert) support

Clinicians also cited support and prompts from members of the infection prevention team, as positively affecting assessment practice and the implementation and performance of infection prevention and control interventions. This was because members of this team had specialist, expert knowledge in infection prevention and control. At the time of the study, members of the infection prevention team had a tangible presence in the AMU, as the unit was under infection control special measures. Although clinicians reported appreciating their input with regard to advising them on what lines of enquiry to pursue when caring for patients with unusual histories and what precautions to follow in unusual or tricky situations, there was a sense of unease about the team, as many clinicians viewed them as a policing team. That is to say, visits from the team were associated with infection prevention and control related problems on the unit that needed resolving. Furthermore, clinicians generally reported that interactions with the team were often related to some form of 'telling off'.

Nurse 3: I remember there was one occasion we had a patient coming in with diarrhoea and vomiting and he had been overseas. I remember because the Infectious Diseases team came right after the patient arrived to AMU and they did put a lot in place. They did come and speak with me who was looking after the patient, talking about what would be expected and what had to be put in place... Even though sometimes they are a bit of a difficult team to work with... (I mean,) we all know about (the importance of) infection and of course someone that works in Infectious Diseases is really, really into the issue... but the (crux of the matter is) that it is a very busy place. Infection's not something that we can put on the side, but sometimes they are a bit difficult with what they ask for. But, yes, they do help...

Second opinions and guidance from members of the multidisciplinary team

From a multidisciplinary perspective, different contexts of multidisciplinary team support were observed and noted. With a specific focus on patient assessments and second opinions, in one dynamic, healthcare assistants usually sought a second opinion from nurses, whilst nurses usually sought a second opinion from doctors, as recommended by the hospital's diarrhoea and vomiting

assessment tool. In this context, second opinions were sought from clinicians who were considered to have greater professional responsibility over the patient's care. Although clinicians were not clear about how this second opinion promoted an effective assessment, it was likely due to the opinion seeker's trust in the second person's differing professional perspective and judgement. There was also an element of seeking the reassurance, back up, or endorsement of individuals perceived as possessing either greater medical authority or knowledge.

Another dynamic of second opinion giving/receiving was observed between junior and senior doctors. As part of the AMU system, all of the patients within the unit were reviewed by a consultant who finalised their working diagnosis and plan of care. This second review was in itself a second opinion, as it often occurred after a junior doctor had clerked the patient, suggested a working diagnosis and initiated a plan of care. It served to either confirm, amend, or completely change the direction of care implemented by the junior doctor. It was seen as promoting an effective assessment because of the expert level of assessment that the senior clinician brought to the whole process.

Finally, it was observed how doctors, healthcare assistants and other staff groups sometimes sought advice and guidance from nurses with regard to what precautions to take when dealing with patients whose symptoms were either suspected or confirmed to be infectious. In this context, nurses were seen as the 'go to' clinicians and primary advice and guidance providers with regard to infection prevention and control interventions.

7.3.8 Availability and access to essential information, equipment and resources

Factors relating to availability and access to essential information, equipment and resources were identified as both positively and negatively affecting clinician assessment practice and the implementation and performance of infection prevention and control interventions. Information in this context, referred to hospital guidelines, protocols and patient medical data. Equipment included clinical artefacts such as commodes and machines used to measure patients' vital signs. Resources included human resources, isolation facilities, and toilet and shower facilities.

Access to pertinent patient medical information

Assessing clinicians in the AMU, often first read referral letters and/or other clinicians' notes about a patient, before going to speak with them. This helped assessing clinicians to determine

what lines of enquiry to pursue during history taking, or at the least, have a general idea of why the patient was in the hospital. As such, easy access to patients' medical information promoted effective assessments, as time was not wasted searching for the information. Other forms of information accessed during an assessment included clinical observations, blood results and results from other previously requested tests.

Clinicians described easy access to information documented on paper in the context of paper records being at the patient's bedside or in the unit's notes cabinet. Easy access to electronically held information was described in the context of having an available computer to view pertinent patient records. Problems arose when, for example, some paper records were not available in designated files or locations because someone else was either using them or had moved them - and/or when access to computers was limited during busy periods. When required records were missing, or computer access limited, clinicians would sometimes resort to undertaking assessments with limited/incomplete information, which increased the likelihood of errors and omissions. Nevertheless, if time and other priorities permitted, they would wait to access this information and assess patients at a later time. Table 27 shows the different locations where essential information required for a thorough assessment was recorded and stored.

Information required	Media	Location
Vital signs (body temperature, pulse rate, respiration rate and blood pressure)	Paper record (Observations chart)	Bedside file or clipboard
Stool and vomit volume, frequency and consistency	Paper record (Stool and vomit chart)	Bedside file or clipboard
Past and recent reviews by other clinicians	Paper record (written record)	Nursing notes (in bedside file) or doctors medical notes (in AMU notes cabinet)
Blood results	Electronic record (Results server)	Computer programme 1
Other results (for example: x-rays, endoscopy, and so on)	Electronic record (Results server) and Paper record (written record)	Computer programme 2 Medical notes

Table 27: Different locations where essential information was recorded and stored

Access to guidelines and protocols

Clinicians also highlighted how information and guidelines relating to the care and management of patients with symptoms of diarrhoea and vomiting, were not easily accessible in the clinical environment. Although guidelines could be accessed from the hospital's intranet, locating a free computer was often challenging in the busy AMU environment. Furthermore, clinicians did not have time to search the intranet and then read through lengthy documents. What they wanted was an easily accessible and succinct resource, which contained pertinent information and showed examples on how to complete necessary paperwork.

December 2014 (Photo walk data)	
[Research question: What makes it difficult for you to look after patients with diarrhoea and vomiting?]	
	Title: Folder Written comment: No infection control folder which gives you information about how to look after someone with diarrhoea and vomiting – what is the protocol.
January 2015 (Interview data)	
Researcher: "[...] you have mentioned the folder [...] what would you hope to find in the folder?" Nurse 1: "How to fill out the pro forma correctly and like an example..."	

Figure 24: Picture of folders representing the absence of an infection prevention and control folder containing diarrhoea and vomiting related information and documentation examples

Time wasted looking for resources

Clinicians identified the problem of time wasted looking for resources to help perform routine tasks or support pertinent patient care activities, as often affecting patient assessments and the implementation of aspired infection prevention and control interventions. This was either because the resources were unavailable or not located in convenient locations. Clinicians highlighted a number of resources that they regularly searched for, which included paperwork, gloves, sick bowls, physiological monitors, cleaning and decontamination materials, commodes, linen trolleys and an extra pair of hands to assist with patient toileting and washing.

Difficulties in obtaining/finding these resources would lead to tasks either not being completed or delays in task completion, occurring in such a way as to directly or indirectly impede the performance of aspired infection prevention and control related practices. Doctors in particular, highlighted regular difficulties in finding all the resources that they needed in order to take blood specimens. As they reported, the time wasted searching for these resources (which should have been stored in one central place) impacted on the amount of time that they could afford to spend thoroughly assessing patients.

***Doctor 1:** I guess the main thing is you have only got a limited amount of time and if you have wasted maybe five minutes for one patient looking for gloves that means you have got five minutes to make up at some point by cutting short something. And it just means that in general, although I try to be as thorough as possible, all of us just spend less time with the patient.*

Doctor 2:

	<p>Title: Blood trolley</p> <p>Written comment: Messy and unstocked blood/cannula trolley, takes longer to get a job done.</p>
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Figure 25: Picture of messy and unstocked blood/cannula trolley, representing things that cause routine jobs to take longer than normal; thereby affecting time spent on other clinical tasks

Challenges relating to shared/limited equipment and resources

Problems to do with not having enough shared equipment, were wide ranging and often exacerbated when regularly used equipment was broken and not promptly repaired or replaced. Common equipment related challenges, included not having enough commodes and physiological monitors to facilitate patients in isolation care having their own dedicated equipment. This led to

clinicians having to use equipment between patients in isolation care and those in general bays, with the requirement to decontaminate the equipment in-between patient use. Nevertheless, as observed during observations of practice, shared equipment was not always decontaminated between patient use, which risked the spread of infection.

In relation to shared equipment in the context of isolation rooms without toilet facilities, clinicians reported how patients often resorted to using communal toilets without informing staff (and often flushing away potential stool specimens), because they could not wait for the next available commode. This would lead to the risk of communal toilets becoming vectors of the spread of infection and potential stool specimens required for testing, not being collected.

Nurse 3: Sometimes on AMU there is a difficulty that you really don't have an obs (physiological monitoring) machine available at all times, or you don't have (as) many commodes as you should have. Not all the side rooms have toilets. So, yeah, those make up barriers for assessing a patient as well.

With regard to staffing, the lack of human resources was often described in the context of delivering care to patients who required high levels of nursing input, with regard to toileting and washing. Issues to do with heavy workloads, high staff turnover and the bad reputation of the AMU (including low staff morale), were described as contributing to poor staff recruitment and retention, which negatively impacted on available human resources.

Nurse 3: See, it's always difficult when people leave as well because when you've got such a high turnover, you're constantly training people. And you've constantly got the more senior staff, which have not necessarily been there that long themselves, then doing more for the new people. And if you've got people coming over from a different country then you've got more challenges, like the language barrier and the fact that they're not allowed to do certain things [...] And if obviously people leave then it takes the Trust (hospital) months to get new people through [...]. So they say two months, isn't it, from when you hand in your notice? So you hand in your notice and you've got two months, and usually you won't get any more nurses in that two months. So there'll always be a crossover where you're short. So it's kind of like a rolling (a cycle) – and because we're short, people want to leave more, so it's very much an escalating thing. I think, from what I've found out through my time in AMU, is that it's kind of a pattern in AMU, that people come there to learn, because it's a very good place to learn and you see a lot of stuff and you learn a lot of things. It's got a

bad reputation because it's so hard and so difficult and it's not like anywhere else, really. So it's got a bad reputation but it's highly regarded for, like, the skill set you learn there.

7.3.9 Unit and isolation room design and layout (including placement of clinical items)

As described in Chapter 1 and presented in Figure 1 (page 5), the AMU at the study site was a 52/53 bedded unit, divided into four open-plan clinical areas: AMU 1, 2, 3 and Short Stay. Altogether, there were 11 isolation rooms located in AMU 2 and 3 of the unit; 5 with a sink, toilet and shower and 6 with only a sink. All the rooms relied on ceiling-mounted air conditioners for optimal temperature control. There were also 2 sluices in the unit located in AMU 1 and 3.

Isolation rooms

Clinicians identified various unit design and layout issues that affected assessment practice and the implementation and performance of infection prevention and control interventions in the AMU. Most of these issues were related to isolation rooms. Clinicians described how 11 isolation rooms were not always enough to accommodate the number of potentially infectious patients that were usually referred to the unit, or those that developed symptoms whilst on the unit. Isolation room unavailability often led to delays in isolation, which increased the risk of spreading potential infection, as symptomatic patients would be cared for in open bays, or held up in the AMU waiting area.

Doctor 4: I've just thought of something that may not be entirely relevant to that question, but I can recall a few occasions where we've had new admissions, patients coming in with D&V and we've been very busy and they've come through the GP surgery and we've not had beds or side rooms available for them and they've sat in the waiting area outside GP AMU for quite a long time or perhaps even, like on a stretcher or with paramedics while we've waited for a side room for them. I'm thinking that's probably not great practice – it's quite open.

Furthermore, when isolation rooms were sought after, doctors were pressured into making decisions as to whether or not patients already in isolation rooms still needed them. Such pressures were not good, as they had the potential to effect rash decisions.

Doctor 3:

	<p>Verbal (dictated) comment:</p> <p>[Side rooms] are bad, because we are often short of side rooms and you're often being pressured into, "Does this patient still need a side room? We've got another patient for the side room!"</p> <p>And often you're being asked that about patients you do not know anything about. (Patients) that just arrived 'on take' or you've just started on that (AMU area) that morning, but you don't know the patients very well and there's people asking you questions straightaway, "Does this patient still need the side room? Are they now clear? Are they not?"</p>
Title: Side room	

Figure 26: Side room door (representing isolation rooms)

Isolation rooms without toilet and washing facilities were another problem. Such rooms necessitated that commodes be brought into the room and kept inside for patient use. This then had a direct impact on the working space within the room, as they were also small-sized rooms. There was also an increased risk of spreading infections, as staff had to carry used bed pans with infectious waste out of the rooms, through the unit and into the sluice. These design oversights prompted some clinicians to strongly suggest that in the future, all isolation rooms should be of a good size and have their own toilet and washing facilities.

Healthcare assistant 3: (Isolation room 2)

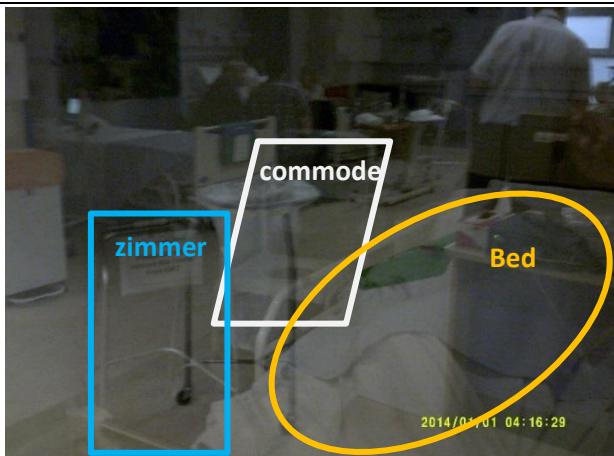
	<p>Written comment:</p> <p>They are too small to provide proper care - space for commodes and staff.</p> <p>Verbal (dictated) comment:</p> <p>So I think in the side rooms we should provide as much of the equipment as we can to avoid spreading things around. Like the other day, I just walked out of the side room and I didn't notice that the pot was leaking and it was all over the floor!</p>
Title: Size of side room	

Figure 27: View from isolation room window showing cramped space inside

Finally, poor ventilation and temperature control within isolation rooms, was described on multiple occasions by both clinicians and patients. This was mainly because the air conditioning units in the rooms were not working properly at the time of the study. This caused rooms to quickly get stuffy, especially during spells of warm weather, thereby prompting patients to request that room doors be left ajar - in breach of isolation protocol. The following is healthcare assistant 2's brief summary of this particular problem: *"...the side rooms aren't the best because they're really hot or really cold, depending on what time of year it is."*

Amount and placement of essential facilities and clinical items

With regard to shared facilities, the unit only had 2 sluices located in AMU 1 and 3, thereby presenting logistical challenges for staff working in AMU 2 and Short Stay, when carrying potentially infectious waste. There was also only one waiting area in the AMU, meaning that if potentially infectious patients attended the unit as community referrals, they would have to sit with other patients, potentially spreading infection, until they were seen by a clinician.

Doctor 2:

	<p>Title: Waiting room in GP AMU</p> <p>Written comment: Not ideal for D and V patients to sit with the rest of the other patients.</p>
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Figure 28: Chair representing seating area in GP AMU waiting room

There were also issues to do with the inconvenient placement of clinical waste bins. These were discussed in the context of both isolation rooms and open bays. In some isolation rooms, clinical waste bins were not located near hand hygiene sinks and thus created challenges relating to the implementation of aspired infection prevention and control interventions.

Doctor 4:

	
<p>Title: Clinical waste bin</p> <p>Verbal (dictated) comment: The clinical waste bin is located in the bathroom, approximately 2 metres from the sink, which in theory could involve having to go into the bathroom and possibly standing on diarrhoea on the floor, which has happened previously. So it would be more helpful to have the waste bin next to the sink, so that you can wash your hands and immediately dispose of gloves and apron in the bin next to it.</p>	

Figure 29: Clinical waste bin and the inconvenient placement of bin away from sink

With reference to the four open bay areas in the AMU, clinicians spoke of inconvenient placement of clinical waste bins, as well as there not being enough of them. Both issues impacted on the implementation of aspired infection prevention and control interventions.

Nurse 2:

	<p>Title: Orange bin AMU 1 (not next to any sinks, only bin on A-side of AMU 1)</p> <p>Verbal (dictated) comment: Orange bin in AMU 1 (not next to any sinks, only bin in A-side of AMU 1). This makes it difficult for me to look after patients who have D&V, because it's the only bin in AMU 1 on A-side. It's not actually next to any bed space really. Maybe it's next to bed space 5. But apart from that, you'd have to leave your individual patient area to get to the bin and then you'd have to go back to a sink which is nowhere near the bin to then wash your hands afterwards. So when you dispose of your PPE, you'd have to walk away and then come back.</p> <p>There should be more than one bin. I don't know why there's only one bin? There should be, yeah, two or three bins.</p>
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Figure 30: The only clinical waste bin in A-side bay of AMU 1

7.3.10 Patient location during inpatient admission (a different perspective)

The location of symptomatic patients during their inpatient admission, significantly affected the assessment process and the implementation of aspired infection prevention and control interventions.

When the patient was being cared for in an isolation room

Despite previously described problems, being in an isolation room was seen as advantageous, with regard to providing a private environment where the clinician and patient could speak freely about intimate aspects of having diarrhoea and/or vomiting without the embarrassment of being overheard. Clinicians perceived that patients were less embarrassed about telling their story and describing incidences which informed the history taking/assessment process in this environment. Clinicians also appreciated how gloves and gowns were within easy reach, whilst inside isolation rooms. This meant that time was not wasted searching for gloves and gowns that needed to be worn before physical assessments were undertaken. This time-saving translated to more time spent with the patient, thereby facilitating thorough assessments. Furthermore, the easy accessibility of gloves and gowns in isolation rooms, facilitated the convenient changing of gloves and gowns that sometimes got soiled when clinicians were assisting symptomatic patients with toileting and washing.

The rooms, and especially the room doors, acted as physical barriers that separated potentially infectious patients from other patients and staff. In many cases, closed doors prompted staff to don gloves and a gown before entering the room and tending to the patient. Furthermore, all rooms had soap and washing facilities that facilitated the performance of hand hygiene and the donning of personal protective clothing.

When the patient is being cared for in an open bay

Having potentially infectious symptomatic patients in an open bay was problematic for various reasons, including the increased risk of spreading infections as a result of not being able to implement aspired infection prevention and control interventions. Open bays were not designed to contain potentially infectious patients and essential facilities such as showers, sinks and toilets were shared. Furthermore, as clinicians associated open bays with non-infectious patients, there was often low adherence to, and awareness of, the need to implement and perform infection

prevention and control interventions. With regard to undertaking assessments, assessing clinicians were more likely to be interrupted in open bays, thereby inhibiting thorough assessments. The description below by Doctor 3, summarises the extent to which caring for symptomatic patients in open bays was problematic.

Doctor 3: *With the patients who are just in the bay in GP AMU, (like) that man I saw last night. (He) was sat wearing a nappy because he was so concerned he wouldn't make it to the toilet in time. And he was in a corner of GP AMU, the corner furthest from the bathroom, just because that's where the bed came up. And he's got another bed within three feet the other side of him. There's no gowns, there's no gloves by the bed to gown up. I didn't actually gown up to see him because we suspected it was colitis not infectious. But if I had wanted to gown up I'd have had to go across the room to get an apron, two gloves and walk past three or four other patients to get to him. To then do the examination and whatever, to then take them off to walk past three other patients to the bin, to put all those in the bin, to walk past two other patients who were sick. And so on. And in the middle of all that, I would have been interrupted by nurses trying to move people to the ward, asking for this, asking for that as well.*

7.3.11 The cognitive state of patients and their willingness and ability to engage with staff and the care process

The cognitive state of patients, their ability to provide good histories, and their willingness and ability to engage with clinicians and the care process, were identified as important factors that affected the assessment process and the implementation of aspired infection prevention and control interventions. With regard to assessments, clinicians reported how relatively easy it was to interact with and assess patients who were not cognitively impaired and were able to competently answer questions. Moreover, the assessment process was effective when patients engaged with the process and willingly recounted their stories with honesty, without leaving any details that were otherwise regarded as socially embarrassing.

Nurse 2: *...the patient wasn't confused, so when I went through the isolation pro forma with them it was quite easy for us to answer the questions together. So there's a certain amount of questions that you can answer yourself just by checking on (computer systems) ...but some things you need to ask them, history related questions. So, yeah, that is quite easy when they've been independent (not confused)..."*

With regard to honesty and engagement, some nurses identified young patients (especially young female patients) aged between 16 and 30 years as often exhibiting embarrassment to the point of not fully engaging with clinicians and not being open about their symptoms. As described below, this tendency of young patients to conceal symptoms was also observed personally whilst undertaking agency shifts.

Observations of practice, 31st August:

During the shift, two of my patients had episodes of diarrhoea. One reported it to the nursing team and the other one didn't. The patient who didn't report their incident was a young female in her early 20s due to be discharged in the evening. I don't know why she didn't report the incident but I would presume that she was embarrassed. It was in fact another patient in need of the toilet who discovered faeces on the floor. This other patient is the one who made me aware that 'someone' had made a mess in the toilet.

When dealing with cognitively impaired patients, history taking was reported as especially difficult because some patients would give unreliable information that required a collateral check.

Doctor 1: *So, you can't take anything they say at face value. They might be telling you about an episode of diarrhoea and vomiting that they had 40 years ago that they're remembering now and they go, "Oh yes, yes Doctor, it was yesterday. I was really, really unwell." And then you have to get a collateral history from someone who knows the patient and they'll be like, "No, they've got a cough now and they've come in because of a chest infection..." and then you can go, "Okay then, maybe they don't have to be in a side room." And if you've got a confused patient who HAS had diarrhoea and doesn't remember going to the toilet, that's kind of even worse because then you're like, "Oh, patient says bowels not open 5 days, let's give them some laxatives!"*

Understanding and complying with communicated care plans, was another factor that clinicians identified as important when asking patients to follow specific instructions and perform recommended precautions. With reference to assessments, compliance was described in relation to patients actively informing clinicians when they had had bowel movements so that stool specimens could be looked at, collected and sent for laboratory testing. This factor was particularly important when clinicians were looking after patients who were not bed bound and were able to go to the toilet independently. Clinicians were hugely appreciative when such

patients were cooperative and did not succumb to embarrassment, as it made the task of obtaining stool specimens easier.

Nurse 2: And it's also been a bit easier in trying to obtain stool samples from them if they're on board with the plan and [...] they are alert and orientated and they know what's going on? Then they can tell you next time they need to go or [...] they could leave a stool sample in the toilet and tell you straightaway. Or in the commode or whatever. So that you can take it away and that's been quite a lot easier.

With reference to infection prevention and control interventions, compliance was described in relation to patients adhering to recommended precautions and declaring when accidents or a breach of recommended precautions had occurred. The main recommendations were keeping isolation room doors closed and not using communal toilets. Many clinicians reported great frustration with patients who did not comply with precautions, or declare having had accidents that exposed staff and other patients to potential infection. As an example, during a photowalk, as a senior healthcare assistant was describing her frustration with non-compliant patients who did not follow clinician recommendations, we walked past the scene shown below. This incident occurred at such a time to prove the clinician's claim to be true with regard to how often, in their experience, some patients with diarrhoea used communal toilets, made a mess and did not inform staff.

Healthcare Assistant 4:

	<p>Title: Patient</p> <p>Written comment:</p> <p>Difficult patients who remove pads, leave side rooms, decide to open bowels elsewhere, e.g. floor.</p>
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Figure 31: Patient toilet with faeces on toilet bowl and floor (most faeces are covered by paper towels)

Nevertheless, although there was evidence of incidences of deliberate non-compliance (likely due to embarrassment), the study also identified that non-compliance was often unintentional. These

unintentional incidences of non-compliance were often as a result of cognitive impairment in confused or acutely unwell patients, genuine forgetfulness in those who were not confused, physical limitations (due to disability or being connected to lines), poor clinician communication of instructions and expectations and clinicians not checking whether or not patients had actually understood communications.

The white coat effect?

A number of clinicians expressed frustration regarding occasions when they could not effectively complete assessments of patients' infective status, due to the absence of stool specimens. They reported how, on countless occasions, patients suddenly stopped having diarrhoea after their admission in to AMU, despite having given convincing histories of potentially infective diarrhoea. Indeed, on some of these occasions, it was reported that patients ended up receiving laxatives, as medical staff began to suspect that they had actually presented with constipation, which had been masked by overflow diarrhoea.

***Nurse 1:** So you do isolate them and then they end up not going and you don't actually get a sample. And then they end up being in a side room and actually they're not producing (any loose stools)...*

***Doctor 2:** So, sometimes they come in with a history of diarrhoea, but actually they haven't opened their bowels in like ages and you sit there waiting for them to open their bowels and they just never do!*

Waiting for the next episode hindered effective assessments as clinicians could not verify patients' reports of having had diarrhoea. Furthermore, without a stool specimen, it was difficult to determine whether or not patients' causes of reported diarrhoea were infectious.

7.3.12 Patient and visitor engagement and involvement in infection prevention and control practices

It was observed in this study that patient and visitor involvement and engagement in infection prevention and control related aspects of care was sporadic and poor. This had a negative impact on the performance of aspired infection prevention and control interventions by both patients and visitors. Clinicians were not always actively involving patients and visitors in infection

prevention and control aspects of care. On the occasions when they did, engagement was sometimes poor, due to visitor non-compliance.

Nurse 3: *Yeah, family sometimes, it is difficult, because some of them, the moment you walk out of the room they'll take their gloves off or take... you know, just doesn't matter (to them). And the moment you walk in the room, they'll put the gloves on again. It's kind of like just a show-off for you when really... I don't gain anything from seeing it. And I've said this to some of the relatives before, "I'm not asking you to do this for me. You're doing this for yourself. So if you don't want to use them it's not fine, but I cannot make you wear them. But at least be sure that when you walk through this door don't go and pick up your son on the lap or..." you know what I mean, or "If you get home don't go and prepare your meal for everybody else without washing your hands. If you're not doing this for yourself at least do it for the other ones that are around you and will touch the same door handles you will."*

On other occasions, clinicians' communication of instructions and expectations was poor; particularly through the use of posters that assumed an awareness of the significance of the different colours of posters and a good command of the English language. Despite isolation room door posters encouraging visitors to speak to a nurse before entering the room, visitors often walked straight into patient rooms. The reasons for this behaviour were not investigated in this study, but could be attributed to either of the following: either visitors ignored the posters, did not notice the posters, did not understand the posters, or the nurses were not close at hand.

Healthcare assistant 1: *...so the only thing is when family members come in like I said. They're not always safe. We're all busy. So that's mostly the case, we're not all there. They come in for visiting times. They obviously have been told somehow that their relative is in side room 3 in AMU 2. It's pretty simple to find it. They go in without thinking, 'Oh they're infective,' they just think their relative is in hospital. They don't think there's a risk of them catching it and spreading it while they're in hospital or at home or wherever. So, yeah, I don't know if, how much relatives know...*

I think it's another issue of just communication with the hospital to relatives about procedures that they need to follow.

As a result of not actively engaging with visitors, many breaches to aspired infection prevention and control interventions occurred, such as visitor use of patient toilets, not wearing gloves and an apron when tending to loved ones and not taking proper precautions.

Observations of practice, 9 December**- 14:10 -**

I decide to walk past the side room to observe what is happening inside. I notice that one of the relatives has entered into the patient's side room toilet to use it. The other relative is sat on the patient's bed next to the patient's table. I observe as the relative who was in the toilet comes out of the toilet and proceeds to go and sit on a footstool that is near the entrance into the side room (see diagram).

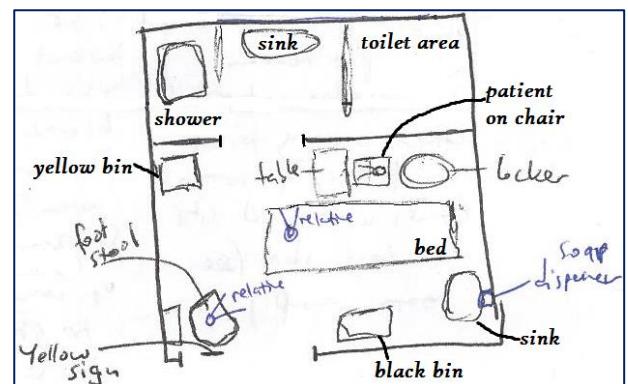


Figure 32: Diagram from field notes showing the position of people and items

7.3.13 Quality and effectiveness of patient monitoring

Patient monitoring was an essential component of the patient assessment process, as it provided important information with regard to patients' symptoms. Quality, in this context, was to do with adequate completion of monitoring charts and records in a timely manner, and effectiveness was to do with how successful clinicians were at noticing and recording pertinent events, episodes, markers and/or parameters.

Doctor 1: *...In those cases I guess that if you suspect (that someone is infectious), just isolate as a precaution if you've got the side room. If you haven't got the side room available, keep an eye on their stool and have a proper stool chart filled out. And make sure that everybody's aware of the importance of filling out the stool chart as and when it happens and proper times...*

Clinicians identified that in order for an effective assessment to be undertaken, essential charts and records that aided the assessment process had to be adequately completed. These included vital signs charts and bowel movement and vomiting charts, which informed clinicians of the effects, consistency, frequency and colour of the patient's diarrhoea and/or vomiting. These key

pieces of information helped clinicians ascertain both the severity of the symptoms and the likelihood of an infectious cause. Moreover, as described below, without timely and adequately completed charts, clinicians found it difficult to set up appropriate care plans for affected patients.

Doctor 2: *...because sometimes stool charts (get started) only if a doctor says, "We need a stool chart," because not every patient immediately gets a stool chart. Stool charts are important for Crohn's and ulcerative colitis (patients), but also equally, you kind of need to know how frequently a person's going and how often. How much fluid you need to give them and stuff. And there would be an accurate frequency of whether the diarrhoea is settling or not, and whether they're actually 24, 48 hours diarrhoea free. If you've done a stool chart you can objectively say (whether they've been diarrhoea free or not)...*

Absent or incomplete charts also impacted on patient infectious status clearance and discharges to other healthcare facilities. In the context of stool charts, absent or incomplete records impacted on patients' clearance processes because clinicians found it difficult to determine when patients last had diarrhoeal symptoms. This was important information as local hospital policy stipulated that patients needed to be at least 48 hours free of diarrhoeal symptoms before they could be considered to be non-infectious. Furthermore, absent or incomplete charts increased the chances of diagnostic errors occurring, which could impact on the implementation of infection prevention and control interventions. For example, if assessing clinicians thought that patients' symptoms had resolved when they had not, they were highly likely to move patients out of isolation rooms into general bays, where they would pose an infection risk to other patients, staff and visitors.

Doctor 1: *I always worry about the 12 o'clock board round time. (I know) I'll be asked, "Can these people come out of the side rooms because we need the side rooms?" and then it's quite difficult to know sometimes whether or not (they can come out) especially if the stool chart's not been filled in. It's really hard to know with (specific patients) whether they've had any loose stools for 48 hours (or not). So I'll be quickly having a look round, frantically going, "Umm, probably can come out of the side room?"*

The charts were also beneficial in that the clinicians completing them could also communicate whether or not specimens had been collected and sent. If specimens were known to have been sent, reviewing clinicians would then check for laboratory results. They would also not waste time and resources by sending more specimens, or burden the laboratory with unnecessary additional specimens.

7.4 Comments on findings

The findings presented in this chapter suggest that there were numerous, multifaceted factors that were affecting infection prevention and control practice in the AMU in relation to the assessment and management of patients with symptoms of diarrhoea and vomiting. Some were less visible than others and yet all were relevant to the subject matter. They related to different socio-technical elements within the AMU, where people interacted in various ways with each other, the environment, policies, artefacts and work-related tasks. In this context, the term socio-technical refers to the interdependency between social and technical elements of the AMU; where social elements related to patterned networks of relationships between individuals and groups in the AMU, whilst technical elements related to material technology, as well as procedures, structures and a broader sense of technicalities (Appelbaum, 1997; Opazo, 2010; Trist, 1981). Findings also suggest that relationships and interactions between these different elements were largely non-linear and characterised by unpredictability (Kernick, 2002), further demonstrating the complexity of clinical practice in this aspect of care. This is discussed further in Chapter 8. Beyond highlighting these complexities, the findings also draw attention to potential pragmatic solutions to identified problems, which are also considered in Chapter 8.

7.4.1 Human factors thinking in infection prevention and control practice

In relation to comparisons with relevant bodies of evidence, a rigorous process of amalgamation yielded 13 broad themes of factors identified as collectively affecting infection prevention and control practice in the AMU - with respect to the assessment and management of patients with symptoms of diarrhoea and vomiting. These themes resonated with those identified in outbreak management report literature, as having affected respective clinicians' ability to effectively implement and perform aspired diarrhoea and vomiting related infection prevention and control interventions (Abeyesundere, 1982; Conway *et al*, 2005; Khanna *et al*, 2003; Timen *et al*, 2010). These included staff attitudes, beliefs and perceptions; staff education, support and awareness; availability of essential facilities and equipment and the social and physical environment of the practice setting. The factors described and analysed in this chapter also resonated with themes linked to non-compliance of healthcare staff with policies and procedures, as presented in human factors related literature (CHFG, 2013). These included a lack of awareness and/or understanding of policies and procedures; lack of training and reinforcement of key policy messages over time; difficulty in accessing policies; time pressures and pressures to get the job done. They also

resonated with themes of factors that are known to influence people and their behaviour at work, as described by human factors experts (Carthey and Clarke, 2009; Rosenorn-Lanng, 2014; Yanke *et al*, 2014). These included the influence of culture on performance and safe practice; the physical design and layout of the clinical environment and the impact of physical demands and distractions on cognition and mental workload. Such resonances with concepts discussed in human factors related literature were particularly interesting because they supported the view that human factors thinking is applicable to infection prevention and control practice, as other researchers have indicated (Wilson *et al*, 2017; Yanke *et al*, 2015).

Human factors is defined as 'the scientific discipline concerned with the understanding of interactions among humans and other elements of a system, and the profession that applies theory, principles, data and methods to design in order to optimise human well-being and overall system performance' (International Ergonomics Association, 2018). As Shaver and Braun (2008) explain, human factors thinking is relevant anywhere people work with systems, whether they are social or technical in nature. The application of this discipline in healthcare is, however, not widespread. As various commentators report, it is only in recent years that human factors in healthcare has become an increasingly important and recognised topic, under the patient safety agenda (Carayon *et al*, 2014; Rivera and Karsh, 2008; Waterson and Catchpole, 2016). Indeed, following the recognition of improvements that were required in healthcare, a concordat from the National Quality Board (NQB, 2013), pledged to provide leadership and oversight for embedding human factors principles and practices within the NHS.

At present, the widely accepted definition of the discipline within a healthcare context is that offered by Catchpole (CHFG, 2013). According to Catchpole (CHFG, 2013, p5), human factors in healthcare is about 'enhancing clinical performance through an understanding of the effects of teamwork, tasks, equipment, workspace, culture and organisation on human behaviour and abilities - and application of that knowledge in clinical settings'. This definition implies that, in pursuit of enhancing general practice, human factors thinking employs a whole-system approach to understanding pertinent phenomena in clinical practice, whilst paying particular attention to the human element. This, therefore, makes human factors thinking not only beneficial to infection prevention and control practice (Wilson *et al*, 2017; Yanke *et al*, 2015), but also to clinicians and patients as individuals. Furthermore, as Carthey and Clarke (2009) suggest, through an application of human factors principles, it is possible to understand why clinicians make errors, and in particular, which system factors threaten patient safety. These points are pertinent to this study, as human factors thinking (principles, tools and theories) can help make sense of the AMU's complex socio-technical system and observed (desirable and undesirable) infection prevention

and control related outcomes (Holden *et al*, 2013; Waterson, 2009). Chapter 8 will, therefore, offer a discussion that employs a socio-technical systems analysis approach, based on human factors thinking (Carayon *et al*, 2011). This approach will assist in the exploration of practical and theoretical explanations for the study's findings. In particular, the discussion in Chapter 8 will utilise the Systems Engineering Initiative for Patient Safety (SEIPS) 2.0 framework (Holden *et al*, 2013; Figure 33) to make sense of how the AMU's complex socio-technical work system (at the time of the study), impacted on patient, clinician and organisational infection prevention and control outcomes. It will also help explain the themes presented in the present chapter, their relationship to each other, as well as their relationship to the other findings of the study.

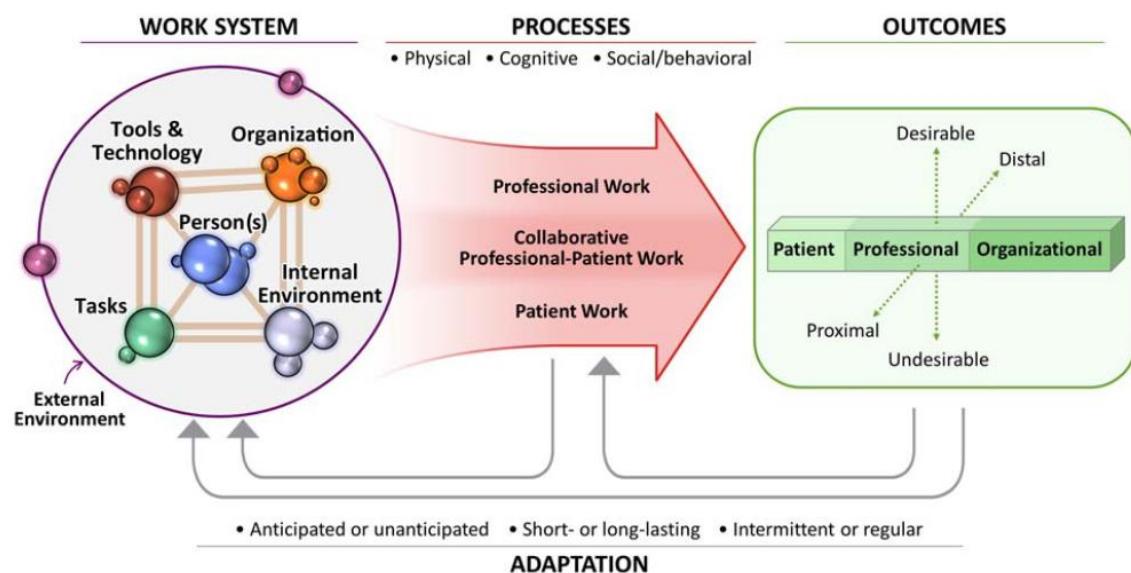


Figure 33: SEIPS 2.0 model (Holden *et al*, 2013; reuse of content permission confirmed via Rightslink®)

7.4.2 A brief description of SEIPS 2.0

SEIPS 2.0 (Holden *et al*, 2013) is a next-generation human factors-based socio-technical systems analysis approach. It builds on the original SEIPS model of work system and patient safety by Carayon *et al* (2006). As described by Carayon *et al* (2011), the SEIPS model is one of a number of socio-technical systems analysis approaches aimed at understanding complex system interactions in healthcare that can produce hazards and patient safety risks. The key characteristics of the original SEIPS model include: description of the work system and its interacting elements; incorporation of a quality of care model developed by Donabedian (1988); identification of care processes being influenced by the work system and contributing to outcomes; integration of patient, employee and organisational outcomes; and feedback loops between the processes and outcomes, and the work system. After several years of use and research applications - spanning

multiple healthcare delivery settings, including acute and primary care settings - the SEIPS model evolved into SEIPS 2.0 and incorporated contemporary concepts of configuration, engagement and adaptation, to reflect emerging healthcare issues and priorities.

SEIPS 2.0 (Figure 33, previous page) depicts a socio-technical work system with six networked components that can interact simultaneously, at 'a moment in time' (left), to shape physical, cognitive and socio-behavioural work processes (middle), which in turn shape patient, professional and organisational outcomes (right). The six, interacting, socio-technical work system components include person(s), tasks, tools and technologies, organisation, internal environment and external environment. 'Person(s)' can be clinicians, patients, non-professional caregivers and visitors, whether individual or collective (for example, clinician teams). The person(s) component, therefore, describes individual characteristics, such as individual level of knowledge, as well as collective characteristics, such as team cohesiveness or collective knowledge (Carayon *et al*, 2006; Holden *et al*, 2013). 'Tasks' are specific actions within larger work processes. The task component, therefore, describes attributes or characteristics of the task such as sequence, complexity and ambiguity. 'Tools and technologies' are the objects (items and artefacts) that assist people in doing work or that are used to do work. In the present study, these included the diarrhoea and vomiting assessment tool, vital signs charts, stool and vomit charts, commodes and information technologies. The tools and technology component, therefore, describes characteristics such as accessibility, familiarity, usability and portability. 'Organisation' broadly refers to structures which organise time, space, resources and activity. These structures are external to a person, but often put in place by people. Organisation factors have both social (for example, culture) and technical (for example, technical infrastructure) characteristics. They include work schedules and assignments, interpersonal relationships, policies, resource availability and organisational culture, social norms and rules. It is worth highlighting that although it is typical in other disciplines, such as sociology, to talk about social environments, social factors are assigned under 'organisation' in SEIPS 2.0. 'Internal environment' refers to the physical environment and includes characteristics such as physical layout, available space, lighting, noise and temperature. Finally, 'external environment' incorporates macro-level societal, economic, ecological and policy factors outside an organisation.

Within a socio-technical systems perspective, any number of work system components can interact simultaneously at 'a moment in time' to shape performance processes and outcomes (Carayon *et al*, 2011; Holden *et al*, 2013). This focus on interactions is a fundamental characteristic of the human factors discipline and is central to the SEIPS 2.0 concept of 'configuration'. That is, while all the components of the work system potentially interact, only a

subset of all possible interactions is actually relevant in a given work process or situation (Holden *et al*, 2013). With regard to work processes and 'engagement', SEIPS 2.0 posits that these can be decomposed into physical, cognitive and socio-behavioural performance processes, and differentiated based on who is actively engaged in performing them. In this context, to be engaged 'at a moment in time' is to be an 'active agent' who performs some or all of a health-related work activity, whilst indirect or passive contributors are called 'co-agents' in recognition of their presence and relative inactivity. As such, being an 'active agent' is an assignment, not an enduring property of a person; meaning that multiple individuals can be active agents at a given time, or for a given process. Three ideal-type categories are plotted along the engagement continuum: professional, patient and collaborative work. In professional work, the primary agent is a professional or team of professionals, with minimal, active patient, caregiver or other non-professional involvement. In patient work, the primary agent is the patient and/or caregiver and other non-professional, with minimal active healthcare professional involvement. In collaborative work, both healthcare professionals and the patient and/or caregiver and other non-professionals are jointly and actively involved.

With regard to outcomes, these can be desirable or undesirable. Furthermore, they can be proximal and/or distal; that is, some outcomes may be the immediate result of work processes (proximal) while others are further down the care trajectory and may only emerge over time (distal). In relation to the concept of 'adaptation', SEIPS 2.0 describes feedback loops, representing planned and unplanned adaptations in the care trajectory, which may be short or long-lasting, and either intermittent or regular. In this context, work processes and their outcomes are monitored, and then adaptations are made in an attempt to decrease the gap between 'actual' versus 'ideal' performance (Holden *et al*, 2013). As Carayon *et al* (2014) suggest, workarounds (or ad hoc adaptations) seen in healthcare, may be one way that healthcare professionals balance their work system when one of its components (for example, a policy or physical infrastructure) is relatively fixed.

7.5 Chapter summary

This chapter has presented the findings of the study with regard to the factors that were identified as affecting the infectious status assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU. It has built on the findings presented in preceding chapters, by offering insight into pertinent factors impacting diarrhoea and vomiting related infection prevention and control practice. The intertwined nature

of the identified factors to each other and to the findings presented in preceding chapters, has demonstrated the complexity of practice that necessitated a contextual approach to investigating the phenomena in question. In particular, findings have shown the socio-technical complexity of the AMU work system and its effect on various infection prevention and control outcomes. An examination of the themes of the factors that were identified as affecting pertinent infection prevention and control practice in the AMU, showed resonances with themes described in pertinent outbreak management and human factors literature. The next chapter will employ a human factors-based socio-technical systems analysis approach, in order to offer a discussion that will explain the factors (and themes) presented in this chapter, their relationship to each other, as well as their relationship to the other findings of the study.

Chapter 8 General discussion

8.1 Introduction

The findings of this study suggest that despite being challenging, the process of assessing the infectious status of patients with symptoms of diarrhoea and vomiting is logical and fairly consistent among clinicians tasked with undertaking formal patient assessments. This is in contrast to the infection prevention and control related management of these patients, which is inconsistent and inefficient, in that clinicians are not empowering patients and their visitors to become contributors to infection prevention and control related aspects of care. Despite the fact that clinicians displayed good basic knowledge of the interventions they were expected to perform when caring for pertinent patients, actual performance of these interventions was poor. Issues to do with leadership, training, work culture, time, workloads and resources, were among many factors identified as contributing towards incidences of breaches in following infection prevention and control related practice recommendations.

In this chapter, a number of practical and theoretical explanations for the study's findings are explored, and resonances with relevant research literature are examined. Implications for clinical practice, training and education are also considered.

8.2 A whole-system perspective in a complex clinical environment

The lack of a whole-system perspective when examining the care of patients with symptoms of diarrhoea and vomiting in clinical practice is impeding infection prevention and control practice and compromising patient safety. In this context, a whole-system perspective involves identifying the various components of the AMU work system and assessing the nature of the relationships and links between each of them, in relation to pertinent clinical practice.

In the present study, ethnography offered an in-depth approach to exploring the relationship between context, culture and events, in relation to the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU (Savage, 2006). 'Context' referred to work systems (including organisational legal structures, information systems and formal support structures); the work social context (including teamwork, leadership and management); the environment within which work occurred and the equipment with which people performed work. 'Culture' referred to basic assumptions and values, beliefs, procedures

and behavioural conventions that were shared by AMU staff, and that influenced (but did not determine) each staff members' behaviour and their interpretations of the 'meaning' of other people's behaviour. 'Events' related to staff, patient and visitor interactions and activities, including services that staff delivered to patients.

Having such a contextual perspective was important in this study, as merely focusing on specific aspects (facets and perspectives), would have provided limited understanding of the complex, multifaceted elements (and influences) that were affecting infection prevention and control practice in the AMU (Carayon *et al*, 2014; De Bono *et al*, 2014; Savage, 2006). It would have also provided limited understanding of both clearly visible and subtle elements (and influences) affecting pertinent practice. In particular, a contextual, whole-system perspective to undertaking research in the AMU, revealed a complex socio-technical work system that lay at the heart of perceived infection prevention and control problems in the AMU (Chapter 7).

8.3 An appreciation of a complex socio-technical work system

As highlighted in Chapter 1, the doctoral journey presented in this thesis was based on a research priority identified by the matron of the local AMU, with regard to observed infection prevention and control related service failures and inefficiencies that were being experienced in the unit. The goal was to understand how AMU clinicians assessed patients with symptoms of diarrhoea and vomiting and managed those whose symptoms were suspected or confirmed to be infectious. The investigation that ensued, sought to contextually understand the observed infection prevention and control problems in this unresearched area of practice and did not impose any hypothesis. As the investigation progressed, it began to emerge that the core of the perceived infection prevention and control related problems lay in the socio-technical complexity of the AMU, as described in Chapter 7. The term 'socio-technical', refers to the interdependency between social and technical elements of the AMU; where social elements related to patterned networks of relationships between individuals and groups in the AMU, whilst technical elements related to material technology, as well as procedures, structures and a broader sense of technicalities (Opazo, 2010; Trist, 1981). In other words, two kinds of systems of different levels of complexity (social and technical systems), coupled together to become a socio-technical system.

This finding - that the AMU at the study site is a complex socio-technical work system - is unsurprising, as many healthcare researchers and commentators have described various socio-technical complexities in healthcare work systems spanning primary, secondary and tertiary care

settings (Allen and May, 2017; Backman *et al*, 2012; Carayon *et al*, 2011; Debono *et al*, 2013; Knobloch *et al*, 2017). To this end, Plsek and Greenhalgh (2001) describe healthcare as a complex, adaptive system that has the following characteristics: system boundaries that are fuzzy and ill-defined; inherent self-organisation through locally applied rules; individuals in the healthcare system who use often-internalised rules and mental models that may not be shared with, or understood by others; people and system(s) that adapt to local contingencies; systems embedded within other systems that co-evolve and interact over time; interactions between multiple systems that may produce tension and conflict that do not necessarily need to be resolved or can be resolved; system interactions that are non-linear and often unpredictable and system interactions that continually produce new behaviours and new approaches to problem solving. In addition, Effken (2002) describes healthcare as a complex dynamic socio-technical system in which groups of people cooperate for patient care and are faced with numerous contingencies that cannot be fully anticipated; often because the people involved have different perspectives. This, therefore, means that the socio-technical complexity observed in the AMU at the study site, is not unique to the AMU. Indeed, such complexity is to be expected in other hospital departments (Carayon *et al*, 2011), in AMUs in other hospitals (Lees *et al*, 2013) and in various other clinical and non-clinical settings in the NHS as a whole (Baxter and Sommerville, 2011; Waterson, 2014).

In order now to make sense of how the AMU's complex socio-technical work system (at the time of the study) impacted on patient, clinician and organisational infection prevention and control outcomes, a socio-technical systems analysis framework is required. At present, however, there are numerous approaches for the analysis of socio-technical systems, spanning multiple disciplines and underpinned by various assumptions (Baxter and Sommerville, 2011; Carayon *et al*, 2011; Mumford, 2006; Nathanael *et al*, 2002; Rosenorn-Lanng, 2014). Within healthcare research itself, there is currently no consensus as to the best approach for the analysis of complex socio-technical healthcare systems (Carayon *et al*, 2011; Hughes *et al*, 2017; Xie *et al*, 2016). This, in part, is because those engaged in this area of healthcare research have borrowed from different scientific disciplines, different assumptions and ways of looking at socio-technical systems, depending on subject focus (Carayon, 2006; Harrison *et al*, 2007; Marsilio *et al*, 2017; Sittig and Singh, 2010). For example, a majority of socio-technical systems analysis approaches have related to technologies (mainly, healthcare information technologies) and focused on systems engineering and people's interactions with technologies (Baxter and Sommerville, 2011). This has, however, led to gaps in identifying and understanding important social aspects of healthcare, including culture, organisational structure and people's interactions with each other. Gaps that have subsequently led to incorrect approaches to solving problems, as well as failures in

implementing new technologies in some healthcare settings (International Association for Management of Technology, 2018). To this end, SEIPS 2.0 (Holden *et al*, 2013), a socio-technical systems analysis approach rooted in human factors principles, has been chosen as the best fit for the present study. This is due to its systems orientation, person-centredness and established rapport in relation to its use in the design and analysis of multiple patient safety research projects (including infection prevention and control), spanning multiple healthcare delivery settings (Barker *et al*, 2017; Carayon *et al*, 2014; Holden *et al*, 2013; Ngam *et al*, 2017; Wilson *et al*, 2017; Yanke *et al*, 2015). These considerations were pertinent to the present study as under the 'systems orientation' umbrella, it is recognised that performance results from the interdependent interactions of the social and technical elements of a socio-technical system (Holden *et al*, 2013). Furthermore, under 'person-centredness', it is recognised that central to any healthcare work system is 'the person' and/or groups of people; meaning that efforts must be taken to support people through the design of work systems that fit their performance needs, strengths, limitations and other pertinent characteristics (which may include culture), not the other way round – that is, to make people fit the work system (Carayon *et al*, 2006).

8.3.1 Approach to understanding the socio-technical complexity of the AMU

In the present study, 13 broad themes of factors identified as affecting diarrhoea and vomiting related infection prevention and control practice in the AMU, were identified. These themes and related subthemes are all connected to each other and the other findings of the study. One way of making sense of, and explaining these connections, is by mapping them using the SEIPS 2.0 model. Nevertheless, given the numerous diarrhoea and vomiting related infection prevention and control activities represented in the data collected in the present study, such a mapping exercise cannot be completed in the time allocated for this doctoral work. Furthermore, in terms of practice solutions, it would be impractical to simultaneously address all problematic socio-technical elements of a complex AMU clinical environment. As such, a pragmatic solution would be to employ a systematic approach that has a starting point, using examples that can be further developed. To this end, and in order to demonstrate how to map identified themes, whilst also explaining and showing how they relate to each other and the other study findings, three observed and reported infection prevention and control related activities, will be used (Table 28, pages 182-183). The first, relating to patient assessment practice, was of clinicians taking a patient's history in order to help assess their infective status. The second, relating to patient management practice, was the immediate isolation of patients with suspected infectious diarrhoea and vomiting. The third, also relating to patient management practice, was the de-isolation of patients whose symptoms had either resolved or were identified as non-infectious.

8.4 AMU work system components impacting on infection prevention and control practice

As described in section 7.4.2, SEIPS 2.0 depicts a socio-technical work system with six networked components that can interact simultaneously at 'a moment in time' in order to shape work processes, which in turn shape either desired or undesirable outcomes. These work system components include person(s), tasks, tools and technologies, organisation, internal environment and external environment. As demonstrated in Table 28 (next two pages), due to some of the unique tasks and actions involved in the individual infection prevention and control activities, these components interacted differently in respective activities. Beyond demonstrating complexity, these interactions also show both common and unique component-related factors that most strongly shaped individual and collective exemplified infection prevention and control activities in the AMU at the time of the study.

8.4.1 Person(s)

Person-centredness and well-being is a key principle in human factors thinking and is placed at the centre of SEIPS 2.0 to highlight the need for work systems to support people to do the right thing. As exemplified in Table 28, through Activity B (the immediate isolation of appropriate patients), the AMU coordinator's incentive and ability (P3) to immediately isolate a patient, was shaped by other clinicians; tools and technologies; organisational and internal environmental factors within the system. In the present study for example, where there were no isolation rooms available, immediate isolation was not possible. Furthermore, where the coordinator and other clinicians had a high workload, patients' immediate isolation was not always a priority. In these two examples, the work system did not always support the coordinator to do the right thing.

With regard to individual, 'person'-related factors, this study has highlighted how factors such as beliefs, values and attitudes; social and professional-related skills and experiences; and individual cognitive states, shaped the performance of an activity. This is shown through all three examples presented in Table 28. For example, when taking a patient's history (Activity A), the clinician's clinical judgement and history taking skill (P1) and the patient's cognitive state, willingness and ability to communicate essential information (P3), shaped the questioning, sense making and answering tasks (Tk2 and Tk4) of the history taking process.

(A) Clinicians taking a patient's history	(B) The immediate isolation of appropriate patients	(C) The de-isolation of suitable patients
The performance of respective activities was most strongly shaped by a combination of:		
Person(s) factors: P1, P2, P3 and P4 <ul style="list-style-type: none"> - P1: Assessing clinician's clinical judgement and history taking skill - their personal and professional experience. - P2: Assessing clinician's physical and mental workload. - P3: Patient's cognitive state and their willingness and ability to communicate essential information. - P4: Caregiver's knowledge of patient's history and their ability to understand questions and convey key information. 	Person(s) factors: P1, P2 and P3 <ul style="list-style-type: none"> - P1: Assessing clinician's clinical judgement, beliefs and suspicions of potentially infectious diarrhoea and vomiting. - P2: Assessing clinician's perceived available time (as determined by workload) and ability to search for and convince AMU coordinator of the need to isolate patient. - P3: AMU coordinators workload and prioritisation of the need to immediately isolate patient. 	Person(s) factors: P1, P2, P3 and P4 <ul style="list-style-type: none"> - P1: Nursing staff ability to maintain accurate documentation (including stool and vomit chart). - P2: Reviewing clinician's awareness and knowledge of de-isolation plan and/or protocol. - P3: Reviewing clinician's medical knowledge of the patient. - P4: AMU coordinators workload, knowledge of de-isolation plan/protocol and ability to facilitate patient movement.
Task factors: Tk1, Tk2, Tk3 and Tk4 <ul style="list-style-type: none"> - Tk1: Clinician: finds and reviews information by others. 	Task factors: Tk1, Tk2 and Tk3 <ul style="list-style-type: none"> - Tk1: Assessing clinician: finds, alerts and convinces AMU 	Task factors: Tk1, Tk2 and Tk3 <ul style="list-style-type: none"> - Tk1: Clinician: finds information, reviews it and concludes

<ul style="list-style-type: none"> - Tk2: Clinician: asks questions, waits for answers and makes sense of all available information. - Tk3: Clinician: documents findings and working diagnosis. - Tk4: Patient/caregiver: understands and answers clinician. 	<ul style="list-style-type: none"> coordinator of the need for patient isolation. - Tk2: AMU coordinator: finds and allocates isolation room, and then assigns staff to move the patient into the room. - Tk3: Assigned staff: organise and move patient into room. 	<ul style="list-style-type: none"> that patient can be de-isolated. - Tk2: Clinician: finds/informs AMU coordinator of decision. - Tk3: AMU coordinator: finds and allocates bed space, and then assigns staff to move the patient into the bed space.
Tools/Technology factors: T1 and T2 <ul style="list-style-type: none"> - T1: Design and ease of access to electronic and paper-based patient medical records - T2: Training on, and access to d&v assessment tool. 	Tools/Technology factors: T1 <ul style="list-style-type: none"> - T1: Access to, and training on bed management system. 	Tools/Technology factors: T1 and T2 <ul style="list-style-type: none"> - T1: Access to d&v assessment tool / stool and vomit chart. - T2: Training on, and accurate completion of, diarrhoea and vomiting (d&v) assessment tool, and stool and vomit chart.
Organisation factors: O1, O2, O3, O4 and O5 <ul style="list-style-type: none"> - O1: Leadership, teamwork and staff support: availability, accessibility and situational awareness of peers and/or leadership to support and/or facilitate successful task completion. - O2: Departmental culture and norms: a task-oriented culture with time pressures as a norm, often fuelled by high workload and competing planned and unplanned tasks to perform. - O3: Professional cultures and norms: hierarchy and subordination among clinicians of different professions and among clinicians of the same profession. - O4: Complexity of communication: ease of access to, and flow of information in the AMU, through formal and informal, verbal, electronic and paper-based information systems. - O5: Hospital policies regarding patient assessment, isolation of suspected infectious patients and patient de-isolation. 		
Internal Environment factors: IE1 <ul style="list-style-type: none"> - IE1: Location of patient: isolation room (privacy and less disruptions) or open bay (less privacy, more interruptions). 	Internal Environment factors: IE1 <ul style="list-style-type: none"> - IE1: Availability of isolation room. 	Internal Environment factors: IE1 <ul style="list-style-type: none"> - IE1: Availability of a bed space in a bay.
External Environment factors: EE1 and EE2 <ul style="list-style-type: none"> - EE1: Local (commissioning) authority expectations that patients are fully assessed when admitted into hospital. - EE2: Guidelines by the RCP regarding the thorough assessment of acutely ill patients. 	External Environment factors: EE1 <ul style="list-style-type: none"> - EE1: National guidelines regarding the immediate isolation of patients with suspected or confirmed infectious diarrhoea and vomiting. 	External Environment factors: EE1 <ul style="list-style-type: none"> - EE1: National and local authority guidelines advocating the need for hospitals to manage and maintain a balance between the prevention of spread of infection and regular/normal organisational activity.
<p>All of the factors highlighted under each activity were mutually intertwined, and as a whole, shaped how (including how well) an activity was performed.</p>		
<p>All three activities presented here were also <i>weakly</i> shaped by other Person(s), Task, Tool/Technology, Organisation, Internal Environment and External Environment factors, such as clinicians' personal beliefs, values and attitudes and/or patients' comorbidities and cooperation.</p>		

Table 28: Examples of three infection prevention and control related activities in the AMU, mapped to SEIPS 2.0 work systems concept

With a specific focus on patients, every patient encountered in the study was unique with respect to illness, behaviour, personal preferences, anatomy, physiology and how their symptoms of diarrhoea and vomiting - or the causes of their symptoms - affected them. Each individual presented different infection prevention and control challenges and opportunities. Cognitive impairment represented the highest reason for non-participation in the study (40% of potential participants were cognitively impaired). It also represented the most cited reason attributed to patients whose infective status was difficult to assess and those who were non-compliant with care plans (including following infection prevention and control related advice). This finding resonated with the findings of VanSteelant *et al* (2015), in which clinicians in their study reported how infection prevention and control practice was generally difficult with cognitively impaired patients, but easier when such patients were in private rooms. In the present study, clinicians generally found it easier to work with patients who were not cognitively impaired, as they could participate in history taking and comply with care requirements.

With reference to diarrhoea and vomiting symptoms themselves and patient assessments (including history taking, Activity A), the subject of patients with conditions that predisposed them to diarrhoea, presented reporting conflicts among clinicians. This is because some reported finding it easy to assess such patients, whilst others reported difficulties. This reporting conflict could be explained by the fact that there is currently no consensus in literature on how to deal with such patients (NICE, 2013c; Sabol and Carlson, 2007). In relation to history taking interviews and engaging with the history taking process, patients who were interviewed described not feeling embarrassed with regard to talking to clinicians about their incidences of diarrhoea. In contrast, however, clinicians described incidences of patients displaying embarrassment to the point of not fully engaging with the assessment process. This conflict in findings was also reconcilable as it was identified that clinicians cited young patients aged between 16 to 30 years as displaying embarrassment, whereas patients interviewed in the study, ranged from 56 to 86 years of age. This conflict therefore resonates with the view that a person's age influences their perception(s) of communication (interaction) with healthcare professionals (DeVoe *et al*, 2009).

With a specific focus on clinicians, issues to do with physical and mental workloads were a common theme. This finding is, however, not unique to the AMU as it is known that high mental workload in clinical practice impacts on patient care and performance (Weigl *et al*, 2014; Weigl *et al*, 2016; Yurko *et al*, 2010). In this context, mental workload can either be described as the amount of attention a clinician can direct to any given task, or the difference between available attentional resources and task demands (Yurko *et al*, 2010). In general, simple tasks are associated with low mental workload, whereas difficult tasks are associated with high mental

workload. According to Yurko *et al* (2010), a high workload task that is mentally demanding, leaves little or no spare attentional capacity to deal with new or unexpected events, thereby increasing the likelihood of performance errors. In the present study, AMU clinicians worked in a busy, task-oriented work culture. It was observed and reported how they had numerous tasks to perform, regularly multitasked, experienced constant interruptions and were often pressed for time. These issues, coupled together with reports of forgetting to undertake infection prevention and control interventions, as well as other tasks that they had set out to achieve in a day - strongly suggest that AMU clinicians often had mental workload challenges that negatively impacted their practice. There was therefore a need to support clinicians and equip them with tools to monitor the state of their mental workload, so that they sought timely help and support before problems arose (Robson, 2016). Reason's (2004) 'three bucket' model is one such tool that clinicians could use to monitor and risk assess their mental loads (Gluyas and Harris, 2016; Robson, 2016). These buckets relate to self, context and task – so that the fuller the buckets are, the more likely that errors are to occur.

8.4.2 Tasks (within an infection prevention and control activity)

Without close scrutiny, some infection prevention and control related activities do not appear complex. Nevertheless, as demonstrated in Table 28 and by the study's observational and interview data, a single activity often comprised of several tasks. Linking to the preceding 'person(s)' work system component (in relation to mental workload), where an infection prevention and control activity comprised of multiple tasks, successful completion was challenging when clinicians had other (competing) urgent and/or routine tasks to perform. Furthermore, where the tasks included in an activity were dependent on (or influenced by) relatively fixed work system components, such as physical infrastructure, successful completion was also challenging. Therefore, as a result of competing priorities and dependency on other work system components, workarounds were common place. For example, when there were no isolation rooms to enable the immediate isolation of pertinent patients, 'bedside cordoning' was employed as a workaround for isolation care.

Within SEIPS 2.0, workarounds are considered under the concept of 'adaptation', which describes feedback loops, representing planned and unplanned adaptations in the care trajectory that may be short or long-lasting (Holden *et al*, 2013). Allen (2018) also describes this concept as 'emergent organisation'; that is, continuous oversight and on-going negotiations in the management of care, in response to contingencies. This concept is discussed further in section 8.6.

8.4.3 Tools and technologies

The discussion on tools and technology will focus on equipment readiness for use, training, storage, restocking and signposting. In relation to readiness for use and patient assessments, diarrhoea and vomiting related paperwork was often printed out and ready to use. This included the diarrhoea and vomiting assessment tool, the risk assessment tool, the stool and vomit chart and the vital signs (observations) chart. Nevertheless, training on how to complete and utilise the paperwork was essential, as respective documents had to be completed in a particular way. Furthermore, some paperwork contained algorithms to support decision making and as such, training and demonstrations on how to read and interpret these algorithms were necessary for new users. Findings however suggest that on some occasions, training was lacking, so that essential paperwork was either incomplete or not completed properly. This in turn, impacted on the ability of assessing clinicians to undertake thorough assessments when taking patient histories or making decisions regarding the de-isolation of patients (Table 28). Poor documentation also inhibited the performance of other infection prevention and control interventions, when isolation precautions were prematurely stopped because symptomatic patients were presumed to be symptom-free (section 7.3.13).

In relation to storage, restocking and signposting, the problem of clinicians spending much time searching for equipment and resources to undertake routine tasks was raised on a number of occasions. This related to paperwork, gloves, equipment used for cannulation and venepuncture, physiological monitors and universal sanitising wipes. Using the example of paperwork, although there were designated folders and cabinets where essential paperwork required for assessments and reviews was to be stored and/or filed in the AMU, the paperwork was not always there, because of poor restocking. As a result, clinicians often had to go around different storage areas in the AMU, searching for required resources. This exercise was often prolonged, due to the fact that required resources were not always stored in one place. Moreover, there was no signposting or proper system in place to inform clinicians where replacement resources could be found. This was both an inefficient and frustrating way of working, as described by various clinicians. As some explained, time spent (wasted) searching for and gathering resources, translated to less time spent with patients; thereby impacting on time for patient assessments. This finding resonated with reports that nursing staff spend at least an hour per shift locating resources/equipment (Ford, 2009).

8.4.4 Organisation

As highlighted in Table 28, the organisational factors impacting on, and shaping, various infection prevention activities were largely the same. These included hospital policies, leadership, teamwork, staff support, communication and departmental and professional cultures and norms.

Guidelines and policies

Hospital policies (O5), largely based on national and local authority guidelines (external environment, EE1), shaped aspired infection prevention and control practice in the AMU. They formed the bases of what good practice should look like. Nevertheless, in the present study, adherence to these guidelines and policies was variable. As identified by various authors - and found to be true in the AMU - this variability was dependent on issues such as, how clear the guidelines and policies were; whether they were believed; how easily translatable they were into practice; how well they were communicated and made accessible (that is, do people know that they exist and are they easy to locate?) and whether or not they were robust enough to be applied to various (often unanticipated) clinical scenarios (Carthey *et al*, 2011; Cochrane, 2014; Jenner *et al*, 1999; Timen *et al*, 2010).

Leadership, teamwork and staff support

With regard to leadership, teamwork and staff support (O1), in the present study, a lack of effective and consistent leadership and management was observed as significantly impacting on team cohesion, teamwork and infection prevention and control practice. With reference to consistency in leadership, it was noted on the nursing side that over a three-year period (2012-2015), the AMU had had four different matrons. Each matron who came into post introduced new ways of working, to which staff had to adapt. Those who could not adapt, left the AMU and those who remained, needed time to adjust to new ways of working. Among the staff that left were those who championed the infection prevention and control cause, and managers with staff supervisory responsibilities. Their departure, therefore, impacted on supervisory and infection prevention and control support in the AMU. On the medical side, the rotation of doctors, including those in senior trainee posts, affected the continuity of middle-level leadership. Consequently, as a task-oriented culture was dominant in the AMU, a task-oriented leadership and management style was the default way of working, especially when new staff joined the team. This is because new staff required task-oriented guidance, including specific instructions and deadlines, in order to achieve desired clinical outputs (Barr and Dowding, 2012). In this

context, task-oriented (or task-focused) leadership and management is described in the context of leaders and managers who focus on overall success through the completion of tasks. Such leaders and managers are described as less concerned about relationship building and the needs of individual workers (Barr and Dowding, 2012; Sullivan, 2018). This is because their main concern is that workers meet particular goals within pre-set time frames, usually at the expense of other values. Negative consequences of such an approach included poor staff support, low morale and demotivation, increased stress on staff, increased risk of staff burnout, undesired work outcomes and high staff turnover (section 7.3.7).

With reference to teamwork, it was observed in the study that AMU clinicians functioned under conditions of high stress and unpredictability. There were also many competing priorities and constant interruptions that clinicians had to negotiate and juggle within a working day. These combined factors impacted on teamwork and overall team performance, as they often led to conflicts and communication barriers/breakdowns. Clinicians often reported being involved in situations when, whilst undertaking one task, someone would approach them and ask them to either focus on, or give attention to, another task. In other instances, inconsistencies in practice were described where various clinicians did not adhere to, or strictly follow, similar standards of practice. These issues evidenced a lack of situational awareness and shared mental models within the team (Rosenorn-Lanng, 2015). This is further discussed in section 8.6.

In relation to staff support, junior colleagues (whether medical or nursing) could generally access senior doctors and nurses and receive advice and second opinions, with regard to patient assessments and precautions to follow. On calm (mildly-pressured) days, this support structure worked well. On busy (highly-pressured) days, however, senior colleagues were themselves often over-stretched, so that support was often lacking, thereby increasing the potential for errors and omissions across the team. This finding resonated with those reported by Flowerdew *et al* (2012) in their study that investigated positive and negative behaviours associated with working under pressure in an emergency department. In their study, junior clinicians described communicating less with senior colleagues during periods of high service demand. In the present study, given that the AMU was usually busy, there needed to be a review of how the senior support structure worked, so that junior colleagues could receive adequate and consistent support at all times, as recommended by the RCP (2007).

Communication

Regarding communication (O4), three different types were observed in the AMU. These included written communication: medical and nursing notes, letters, message boards and text on posters; spoken or verbal communication: face-to-face and telephone; and non-verbal communication: body language, gestures, actions and dress code. Of these three types, it was observed that there was a heavy reliance on written communication in the AMU and hosting hospital as a whole. Although written messages/records were advantageous, in that they became permanent records that could be retrieved in the future, they were problematic if they were written ambiguously or illegibly (Murray *et al*, 2012). Written communication was also an ineffective way of information transfer if those who were intended to view/receive the information did not access the records, either by choice, a lack of awareness of the need to access them, or an inability to access them (GS1 UK, 2010). For example, essential information that nurses recorded was often documented in nursing notes, which doctors rarely accessed. Conversely, nurses were not in the habit of reading doctors' medical notes which contained pertinent patient information for them. As such, communication of concerns and recommendations between the two groups was often affected. Kyne *et al* (1998) also identified a similar problem in their study, whereby doctors were often unaware of diarrhoea occurring in hospitalised patients, thereby reflecting poor communication among healthcare staff. In the present study, staff who were aware of these communication problems often made a conscious effort to go beyond recording messages in patients' notes (medical or nursing notes) by also having verbal conversations with relevant clinicians.

In relation to spoken or verbal communication, it was noted that in a number of clinician-patient interactions, explanations were not always offered to patients, nor was there an active check as to whether or not what had been communicated had been understood. In relation to clinician-clinician interactions, it was observed that interactions were often performed in interruption situations. This, therefore, increased the likelihood of messages being heard, but not actually processed or committed to memory (Rosenorn-Lanng, 2014; Sweller *et al*, 1998). Message-givers aware of this problem, took care to wait for opportune (non-interruptive) moments to engage clinicians in conversation; offering a forum where understanding of the message being delivered could be checked. Furthermore, message-receivers aware of the problem, would note down what was being communicated to them on their handover/task sheet for later follow-up.

Cultures and norms

With reference to culture, both departmental (O2) and professional (O3) cultures and norms had a profound impact on how people worked and the tasks they performed. For example, with regard to clinicians taking a patient's history (Table 28), the departmental task-oriented culture and time pressured norms influenced heavily on clinicians' physical and mental workload, so that they sometimes treated patient assessments as rushed 'tick box' exercises (section 7.3.5), in order to move on to other tasks.

Culture itself is largely invisible and yet affects employee thinking, behaviour and patient outcomes (Braithwaite *et al*, 2017; Carpenter *et al*, 2012; Hutchison *et al*, 2015). In the present study, observed AMU norms included the prioritisation of tasks related to treating acutely unwell patients; clinicians juggling multiple, competing priorities; constant interruptions; high staff turnover and poor staffing. The combination of all these norms contributed towards the establishment of a largely task-oriented (task-focused) work culture. This task-oriented culture contributed towards regular adoption of shortcuts or omissions in relation to infection prevention and control activities, as clinicians endeavoured to save time and award it to the performance of other tasks. Overall, in the context of all the clinical tasks that had to be performed in a working day, it appeared as though infection prevention and control activities that were not planned for (and perceived as either inconvenient, time-wasting or non-urgent), were either ignored or undertaken in an unconventional, often risky manner. By definition, a task-oriented culture can be described as one in which individuals focus on tasks, or a series of tasks at hand, as well as the procedures necessary to achieve these tasks - often at the expense of other values/considerations (Barr and Dowding, 2012; Sullivan, 2018).

In addition to the departmental culture, there were various subcultures within the AMU. These included a medical professional culture, a nursing professional culture, a nursing team culture and professional subordination cultures (section 7.3.6). As various authors highlight, such subcultures are not unusual, but it is important that they are acknowledged and understood, as they have an impact on overall team performance, clinical practice and patient outcomes (Braithwaite *et al*, 2017; Davies *et al*, 2000; De Bono *et al*, 2014). In the present study, issues to do with hierarchy and subordination within these subcultures, were identified as impacting on infection prevention and control practice in the AMU. For example, with regard to the immediate isolation of appropriate patients (Table 28), issues linked to professional hierarchy affected the process of convincing the AMU coordinator regarding the need for patient isolation. This was expressed through how coordinators sometimes required doctors' reviews to be performed before they

would accept nurses' requests for patients to be placed into isolation rooms (section 7.3.4). Such hierarchy and subordination issues are, however, not new in healthcare (Churchman and Doherty, 2010; Crowe *et al*, 2017; Hall, 2005; Skela Savič and Pagon, 2008). Nevertheless, various commentators encourage organisations to support clinicians in identifying the negative issues that hierarchical structures and subordination can cause, so that patient safety is not compromised (Braithwaite *et al*, 2017; Davies *et al*, 2000; Hall, 2005).

8.4.5 Internal environment

It is well known that the physical environment (design and layout) of clinical settings has an impact on infection prevention and control practice (Stiller *et al*, 2016; Trudel *et al*, 2018; VanSteelandt *et al*, 2015). In the present study, with regard to design, the AMU at the study site had four open-plan areas (AMU 1, 2, 3 and Short Stay) and 11 isolation rooms (Figure 1, page 5). These open-plan areas had one to three bays in each area that had no doors. The bed spaces in these bays were in close proximity to each other and temporary privacy and segregation was achieved by the drawing of retractable cloth curtains situated in-between bed spaces. This open-plan layout made it possible for clinicians to monitor critically ill patients from a distance. Nevertheless, in incidences when patients with symptoms of diarrhoea and vomiting were being cared for in open bays, the layout posed a significant risk of the spread of infection to other patients, staff and visitors.

With a specific focus on isolation rooms, these were viewed by clinicians as optimal locations for managing patients with symptoms of diarrhoea and vomiting. This is because they were quieter than the rest of the unit, offered privacy and contained patients with suspected or confirmed infectious symptoms. Furthermore, in relation to activities such as clinicians taking a patient's history (Table 28; Activity A, IE1), whilst inside isolation rooms, clinicians were less likely to be interrupted, as those seeking to speak with them could either not find them or would wait until they exited the isolation room, if the door was closed. These advantages relating to increased privacy, more personalised patient contact and potentially fewer interruptions are similar to those cited in expert opinion literature (National Nursing Research Unit, 2009). Nevertheless, isolation rooms were a finite resource, as there were only 11. This, therefore, had a significant impact on isolation capacity and often negatively affected activities such as the immediate isolation of appropriate patients (Table 28; Activity B, IE1), resulting in undesirable adaptations, such as bedside cordoning.

8.4.6 External environment

As shown in Table 28, a number of national, local authority and regulatory body guidelines and policies impacted on, and shaped infection prevention and control practice in the AMU. For example, based on national guidelines, the AMU had adopted practices such as the use of the Bristol Stool Chart and the aspiration to immediately isolate symptomatic patients (Department of Health, 2012b). Nevertheless, as previously discussed, the successful use of the Bristol Stool Chart was dependent on the accessibility of the tool, how well staff were trained on its completion (organisation and tools and technology factors) and whether staff could make time to properly complete it (person factors). Furthermore, because of finite resources (internal environment factors), the performance of activities such as the immediate isolation of symptomatic patients, was only achievable when there were available isolation rooms in the unit. Moreover, from a critical view, it is worth highlighting that guidelines and policies are written by people, meaning that they are shaped by those people's views of how things are and/or should be (Jenner *et al*, 1999; Waring *et al*, 2016); views that may not always be workable. As such, in partnership with end-users and as knowledge and technology advance, these documents require regular reviews.

8.5 Infection prevention and control work processes in the AMU

Just as there are numerous configurations (interactions) of work system components within individual infection prevention and control activities, there are also numerous physical, cognitive and socio-behavioural work processes that involve various contributors (active agents and co-agents; section 7.4.2). The term 'process' in this context refers to linked actions with the purpose of producing an outcome (or completing an activity). As shown in Tables 29 and 30 (next two pages), using history taking and the de-isolation of suitable patients as examples, taking a patient's history was collaborative work (in which the assessing clinician and the patient were actively engaged), whereas the de-isolation of suitable patients was professional work (in which clinicians were primary agents). In this context, and in relation to the other findings of the study, the successful completion of the history taking process largely lay in clinician preparedness and interviewing skill (section 7.3.1); the patients' cognition and willingness and ability to engage with the history taking process (section 7.3.11); as well as the interactive patient-clinician dynamic at a given time (sections 7.3.1 and 7.3.11). This is in contrast to the de-isolation of suitable patients, where successful completion largely lay in the collective work of clinicians involved in patient monitoring; clinicians involved in patient assessments; the coordinator; as well as the availability of a bed space (sections 7.3.13 and 7.3.4).

Work process	Clinicians taking a patient's history (in order to help assess the patient's infective status). This includes the assessing clinician (nurse and/or doctor) reviewing information supplied by other professionals; the clinician asking the patient/caregiver pertinent questions (including referring to the assessment tool for guidance); the patient/caregiver understanding and adequately answering questions; the clinician clarifying answers; the clinician making sense of all the information (including seeking peer and senior colleague support) and the clinician documenting their findings, working diagnosis and care plan.		
Type of work process	Collaborative (professional-patient) work.		
> Active agents	Assessing clinician (nurse and/or doctor) and patient/caregiver.		
> Co-agents	Senior medical and/or nursing colleagues and other professionals (including referring GP and/or emergency department practitioners; AMU healthcare assistants, nurses and doctors) and relatives.		
Work system factors	Person(s), task, tools/technology, organisation, internal environment and external environment factors as described in Table 28, pages 182-183.		
Outcomes	Patient outcomes	Clinician outcomes	Organisational outcomes
> Proximal outcomes: <i>When the history taking exercise is effective</i>	Improved health outcome if infection is identified and remedial treatment and management commenced.	Timely commencement of isolation precautions.	Immediate isolation, cohorting or cordoning of potentially infectious patient. Lowered risk of spread of infection to staff, patients and visitors.
<i>When the history taking exercise is ineffective</i>	Potentially poor health outcome if infection is not identified and remedial treatment and management commenced.	Exposure to infection, as isolation precautions not timely commenced.	Non-isolation of potentially infectious patient. Increased risk of spread of infection to staff, patients and visitors.
> Distal outcomes: <i>When the history taking exercise is effective</i>	Less time spent in hospital. Potentially improved recovery period if appropriate treatment and management commenced.	Increased likelihood of better patient management throughout care trajectory, as most needs/concerns identified.	Lowered risk of infectious outbreak.
<i>When the history taking exercise is ineffective</i>	Longer hospital stay. Longer recovery period. Increased risk of death if appropriate treatment and management is delayed.	Less than ideal patient management throughout care trajectory, as not all needs/concerns identified. Time off work if infection acquired.	Increased risk of infectious outbreak. If outbreak occurs: loss of staff due to ill-health, increased financial burden, lost bed days and negative press.

Table 29: Example of work process and work outcomes concepts - based on clinicians taking a patient's history (in order to help assess the patient's infective status)

Work process	The de-isolation of a patient whose symptoms either resolved or were identified as non-infectious. This includes the primary clinician (nurse or doctor) reviewing the patient (including going through their stool and vomit chart and/or stool results); the clinician concluding that the patient meets de-isolation criteria (including referring to policy for guidance); the clinician informing the AMU coordinator of their conclusion; the AMU coordinator seeking, finding and allocating the patient a bed space in a bay they can move into; the AMU coordinator (or primary nurse) assigning healthcare assistants and/or porters to move the patient into the allocated bed space; and finally, the assigned healthcare assistants and/or porters moving the patient into the allocated bed space.		
Type of work process	Professional work.		
> Active agents	Primary clinician (nurse or doctor) caring for the patient, AMU coordinator, healthcare assistants and/or porters.		
> Co-agents	Patient and relatives.		
Work system factors	Person(s), task, tools/technology, organisation, internal environment and external environment factors as described in Table 28, pages 182-183.		
Outcomes	Patient outcomes	Clinician outcomes	Organisational outcomes
> Proximal outcomes <i>When appropriate, timely de-isolation occurred</i>	Removal of isolation protocols/restrictions – including removal of visitor restrictions. Ability to move freely around unit and hospital – including using public facilities.	Clinicians no longer required to adhere to isolation protocols. Increased patient-clinician interaction.	Isolation room available for other suspected or confirmed, infectious patients.
> Distal outcomes <i>When appropriate, timely de-isolation occurred</i>	Increased interaction with the outside world. Improved psychosocial interaction and wellbeing.	Patient no longer treated as an infectious threat.	Positive impact on patient flow, especially where isolation facilities are required.

Table 30: Example of work process and work outcomes concepts - based on the de-isolation of a patient whose symptoms either resolved or were identified as non-infectious

Understanding the differences in exemplified work processes, not only helps to make sense of individual activities, but also helps identify which actions need to be improved or addressed in order to successfully complete respective activities. With a specific focus on history taking, the quality of answers that clinicians received was dependent on whether their questions were understood as intended and how well patients could tell their story. Before offering a response, it was necessary for patients to decode (make sense of) questions asked of them (Barr and Dowding, 2012; Berry, 2007). Nevertheless, owing to the illness state of most patients, this sense making process was often affected, thereby leading to breakdowns in communication and subsequently, ineffective assessments (Raymont *et al*, 2004). Assessments could therefore have benefited from clinicians initially ascertaining the patients' cognitive abilities, and then adapting their interaction, in order to receive the best answers (Berry, 2007; Raymont *et al*, 2004).

With reference to de-isolation practice, it was clear - at the time of undertaking the study - that de-isolation planning was not routine practice in the AMU. This can be seen in Tables 28 and 30, where the person factors that were strongly shaping the de-isolation process, and the observed de-isolation work processes, did not include the drafting and documentation of a de-isolation plan at the point of the patient's initial assessment. This was a significant finding, which highlighted the need for assessing clinicians to be trained and supported with regard to pro-actively devising and outlining a patient de-isolation plan.

8.6 AMU infection prevention and control outcomes, adaptations and potential practice solutions: a theoretical understanding

As observed in the study, infection prevention and control outcomes were variable. Sometimes, all the conditions required for an activity to be optimally executed, aligned with each other, and sometimes they did not. What was needed, therefore, was a whole-system understanding to support and facilitate best practice (desirable outcomes) in infection prevention and control. This section will offer some theoretical explanations of what was happening in the AMU at the time of the study. It will discuss the intertwined relationships between different infection prevention and control activities and show how adaptations in the management of care arise. These explanations will provide insight into the AMU situation and make it possible to explore some 'first-step' potential solutions to infection prevention and control related practice challenges.

Having established that the AMU at the study site was a complex socio-technical system, whose work system components interacted in various ways to shape clinical outcomes, it can be seen

that what the AMU matron presumed to be an infection prevention and control problem was actually a symptom (a negative indicator) of the socio-technical conditions surrounding and shaping pertinent activities. Study findings suggest that in order for any given infection prevention and control activity to be successfully performed, the work system components that most strongly shaped the activity had to be in alignment. Short of this, clinicians would employ workarounds (or ad hoc adaptations) in an attempt to decrease the gap between 'actual' versus 'ideal' practice. Nevertheless, even when these components aligned, the busyness of AMU clinicians - characterised by a task-oriented work culture - often interfered with the performance of desirable practice. Furthermore, people's expectations (as influenced by their perspectives) in relation to specific infection prevention and control practices, served to either facilitate or interfere with best practice. In other words, it can be seen that in relation to any one infection prevention and control activity: the combination of work system components that most strongly shaped an activity; the expectations of self and others in relation to the said activity; the practical contents of work (that is, the tasks one had to perform in relation to the said activity and as part of general work), shaped (and often interfered with) the delivery of infection prevention and control related care in the AMU. Figure 34 (next page) illustrates this concept.

8.6.1 Work system components that most strongly shaped an activity

In relation to the intricate coupling of the social and technical elements of the AMU (section 8.4), it was clear that in order for any given infection prevention and control activity to be successfully performed, the work system components that most strongly shaped the activity, had to align (Table 28, pages 182-183). This alignment included any relevant combination of person(s), tasks, tools and technologies, organisation, internal environment or external environment components. As explained in SEIPS 2.0, while all the components of the AMU work system potentially interacted, only a subset of all possible interactions was actually relevant in a given work process or situation (Holden *et al*, 2013).

Although clinicians were not actively aware of these interactions, it was observed that when important components required for ideal configuration to occur were affected, practice was adapted in an attempt to facilitate a desirable outcome. As earlier described, the concept of 'adaptation' describes feedback loops, representing planned and unplanned alterations in the care trajectory that may be short or long-lasting. In this context, work processes (that is, linked activities in relation to producing a service or outcome) and their effects were monitored,

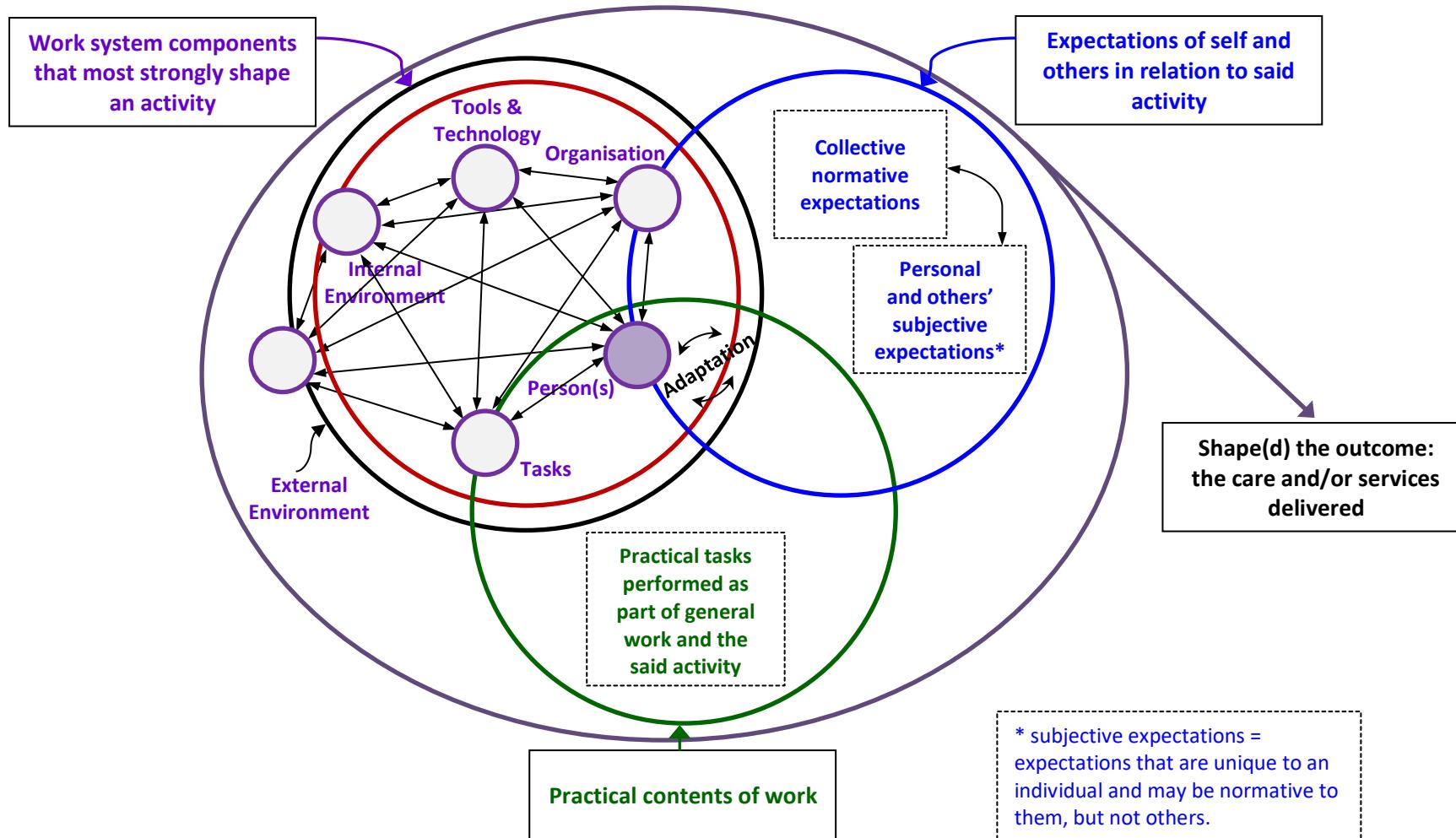


Figure 34: Model demonstrating theoretical understanding of what was shaping pertinent AMU infection prevention and control practice

and adaptations were made in an attempt to decrease the gap between 'actual' versus 'ideal' performance (Holden *et al*, 2013). These adaptations often had a knock-on effect on practical contents of work and people's expectations relating to the activity. For example, if successful history taking was under threat because a patient could not provide a reliable history, clinicians would seek a collateral history from family and/or caregivers (section 7.3.11). This adaptation then impacted on the clinician's practical contents of work by adding extra tasks to the activity and their overall workload (that is, having to seek, find and speak with family and/or caregivers). In this context, adaptations that were well managed had a higher likelihood of producing desirable outcomes, whilst those that were poorly managed were likely to produce undesirable outcomes (Allen, 2018). For example, if the assessing clinician informed colleagues that a collateral history was required for history taking to be fully complete, colleagues' expectations in relation to the activity for that particular patient, would be adjusted and they would (if able) support the assessing clinician in acquiring a collateral history.

8.6.2 The expectations of self and others in relation to said activity

In relation to the social aspects of the AMU, expectations of self and others (including peers and patients) in relation to specific infection prevention and control activities, served to either facilitate or interfere with best practice. Indeed, these expectations were influenced by individual and/or collective perspectives and norms (culture). They could be described as either collective normative expectations across the whole team or personal subjective expectations. In the context of infection prevention and control activities, collective normative expectations created coherent interpretations of what constituted desirable practice, whereas personal subjective expectations gave rise to varied interpretations of what constituted desirable practice. Coherent collective interpretations in the former category did not necessary represent best practice, but they did translate to similar expressions of infection prevention and control practice across the team. For example, AMU clinicians decontaminated equipment that had been in contact with potentially infectious patients using universal sanitising wipes, because they were not aware of policy stipulations to use a chlorine-based disinfectant (section 5.3.4). The latter category, however, often resulted in multiple, often conflicting expressions of infection prevention and control practice. The best example of this was seen in the reflection shared in relation to "the tension of being in the field and observing 'less than exemplary' practice" (section 4.3.4). In the scenario described, I expected the isolation room doors of all patients with potentially infectious diarrhoea to be closed, as taught in the AMU. Nevertheless, patients confined in poorly ventilated rooms would naturally not share such an expectation. To this end, they would often request that doors

be left open. The clinicians caring for them were then placed in a difficult position to choose whose expectations to satisfy. At this point, 'compensatory balance' was struck where positive elements 'compensated' for negative elements in the work system (Carayon *et al*, 2014). Positive elements were that the patient was in a room of their own and not mixing with other patients, whilst negative elements were that the room was uncomfortably warm for the patient and adequate ventilation could only be achieved by the opening of the door. Overall system balance was achieved, therefore, when the overall combination of positive and negative elements produced more benefits than problems for system outcomes (that is, although the door was open, the patient was not mixing with other patients, and their well-being was catered for, in relation to adequate ventilation). In this context, in relation to the performance of effective isolation care, the patient's expectation for adequate ventilation acted as a catalyst to adaptations in practice, which affected both work system components (the door was left open) and practical contents of work (extra policing required to alert others that despite the open door, the patient was potentially infectious), thereby interfering with desirable infection prevention and control practice. Indeed, in agreement with Plsek and Greenhalgh's (2001) description of complex adaptive systems, AMU system interactions produced new behaviours and new approaches to problem solving, in an attempt to find some form of overall system balance.

It is important to highlight here that even the lack of expectation had an impact on infection prevention and control practice. This could be seen in the example of the de-isolation of suitable patients. That is, the combination of poorly completed documentation (section 7.3.13); the lack of individual and peer expectations with regard to de-isolation planning at the point of initial assessment (section 8.5); and the competing priorities (other daily tasks) that clinicians had to attend to (section 7.3.5), often hindered the de-isolation of suitable patients (section 7.3.13) - one of the original concerns raised by the AMU matron (Chapter 1, section 1.5).

8.6.3 The practical contents of work

In relation to the technical aspects of the AMU, the practical contents of work - that is, the practical tasks that people had to perform as part of general work and as part of specific infection prevention and control activities - often interfered with the performance of desirable practice. Owing to the busyness of the AMU (section 7.3.5) and the dominant task-oriented work culture, there were numerous tasks to be performed in any given working day (section 8.4.4). Whether relating to medical reviews, drug rounds, attending to patients' personal care needs or responding to emergency situations (Table 2, page 9), clinical staff performed numerous activities that involved several linked tasks, which combined to create heavy workloads (section 1.2.3.2). In

addition to this, the time that it took to complete these tasks was an important factor, as a work shift has a finite amount of time. In turn, this translated to a finite number of tasks that clinicians could fit into the work shift. To this end, priority and time were given to tasks that were perceived to be of great clinical importance, of which tasks linked to various infection prevention and control activities were often given less time and/or treated as lower priority (section 7.3.5). For example, in the interest of saving time for other 'important' tasks, it was reported how corners were often cut in relation to performing hand hygiene. It was also reported how equipment was either not decontaminated at all, or alternative products to those recommended by the hospital were used in order to facilitate moving on to the next task. Furthermore, as practical contents of work placed a demand on clinicians' cognitive workload, they often reported forgetting to perform certain infection prevention and control activities (section 7.3.2). Overall, as clinicians had many activities and tasks to perform in a working day, infection prevention and control related activities and tasks were among the first to either be forgotten, ignored or completed in a substandard manner, thus hindering the performance of ideal infection prevention and control practice (section 7.3.5).

8.6.4 Potential solutions to improving infection prevention and control outcomes

As shown in the above explanations and examples, the combination of work system components that most strongly shaped activities, people's expectations and practical contents of work, all served to either facilitate or interfere with aspired infection prevention and control practices. On the whole however, interferences were most common, resulting in gaps between aspired and achieved practice. Due to the complexity of components that shaped practice, solutions to bridging these gaps required a whole-system understanding, with an intentional focus on supporting people to do the right thing.

Beginning with a focus on work system components that most strongly shaped the performance of exemplified activities in Table 28 (pages 182-183), it can be seen that highlighted organisational factors (O1 to O5) were common to all. These factors impacted on important clinical team aspects such as information flow (the sharing of essential information), situational awareness (being aware of issues within the work environment and thinking ahead to plan contingencies) and collaborative working (functioning together as a team to facilitate desired outcomes). With a specific focus on teamwork, this aspect of clinical practice is recognised as an essential component in healthcare provision (Fernandez *et al*, 2008). This is because team related issues of poor communication; deficits in interpersonal skills; lapses in situational awareness; lack of coordination or cooperation; ineffective leadership; lack of clarity of leadership and

inconsistencies in processes (or procedures), are identified as contributory factors to error/harm in healthcare settings (Christian *et al*, 2006; Gawande *et al*, 2003). In the present study, team related situational awareness was especially noted as lacking in the AMU team.

Situational awareness refers to being fully engaged and aware of one's environment and any current or potential dangers to health and safety, either to self or others (Curran, 2015a; Rosenorn-Lanng, 2014). Leonard *et al* (2004) describe it as maintaining the "big picture" and thinking ahead to plan and discuss contingencies. In relation to infection prevention and control practice, it was observed how AMU clinicians were not always fully engaged and aware of current and potential threats. For example, the de-isolation of suitable patients (Table 30, page 194) was heavily reliant on the good maintenance of patient monitoring records (section 7.3.13), however, these were often poorly maintained. This displayed a lack of foresight to potential repercussions on the part of those responsible for their maintenance. As reviewing clinicians could not make de-isolation decisions on patients in isolation rooms, those assessed as requiring immediate isolation (Table 28, pages 182-183) could not be accommodated. This resulted in the implementation of bedside cordoning (section 7.3.9) as a workaround (Debono *et al*, 2013); that is, an adjustment in the care trajectory (Allen, 2018) - an adaptation to decrease the gap between 'ideal' and 'actual' performance (Holden *et al*, 2013). A secondary situational awareness problem was then created, where deficiencies in alerting the wider team of a potentially infectious patient in the bay, resulted in team members not implementing precautions, as they associated open bays with non-infectious patients (section 7.3.10). Through this example, it can be seen how one infection prevention and control outcome affected another; how one work system component affected another; how one work system component affected an outcome and how an outcome affected a work system component. In other words, there were multiple-level interactions and cross-level effects that are difficult to show on a 2-dimensional model (Holden *et al*, 2013). Overall, there was a need to improve individual and collective situational awareness of infection prevention and control related matters and other safety issues in the AMU, through shared mental models (Robson, 2016; Rosenorn-Lanng, 2015).

Shared mental models can be described as shared cognitive representations or knowledge structures of tasks, situations or other factors that enable team members to function collaboratively in their environment (McComb and Simpson, 2013; Rosenorn-Lanng, 2015). In order to develop these models, Rosenorn-Lanng (2015) suggests that it is important to gather input and ideas from the team. Robson (2016) further suggests that this task could be achieved through safety huddles; these are described as 'a brief coming together of staff, once or more in a shift, aimed at maintaining situational awareness, sharing observations and going through risks'.

According to Robson (2016), any team member can take part in, or lead the safety huddle, whether they are nurses, doctors, physiotherapists or ward clerks. Risk assessment questions could include: At this moment in time, what important information does the team need to know about you and your patients? How is your workload? Are we managing to adhere to infection prevention and control standards? What type of support would you like to receive? From a clinical team point of view, such an exercise would also allow staff to start forming common expectations through the sharing of (talking about) work-related opportunities and challenges.

Nevertheless, due to the task-orientated work culture in the AMU at the time of the study, in which teamwork and situational awareness were problematic, safety huddles may be difficult to implement and embed. To this end, utilising an existing resource could offer the best option; that is, actively supporting and empowering the AMU-based infection prevention and control champion/advocate (the Infection Prevention Link Nurse for AMU; section 4.4.1) in their role. This was an AMU-based clinician with an expressed interest in infection prevention and control, who often worked closely with AMU staff, helping them to prioritise infection prevention and control related practices on a local level (RCN, 2013b). With the right support, they would be instrumental in championing a whole-system approach to improving infection prevention and control practice, including leading by example; liaising with, and actively involving patients and their families; facilitating team situational awareness; engaging in staff infection prevention and control related development and being the link that bridges the ‘practice as imagined’ and ‘practice as done’ gap between leadership and frontline staff, by representing both sides. As the RCN (2013b) suggests, as well as championing the infection prevention and control cause, individuals in such roles should be involved in creating effective and supportive workplace structures and cultures for infection prevention and control. As various authors have reported, areas that have employed champions who are well supported in their role, have seen improvements in various aspects of infection prevention and control (Hale *et al*, 2015; Marra *et al*, 2013; RCN, 2013b; Sopirala *et al*, 2014). For example, in their observational study investigating the effect of positive deviance on compliance with hand hygiene in two inpatient units, Marra *et al* (2010) saw a statistically significant reduction in the incidence of device-related healthcare associated infections as a result of positive deviants (champions) who took ownership of hand hygiene practice in their areas. Among other activities, these deviants organised and facilitated regular meetings with unit clinicians, in which hand hygiene experiences were shared and practice improvements discussed. Their efforts led to practical changes such as optimal re-positioning of alcohol gel dispensers in the unit, as well as investments in training unit staff in hand hygiene performance. Furthermore, as a result of these individuals, sustained improvements in hand hygiene practice were also reported in both units.

8.7 The value of human factors thinking and a whole-system approach to investigating and understanding infection prevention and control related clinical practice challenges

This study has demonstrated that a whole-system approach to exploring infection prevention and control related issues in clinical practice, allows for in-depth understanding of pertinent socio-technical elements shaping this aspect of care. Employing an ethnographic approach that sought to gain in-depth understanding of the contextual influences shaping infection prevention and control practice in the AMU, led to an appreciation of the AMU as a complex socio-technical system. To better understand this system, a human factors-based socio-technical systems analysis approach was used (Holden *et al*, 2013). This approach made it possible to arrive at the understanding that, in relation to any one infection prevention and control activity in AMU-like areas, the combination of work system components that most strongly shaped an activity, the expectations of self and others in relation to the said activity, as well as the practical contents of work, shaped (and often interfered with) the delivery of ideal care (Figure 34, page 197). This understanding has shown that in order for infection prevention and control practice to be improved in complex AMU-like areas, whole-system knowledge of the issues surrounding pertinent activities is needed. This is because whole-system knowledge allows for an in-depth grasp of the interdependent, often nuanced, social and technical work system components of an area that are pertinent to respective activities at specific moments in time. Furthermore, the person-centred aspect of a human factors-based analytical approach, allowed for the intentional unravelling of what facilitated or inhibited people to do the right thing. This included exposing the importance of there being shared understanding of what constitutes best practice/aspired care across the clinical team, so that infection prevention and control expectations were similar and incidences of varied practice were reduced. This focus on the human element is also important for the development of solutions that prioritise supporting people to do the right thing, whilst considering and appropriately accommodating the needs of patients as people (not 'items' to which things are done).

Based on the knowledge and understanding gained through the present study, I recommend that future researchers in the AMU looking at infection prevention and control practice, consider narrowing the focus of their study to a few selected infection prevention and control activities, whilst employing a human factors-based socio-technical systems analysis model to frame the design and analysis of the study. This is because, despite the narrow focus, the model would still allow researchers to capture information, both subtle and obvious, relating to contextually pertinent (most influential) social and technical elements in the clinical environment that shape

the care that is delivered. The following is an example of a narrow-focussed research question: What factors promote or inhibit the ability of AMU doctors, nurses and healthcare assistants to de-isolate patients whose symptoms of diarrhoea and vomiting have either resolved or are no longer suspected to be infectious?

With regard to clinical practice, it is acknowledged that clinicians may not have the analytical skills or tools required to undertake similar, in-depth reviews of everyday clinical practice, as performed in this study (Rosenorn-Lanng, 2014, 2015). As such, having some form of framework to help in achieving such a task would be beneficial. To this end, a human factors model, called the S.H.E.E.P model (Rosenorn-Lanng, 2014), is recommended. The model can help clinicians employ a whole-system approach to analysing and making sense of information acquired through various forms of enquiry - including observations of practice and speaking with key individuals - so that what is both positively and negatively affecting pertinent practice, is better understood. The model systematically categorises important human factors concepts in five sections, for ease of application in reviewing and understanding pertinent clinical issues under examination. Below are brief descriptions of these sections:

S – the **S**ystems within which we work,

H – the people (including patients, their families/carers/visitors, and staff) with whom we interact (**H**uman interaction),

E – the **E**nvironment in which we work,

E – the **E**quipment with which we work, and

P – the **P**ersonal experiences and self-awareness that we bring to the workplace.

(Rosenorn-Lanng, 2015, p2)

Similar to SEIPS 2.0, the S.H.E.E.P model is rooted in healthcare and facilitates comprehensive analysis of complex (socio-technical) healthcare systems, where the five sections are of equal importance to patient safety. These qualities of the S.H.E.E.P model, provide a lens through which gathered information can be contextually examined, whilst making it possible for nuanced socio-technical interactions that propagate or mitigate pertinent clinical problems to be better understood (Rosenorn-Lanng, 2014, 2015). Unlike SEIPS 2.0 however, the S.H.E.E.P model is anecdotally easier to remember and apply in frontline clinical practice and as such, is recommended for frontline clinical staff. Using the example of a diarrhoea and vomiting related infection prevention and control activity discussed in this chapter, Table 31 (next page) illustrates how - with some restructuring - the S.H.E.E.P model could be used to categorise and make sense of issues impacting pertinent practice under review.

Activity under review: The de-isolation of suitable patients		
Factors observed and identified as most strongly affecting the above-mentioned activity	S	Formal systems factors (policy): De-isolation protocols are written in relevant policy documents. Informal systems factors (culture): There is no obvious expectation or requirement in the unit for de-isolation planning to be performed. Reviewing clinicians (doctors) report often being put on the spot to determine patients' de-isolation suitability.
	H	Team dynamics among clinicians appear to be amicable, however, there is no coordination (leadership) with regard to tasks that facilitate the above-mentioned activity. Also, nurses expect doctors to take lead on de-isolation decisions, despite policy empowering them to also make these decisions.
	E	Patients who no longer require isolation can be moved to bays on downstream wards.
	Equipment > E	Stool and vomit charts are often absent or incomplete.
	P	Reviewing medical clinicians appear to have good working knowledge of de-isolation protocol, however, there does not appear to be an awareness among all staff in the unit, with regard to the interrelatedness of tasks that facilitate the above-mentioned activity.
Investigator's reflection	At the time this information was gathered, it was noted that there was no formal requirement for assessing clinicians to outline a de-isolation plan for patients meeting the criteria for isolation care. Furthermore, stool and vomit charts required by reviewing clinicians to determine whether or not patients were free of symptoms, were either absent or incomplete.	
Recommendation(s)	<ul style="list-style-type: none"> - Encourage assessing clinicians to outline a de-isolation plan for patients at the point of initial assessment, as this may facilitate conscious completion of related de-isolation tasks by the wider team and give nurses confidence to make decisions. - Raise staff awareness regarding the current negative impact to timely patient de-isolation due to poor stool and vomit chart documentation and investigate why some staff are either not starting or fully completing these charts – it may be that some staff do not know how to complete it. - It may also be a good idea to ask able patients to complete their own stool and vomit charts, especially those who are self-caring and have toilets in their room. 	

Table 31: An example, illustrating the clinical application of the S.H.E.E.P model (Rosenorn-Lanng, 2014)

In conclusion, an ethnographic approach to investigating diarrhoea and vomiting related infection prevention and control practice issues in the AMU, has allowed for in-depth knowledge to be gained of the wider contextual, social and technical factors affecting this aspect of care. The

present study has shown that numerous, multifaceted socio-technical factors affect diarrhoea and vomiting related patient assessment processes and the performance of aspired infection prevention and control interventions in the AMU. Solutions to infection prevention and control challenges should, therefore, not only focus on immediate problems, but consider contextual socio-technical system factors shaping identified problems (Gould *et al*, 2016; Timen *et al*, 2010; Yanke *et al*, 2015). Such a perspective will enable clinical leaders to find pragmatic solutions to infection prevention and control and other pertinent clinical challenges (Carayon *et al*, 2014; Castro-Sánchez and Holmes, 2015; Reid and Bromiley, 2012; Wilson *et al*, 2017). Solutions may also include reviews of guidelines and policies that actively involve frontline staff in the review process. This will allow frontline staff to vocalise potential pitfalls in these documents and bridge the gap between 'practice as imagined' and 'practice as done' (Hollnagel, 2017).

8.8 Chapter Summary

This chapter has offered a general discussion on the findings of the study and employed a human factors approach to exploring issues surrounding diarrhoea and vomiting related infection prevention and control practice in the AMU. The multifaceted nature of the socio-technical factors affecting infection prevention and control practice in the AMU have been examined and connections have been made. As well as highlighting resonances with relevant literature, practical and theoretical explanations for the study's findings were discussed. Specifically, in relation to any one infection prevention and control activity in AMU-like areas, the combination of work system components that most strongly shaped an activity; the expectations of self and others in relation to the said activity; as well as the practical contents of work, shaped (and often interfered with) the delivery of ideal care. The discussion showed that no 'one-size-fits-all' solution exists to address current practice challenges. Instead, however, approaches employing a whole-system understanding of the socio-technical factors fuelling identified problems, is needed. In this chapter also, a human factors model that could help clinicians achieve in performing whole-system enquiries of issues affecting pertinent infection prevention and control practice, has been recommended. Overall, an in-depth ethnographic investigation into the assessment and infection prevention and control management of AMU patients with symptoms of diarrhoea and vomiting, has led to a whole-system understanding of socio-technical issues affecting pertinent practice. The next chapter will offer a study summary and conclusion.

Chapter 9 Study summary and conclusion

9.1 Study summary

The idea of this project came about as a result of a research priority identified by the matron of a local AMU, that there was a need to investigate and understand how AMU clinicians managed patients with symptoms of diarrhoea and vomiting. This was based on the matron's clinical observations and concerns that there were some infection prevention and control related service failures and inefficiencies that were being experienced in the unit. These included the poor allocation of resources (including isolation rooms) and poor patient flow. This study aimed to answer the following broad central question:

How are patients with symptoms of diarrhoea and vomiting assessed and managed by Acute Medical Unit doctors, nurses and healthcare assistants - and what factors influence these processes? What are the patients' experiences and understanding of diarrhoeal-related care in the Acute Medical Unit?

The objectives of the study were as follows:

In relation to hospital-based assessments of diarrhoea and vomiting:

- i. To identify and describe how AMU doctors, nurses and healthcare assistants assess the infective status of adult patients with symptoms of diarrhoea and vomiting, in the absence of results from stool microbiology investigations.
- ii. To identify and explain the factors that promote or inhibit the ability of AMU doctors, nurses and healthcare assistants to effectively assess the infective status of adult patients with symptoms of diarrhoea and vomiting.

In relation to hospital-based infection prevention and control measures:

- iii. To identify and describe the infection prevention and control interventions that AMU doctors, nurses and healthcare assistants implement and perform when, caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.
- iv. To identify and explain the factors that promote or inhibit the ability of AMU doctors, nurses and healthcare assistants to successfully implement and perform aspired infection prevention and control interventions, when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.

In relation to hospital-based infection prevention and control practices and patient involvement:

- v. To describe AMU patients' experiences and understanding of the care they received following an incident of suspected/confirmed infectious diarrhoea and vomiting and to obtain recommendations for service improvement.

In relation to improving the practice of local AMU clinicians:

- vi. To produce a report for the AMU matron and relevant clinical managers that presents the findings of the study and consequent recommendations.

An 11-month ethnographic study was undertaken in the AMU of a local hospital in order to understand how clinicians in the AMU assessed and managed patients with symptoms of suspected or confirmed infectious diarrhoea and vomiting. Data collection involved the following activities: observations of pertinent clinical activities; interviews with patients, doctors, nurses and healthcare assistants; reviews of eligible patients' notes; clinician-led photo walkabouts and reviews of relevant hospital policies and guidelines. Over 1000 minutes of direct observations of practice were undertaken and 22 informants actively participated in the study. These informants included 4 doctors, 5 nurses, 5 healthcare assistants and 8 patients. With these participants, the following data collection activities were undertaken: 26 interviews, 13 photo walks and the extraction of pertinent data from the medical notes of patient participants.

9.2 Findings of the study

AMU clinicians used various approaches to assess the infective status of patients with symptoms of diarrhoea and vomiting, in the absence of results from stool microbiology investigations. These approaches included taking a patient's history, using the hospital's diarrhoea and vomiting assessment tool, utilising information supplied by other team members, performing physical examinations and diagnostic tests to rule out non-infectious causes of diarrhoea and using clinical judgement. Of these approaches, it was identified that good (adequate) history taking and developed (matured) clinical judgement were central tenets to an effective assessment.

It was identified that there were many infection prevention and control interventions that AMU clinicians implemented and/or performed, when caring for patients with symptoms of suspected or confirmed infectious diarrhoea and vomiting. These interventions could be categorised under 8 broad themes: (1) standard precautions; (2) isolation care, cohorting, cordoning and related

precautions; (3) staff, patient and visitor awareness-raising, education and restrictions; (4) equipment handling, cleaning and decontamination; (5) patient personal hygiene; (6) contaminated linen and garments safe handling and precautions; (7) contaminated waste safe handling and precautions and (8) environmental cleaning and decontamination.

Although clinicians exhibited good knowledge of the basic interventions that they were expected to perform, it was observed and reported that actual performance and/or adherence to these ideals was inconsistent. This was mainly because there were numerous interventions to perform and several factors affecting their successful performance.

The information supplied by patients showed that clinicians were not providing them with adequate information, education or support in relation to infection prevention and control related aspects of care. Patients were not being empowered to work together with clinicians so as to contribute in performing and promoting infection prevention and control aspects of care. Their understanding of infection prevention and control protocols was poor, and their ability to support others who sought guidance was limited. Furthermore, patients identified a lack of consistency among AMU staff with regard to the implementation and performance of infection prevention and control measures.

Numerous factors were identified that were affecting the assessment and infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU. These factors could be categorised under the following 13 broad themes: (1) quality and effectiveness of history taking; (2) cues and reminders in the clinical environment; (3) beliefs, values and attitudes; (4) staff training and education; (5) time pressures, competing priorities, interruptions and cognitive workloads; (6) teamwork, culture, systems and communication; (7) senior, expert and multidisciplinary team support and prompts; (8) availability and access to essential clinical equipment and resources; (9) unit and isolation room design and layout; (10) patient location during inpatient admission; (11) the cognitive state of patients and their willingness and ability to engage with staff and care; (12) patient and visitor engagement and involvement in infection prevention and control practices and (13) quality and effectiveness of patient monitoring.

Analysis of these factors showed the complexity of clinical practice and the multifaceted nature of factors that affected infection prevention and control practice. Applying a whole-system approach to identifying, contextualising and explaining these factors allowed for comprehensive understanding to be gained with regard to barriers and facilitators to ideal infection prevention and control practice in the AMU. It also made it possible to suggest pragmatic solutions that might

improve clinical practice in respective topic areas. Furthermore, a whole-system approach to investigating and understanding infection prevention and control practice in the AMU has shown that solutions to non-compliance to recommended guidelines and policies, should not only focus on immediate problems, but consider contextual socio-technical system factors shaping identified problems (Gould *et al*, 2016; Yanke *et al*, 2015). Resonances of these factors to themes discussed in human factors literature were also observed. These resonances supported the view that human factors thinking is applicable to infection prevention and control practice.

9.3 Implications for clinical practice, training and education

In relation to hospital-based assessments of patients with symptoms of diarrhoea and vomiting:

Findings suggest that the assessment of the infective status of patients with symptoms of diarrhoea and vomiting is complex. Nevertheless, it is possible to improve clinicians' history taking skills and clinical judgement in this area, through repeated exposure to the assessment process and repeated use of a structured diarrhoea and vomiting assessment tool. The study supports the view that organisations should invest in diarrhoea and vomiting assessment skills for healthcare staff (Gallagher, 2013), especially through the use of simulation exercises that utilise the diarrhoea and vomiting assessment tool.

In relation to hospital-based diarrhoea and vomiting infection prevention and control measures:

The study has revealed gaps in 'practice as imagined' and 'practice as done' with respect to infection prevention and control practice. It has identified and helped to understand some of the workarounds that clinicians employ to circumvent workflow hindrances. The study has also shown the impact that culture, leadership, teamwork, training and education, communication, and patient and visitor engagement have on infection prevention and control practice. This knowledge is being shared in local and national forums. In these forums, clinicians and policymakers are also being encouraged to consider why workarounds work and whether adapting current systems (including guidelines), based on what is learnt, could better support frontline staff and drive improvement in infection prevention and control practice. Having an awareness and appreciation of human factors thinking (a whole-system analytical approach) when looking at issues in clinical practice, is also being encouraged.

In relation to patient involvement in hospital-based infection prevention and control practices:

Findings suggest that at present, the goal of patient involvement in infection prevention and control practices is not being fully achieved. For this to change, clinicians need to consider

patients as active contributors to infection prevention and control. Clinicians should actively engage patients in conversations about infection prevention and control practices and pay attention to patient feedback about their abilities, limitations and anxieties. Such feedback would broaden clinicians' understandings of patients' infection prevention and control related behaviours. This understanding would make it possible for clinicians to better support patient self-care efforts and contribution to infection prevention and control related aspects of care.

Impact on the NHS and clinician training and education:

The study supports the view that having an awareness and appreciation of human factors thinking can help clinicians gain a better understanding of socio-technical system factors affecting infection prevention and control practice in clinical settings. Through an application of human factors principles, it is possible to understand why clinicians make errors, and in particular, which 'systems factors' threaten patient safety (Carthey and Clarke, 2009). It is therefore encouraged that commitments to embed human factors principles and practices within the NHS do not falter (NQB, 2013). The study also supports the view that human factors education should be provided during clinician training and in clinical practice to ensure that human factors thinking is embedded into everyday clinical practice (Cameron, 2016; Health Education England, 2016; NQB, 2013).

9.4 How doing this study has had an impact on local AMU practice

On 2nd March 2015, based on the preliminary findings of the study, I, with the support of project supervisors, wrote a letter of 'service improvement suggestions' to the local AMU's clinical managers (Appendix 17). This letter presented potential solutions to help resolve four problems that had been repeatedly highlighted during data collection. One of these solutions was the creation of a dedicated diarrhoea and vomiting folder that contained pertinent guidelines and resources that clinicians could readily access and refer to. This suggestion was based on recommendations from data collected from clinician participants. The extract below (taken from Figure 24; presented in Chapter 7, page 156), shows one of a number of responses from Nurse 1, that was instrumental in informing some of the proposed service improvement suggestions.

January 2015 (Interview data)
Researcher: "[...] you have mentioned the folder [...] what would you hope to find in the folder?"
Nurse 1: "How to fill out the pro forma correctly and like an example..."

Extract from Figure 24 (presented in Chapter 7, page 156)

Despite the letter of suggestions being reportedly well received by the local AMU's clinical managers, it was not until December 2015 that folders for each area of the AMU were created through the collaborative efforts of myself and the local AMU's Infection Prevention Link Nurse. The figure below (presented in Chapter 4, page 79), shows the cover and contents page of the folder. Among other things contained within the folder, was a completed (filled in) example of the diarrhoea and vomiting assessment tool ('D&V pro forma') in response to Nurse 1's suggestion.

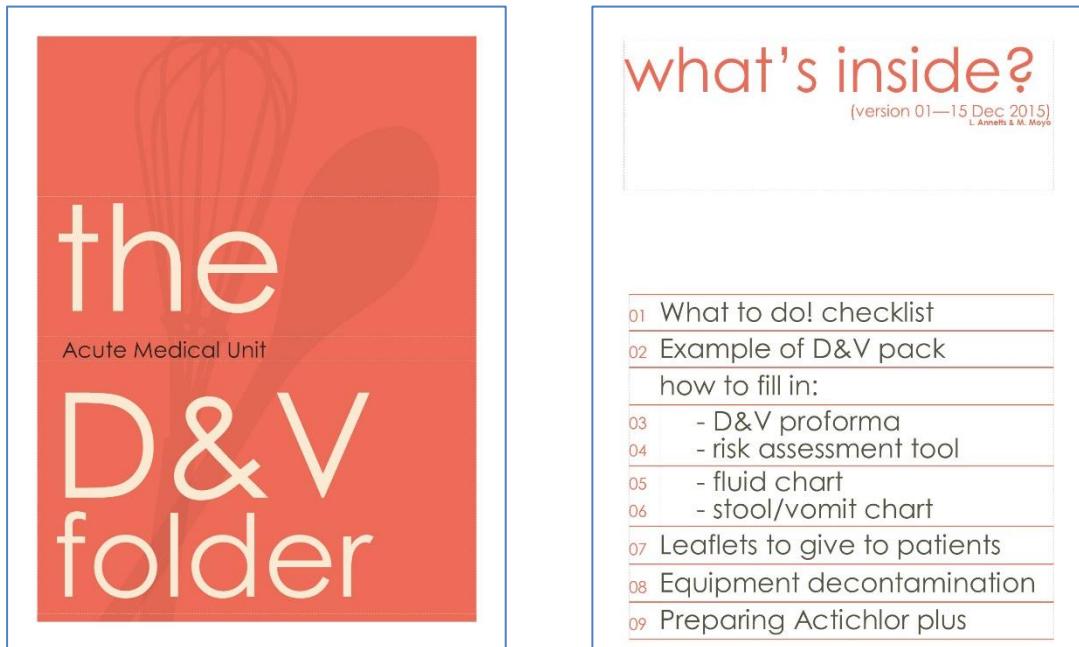


Figure 10: Cover and contents page of the D&V folder (presented in Chapter 4, page 79)

At the time of writing this thesis, plans are underway to arrange a forum, where the findings of the study can be presented to clinicians in the local AMU.

9.5 Study contribution to research

The present study has succeeded in answering proposed research questions and achieving its aims and objectives. It has also addressed some gaps in knowledge relating to the subject areas of patient safety in hospital settings and healthcare associated infections. Table 32 (next page) shows previous gaps in knowledge that have been addressed through this study. Besides addressing these gaps, the study has added new insights to what was already known about patient experiences and understanding of isolation care. It has revealed what hospital based infection prevention and control practice in relation to the care of patients with symptoms of suspected or confirmed infectious diarrhoea and vomiting looks like in non-outbreak situations. It

has also offered new insight into the factors affecting infection prevention and control practice in hospital settings, in relation to this patient group.

Patient safety in hospital settings Healthcare associated infections	
Infection prevention and control practices in hospital settings	
<p>'Diarrhoea and vomiting' and 'infection prevention and control practices' in hospital settings</p> <p>Specifically,</p> <p>diarrhoea and vomiting related infection prevention and control practices in the AMU</p>	
1. Assessing the infectious status of patients with symptoms of diarrhoea and vomiting	2. Infection prevention and control practices associated with the care of patients with symptoms of diarrhoea and vomiting
<p>1a. How do hospital based clinicians assess the infective status of patients with symptoms of diarrhoea and vomiting in the absence of stool microbiology results?</p> <p>- <i>previously unknown - [addressed]</i></p>	<p>2a. What infection prevention and control interventions are implemented and performed in the AMU in relation to diarrhoea and vomiting?</p> <p>- <i>previously unknown - [addressed]</i></p>
<p>1b. What affects clinical assessments of the infective status of patients with symptoms of diarrhoea and vomiting in hospital settings?</p> <p>- <i>previously unknown - [addressed]</i></p>	<p>2b. What affects the implementation and performance of these infection prevention and control interventions in the AMU?</p> <p>- <i>previously unknown - [addressed]</i></p>
Patient experiences and understanding of diarrhoea and vomiting related infection prevention and control practices in hospital settings	
<p>2d. Patient experiences and understanding of infection prevention and control related practices associated with symptoms of diarrhoea and vomiting.</p> <p>- <i>already known</i> - Patient experiences and understanding of isolation care.</p> <p>- <i>previously unknown</i> - Patient education on, and understanding of, infection prevention and control related practices associated with diarrhoea and vomiting. <i>[addressed]</i></p>	<p>2c. Patient involvement in diarrhoea and vomiting related infection prevention and control aspects of care.</p> <p>- <i>previously unknown - [addressed]</i></p>

Table 32: Gaps in knowledge addressed through this study

9.6 Strengths and limitations

As described in the protocol paper by Moyo *et al* (2016), the present study had its strengths and limitations. The main limitations of the study were its focus on one AMU and a small sample size. Although the AMU was representative of other AMUs within the UK, with regard to structure and function, its local policies, departmental culture(s) and actual physical design were unique. This means that some findings are not generalisable to other AMUs. Nevertheless, this was also a strength of the study, in that its focus and small sample size allowed for close and prolonged engagement with participants. Another limitation, related to the fact that fieldwork was undertaken by one clinical academic researcher, who spent two days working clinically in a different area of the hospital and three days a week undertaking fieldwork. As such, not all that could be observed, was observed. Nevertheless, it is believed that what was not observed was either discussed in interviews and photo walks or highlighted in accessed patient notes and relevant hospital policies and guidelines. Moreover, having one researcher assured both observational and reporting consistency. With a specific focus on participants, as not many senior clinicians participated in the study, the findings of the study are not fully representative of AMU senior clinicians' views and experiences. In relation to patients, all patient participants were proficient English speakers. Findings may therefore not be generalisable to minority non-English speaking patient populations, who may face different challenges and opportunities.

Despite these limitations however, the study had strengths relating to its multi-method approach, attention to context and giving voice to individual experience, which provided great insight into the care of patients with symptoms of suspected or confirmed infectious diarrhoea and vomiting in the AMU (Savage, 2006). It also investigated generalisable, practice related factors (human factors) that are not isolated to one clinical setting, organisation or geographic confine (CHFG, 2013). In fact, based on feedback received from clinicians from other hospitals who have listened to talks where the present study's findings have been shared, the knowledge and learning gained through the present study is applicable not only to other AMU settings, but various other ward settings. Furthermore, after presenting some of the findings of the study to an audience of professionals with an interest in oncology at a cancer care specialist hospital in London, a laboratory manager in the audience requested that the same AMU based presentation be delivered to their pathology staff (Appendix 19; manager's email used with permission). This was a welcome surprise, as it evidenced that the knowledge gained through the present study was also applicable to non-clinical settings. With respect to data collection methods, photo walks in particular offered more than just a description of how things were, they enabled clinicians to

reflect on their practice and be aware of their surroundings - thereby birthing new insights and curiosities about personal practice.

9.7 Implications for future research

The present study offers direction for future research in the following areas:

- In-depth, longitudinal work in any clinical setting, to examine whether sustainable improvements to infection prevention and control practice can be achieved in clinical practice, through the use of action plans developed by the application of human factors principles to specific infection prevention and control activities. The work could employ Normalisation Process Theory to interpret findings and explain how the action plans are operating (May and Finch, 2009). Application of the theory would be helpful in identifying factors that promote/inhibit routine incorporation (normalization) of infection prevention and control standards into everyday clinical practice.
- Investigation of the factors that promote/inhibit the ability of doctors, nurses and healthcare assistants in various clinical settings, to implement and perform specific, aspired infection prevention and control interventions when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting. The findings of these investigations can then be compared against each other and used to determine common themes. This may facilitate the development of intervention-specific service improvement plans that are applicable to a wide range of clinical settings.
- A patient and visitor focussed interview and survey-based study to determine how best to engage patients with symptoms of diarrhoea and vomiting and also their visitors, in infection prevention and control aspects of care. The SEIPS 2.0 model (Holden *et al*, 2013) could be used to frame the design and analysis of the study.
- More specific studies at local levels to:
 - Investigate whether infective status assessment simulation exercises that encourage the use of the diarrhoea and vomiting assessment tool, could lead to improvements in clinicians' history taking skills and clinical judgement, in relation to the care of patients with symptoms of diarrhoea and vomiting.
 - Explore how best to manage the infection prevention and control related aspects of care of patients with symptoms of diarrhoea and vomiting in open bays, when isolation rooms are unavailable and cohorts cannot be made.
 - Determine the amount of time and steps it takes for clinicians to gather all the resources required to undertake assessments on patients with symptoms of

diarrhoea and vomiting. Following this exercise, develop diarrhoea and vomiting assessment packs and test whether using them will result in time-savings that can be translated into more time spent with patients.

- Explore whether investment in AMU healthcare assistants, who have advanced cannulation and venepuncture skills, would translate into assessing doctors and nurses being able to spend more time undertaking patient assessments.
- Investigate whether using structured mentorship/supervision programmes for new AMU staff could lead to improvements in staff retention.

Finally, this study has shown that an ethnographic approach to investigating infection prevention and control related issues in practice, can broaden knowledge of the wider contextual, social and technical factors influencing this aspect of care. It is, therefore, encouraged that future clinical research considers using ethnography and other qualitative techniques when undertaking similar investigations in clinical settings.

9.8 Chapter Summary

This chapter has offered a summary and conclusion of the study. It has described what the study was about and how it achieved its aims and objectives. An account of the study's key findings was offered and their implications for clinical practice, training and education considered. Finally, the study's contribution to research, its strengths and limitations and implications for future research, were considered.

This marks the end of the main body of this thesis. Thank you for reading.

Appendix 1 - Synonymous names of the AMU

Some of the synonymous names of the Acute Medical Unit department

Acute Assessment Unit (AAU)
Acute Medical Assessment Unit (AMAU)
Acute Medical Unit (AMU)
Acute Medical Ward (AMW)
Acute Planning Unit (APU)
Early Assessment Medical Unit (EMU)
Medical Assessment and Planning Unit (MAPU)
Medical Assessment Unit (MAU)
Rapid Assessment Medical Unit (RAMU)

Source 1: Empirical knowledge

Source 2: Scott I., Vaughan L. and Bell D. (2009) Effectiveness of acute medical units in hospitals: a systematic review. *International Journal For Quality In Health Care: Journal Of The International Society For Quality In Health Care / Isqua* 21(6): 397-407

Appendix 2 - Initial, AMU specific search string

Example of initial AMU specific search string (Search string for sub-question 1a)

Various search string combinations were used in CINAHL Plus, MEDLINE, EMBASE and Web of Science. The terms listed below are the core search terms that were used in MEDLINE. These terms were adapted appropriately in other databases. Further details relating to the terms used in other databases are available on request.

Databases accessed between (28 April 2014 and 1 May 2014) →		CINAHL	MEDLINE	EMBASE	Web of Science	
Search Terms Used (OR) ↓						TOTAL
1. Acute Medical Unit ⇒ Acute Medical Unit*.tw. OR Medical Assessment Unit*.tw. OR Acute Medical Assessment Unit*.tw. OR Acute Planning Unit*.tw. OR "Medical Assessment and Planning Unit*".tw. OR Acute Assessment Unit*.tw. OR Acute Medical Ward*.tw. OR Rapid Assessment Medical Unit*.tw. OR Early Assessment Medical Unit*.tw. OR Medical Unit*.tw.	451	7,205	5,312	1,192		>10,000
2. Clinicians ⇒ exp Infection Control Practitioners/ OR exp Medical Staff/ OR exp Nursing Staff/ OR exp Hospitalists/ OR exp Nurse Clinicians/ OR exp Nurse Practitioners/ OR exp Nurses' Aides/ OR exp Physicians/ OR doctor*.tw. OR nurse*.tw. OR care support worker*.tw. OR healthcare assistant*.tw. OR clinician*.tw.	513,734	862,412	1,118,006	455,886		>10,000
3. Assess ⇒ exp Nursing Assessment/ OR exp Diagnosis/ OR exp Medical History Taking/ OR exp Physical Examination/ OR investigat*.tw. OR evaluat*.tw. OR assess*.tw. OR diagnos*.tw.	1,214,129	7,866,039	9,908,404	8,962,194		>10,000
4. Diarrhoea and vomiting ⇒ exp Gastroenteritis/ OR exp Diarrhea/ OR exp Vomiting/ OR exp Nausea/ OR exp Norovirus/ OR exp Clostridium difficile/ OR exp Campylobacter/ OR "diarrhea and vomiting".tw. OR loose stool*.tw. OR diarrhea*.tw. OR vomiting.tw. OR "nausea and vomiting*".tw.	26,256	212,610	464,665	140,788		>10,000
Combined Search (AND) ↓						
1 AND 2 AND 3 AND 4	1	5	6	3		15

LEGEND:

- * indicates that a word or term was truncated (for example, clinician* searches for clinician, clinician's, clinicians and clinicians')
- / indicates a Medical Subject Heading (MeSH) with all subheadings selected
- exp indicates that the MeSH was exploded to include the narrower, more specific terms beneath it in the MeSH tree
- .tw. indicates a search for a word or term in the title or abstract

Appendix 3 - Literature search inclusion and exclusion criteria

Respective inclusion and exclusion criteria used

Question 1a: Literature related to how hospital-based clinicians assess patients with symptoms of diarrhoea and vomiting	
Inclusion criteria	<ul style="list-style-type: none"> ▪ Empirical research studies or case reports investigating or discussing the diagnostic assessment procedures that frontline hospital-based clinicians use in order to determine the cause(s) of adult patients' symptoms of diarrhoea and vomiting; ▪ Empirical research studies or case reports offering a clearly detailed description of the diagnostic assessment procedures used by the above clinicians; ▪ Case reports will only be eligible for inclusion if infectious causes of diarrhoea and vomiting are being investigated as part of the main diagnosis or differential diagnosis.
Exclusion criteria	<ul style="list-style-type: none"> ▪ Studies or case reports investigating or discussing the diagnosis of infectious diarrhoea and/or vomiting only by way of results obtained from stool microbiology investigations.

Question 1b: Literature related to the factors affecting the effective assessment of patients	
Inclusion criteria	<ul style="list-style-type: none"> ▪ Empirical research studies or case reports investigating/describing/discussing the factors that promote or inhibit the ability of frontline hospital-based clinicians to assess the infective status of patients with symptoms of diarrhoea and vomiting. ▪ Empirical research studies offering a clearly detailed description of the factors that promote or inhibit the ability of the above clinicians to assess the infective status of patients with symptoms of diarrhoea and vomiting.
Exclusion criteria	<ul style="list-style-type: none"> ▪ Studies describing/discussing generic factors that promote or inhibit the ability of frontline hospital-based clinicians to assess the infective status of patients with potentially infectious conditions but not directly concerned with the care of adult patients with symptoms of diarrhoea and vomiting.

Continued on next page...

Question 2a: Literature related to the infection control interventions clinicians implement/perform	
Inclusion criteria	<ul style="list-style-type: none"> ▪ Empirical research studies investigating/describing/discussing the infection control interventions frontline hospital-based clinicians implement and/or perform whilst caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting. ▪ Empirical research studies offering a clearly detailed description of the infection control interventions implemented and/or performed by the above clinicians.
Exclusion criteria	<ul style="list-style-type: none"> ▪ Studies describing/discussing generic adherence or compliance to infection control interventions and not directly concerned with the care of adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.

Question 2b: Literature related to the factors affecting the successful implementation/performance of interventions	
Inclusion criteria	<ul style="list-style-type: none"> ▪ Empirical research studies investigating/describing/discussing the factors that promote or inhibit the ability of frontline hospital-based clinicians to implement and perform diarrhoea and vomiting related infection control interventions whilst caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting. ▪ Empirical research studies offering a clearly detailed description of the factors that promote or inhibit the ability of the above clinicians to implement and perform diarrhoea and vomiting related infection control interventions.
Exclusion criteria	<ul style="list-style-type: none"> ▪ Studies describing/discussing generic factors that promote or inhibit the ability of frontline hospital-based clinicians to implement and perform infection control interventions but not directly concerned with the care of adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.

Question 3: Literature related to patients' experiences of care after an incident of diarrhoea and vomiting	
Inclusion criteria	<ul style="list-style-type: none"> ▪ Empirical research studies investigating patient's experiences and understanding of care after an incident of suspected/confirmed infectious diarrhoea and vomiting.

Appendix 4 - Papers identified for review

Papers selected to inform the literature review (in order of year published)

Question	Author(s)	Year *	[Country] Setting(s)	Type of study
2b	Abeyesundere	(1982)	[UK] acute orthopaedic ward and female surgical ward	Outbreak report
2a	Cartmill et al	(1994)	[UK] 3 hospitals (medical and elderly rehabilitation wards)	Outbreak report (Comparative study)
2a	Chadwick and McCann	(1994)	[UK] elderly care unit	Outbreak report (Comparative study)
2a	Stevenson et al	(1994)	[UK] hospital	Outbreak report (Epidemiological study)
1a	Kyne et al	(1998)	[UK] hospital	Prospective observational study
2a	Zafar et al	(1998)	[USA] community teaching hospital	Infection control intervention study
1a	Dumas and Zitkus	(2000)	[USA] Not specified	Case report and study
2a	Hanna et al	(2000)	[USA] bone marrow transplant unit	Outbreak report
2a, 2b	McCall and Smithson	(2002)	[UK] elderly care ward	Outbreak report
2a, 2b	Khanna et al	(2003)	[Switzerland] tertiary hospital	Outbreak report
2a, 2b	Conway et al	(2005)	[Australia] tertiary hospital	Outbreak report
1a	Landzberg and Connor	(2005)	[USA] Not specified	Case report
2a, 2b	Prieto and Clark	(2005)	[UK] medical ward	Observational case study
2a	Schmid et al	(2005)	[Austria] internal medicine wards	Outbreak report
1a	Gallagher and Winter	(2007)	[UK] hospital	Case report
2a	Johnston et al	(2007)	[USA] tertiary hospital	Outbreak report
2a	Muto et al	(2007)	[USA] tertiary teaching hospital	Outbreak report
1a	Sabol and Carlson	(2007)	[USA] hospital	Case report and assessment plan
2b	Vardy et al	(2007)	[UK] emergency department	Outbreak report (Epidemiological study)
2a	Whitaker et al	(2007)	[USA] tertiary hospital	Infection control intervention study
2a	Salgado et al	(2009)	[USA] tertiary teaching hospital	Outbreak report
2a	Weiss et al	(2009)	[Canada] tertiary hospital	Infection control intervention study
3a	Madeo and Boyack	(2010)	[UK] hospital	Interpretative phenomenological study
3a	Pacheco and Spyropoulos	(2010)	[Canada] various inpatient units (medicine, geriatrics, cardiac, stroke)	Descriptive study
2b	Timen et al	(2010)	[Netherlands] multi-site/multiple settings	Qualitative Survey

2a	Cheng et al	(2011)	[China] tertiary teaching hospital	Outbreak report (Comparative study)
1a	Desai and Sivaramakrishnan	(2011)	[UK] AMU	Case report
1a	Di Bella et al	(2011)	[Italy] hospital	Case report
2a	Georgiadou et al	(2011)	[Greece] medical ward	Outbreak report
1a	O'Rourke et al	(2011)	[Australia] ED	Case report and study
2a, 2b	Tseng et al	(2011)	[Taiwan] psychiatric centre	Epidemiological study (Outbreak analysis)
2a	Wong-McClure et al	(2012)	[Costa Rica] tertiary hospital	Infection control intervention study
2a	Doshi et al	(2013)	[USA] bone marrow transplant unit	Outbreak report (Observational cohort study)

Appendix 5 - Quality standards for patient experience

Quality standards for patient experience in adult NHS services (NICE, 2012b)

<u>Quality statement 4: Giving patients opportunities to discuss their health beliefs, concerns and preferences</u>
<p>Quality statement: Patients have opportunities to discuss their health beliefs, concerns and preferences to inform their individualised care.</p> <p>What the quality statement means for patients: Patients have opportunities to discuss their health beliefs, concerns and preferences, and these are taken into account when making decisions about their care.</p>
<u>Quality statement 5: Understanding treatment options</u>
<p>Quality statement: Patients are supported by healthcare professionals to understand relevant treatment options, including benefits, risks and potential consequences.</p> <p>What the quality statement means for patients: Patients are helped by healthcare professionals to understand relevant treatment options, including benefits, risks and potential consequences of care.</p>
<u>Quality statement 6: Shared decision making</u>
<p>Quality statement: Patients are actively involved in shared decision making and supported by healthcare professionals to make fully informed choices about investigations, treatment and care that reflect what is important to them.</p> <p>What the quality statement means for patients: Patients are actively involved in shared decision making and supported to make fully informed choices about investigations, treatment and care that reflect what is important to them.</p>
<u>Quality statement 7: Supporting patient choice</u>
<p>Quality statement: Patients are made aware that they have the right to choose, accept or decline treatment and these decisions are respected and supported.</p> <p>What the quality statement means for patients: Patients have their choices respected and supported when deciding whether to accept or decline treatment, and when choosing between treatments.</p>

Quality statement 9: Tailoring healthcare services to the individual

Quality statement: Patients experience care that is tailored to their needs and personal preferences, taking into account their circumstances, their ability to access services and their coexisting conditions.

What the quality statement means for patients: Patients experience care that is tailored to their needs and personal preferences, taking into account their circumstances, how easy it is for them to use the services they need, and any other health problems they have.

Quality statement 10: Physical and psychological needs

Quality statement: Patients have their physical and psychological needs regularly assessed and addressed, including nutrition, hydration, pain relief, personal hygiene and anxiety.

What the quality statement means for patients: Patients are regularly checked and asked whether they need any extra support, for example with eating and drinking, pain relief, continence problems or anxieties.

Appendix 6 - Research protocol

Study Title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Researcher: Matsikachando R. Moyo

Funder:

University of Southampton

Sponsor (if known):

University Hospital Southampton NHS Foundation Trust

Background

The idea for this project came about as a result of a suggestion made by the matron of a local Acute Medical Unit (AMU) that there was a need for a study that investigates how AMU clinicians assess and manage patients with symptoms of diarrhoea and vomiting. This suggestion was based on the matron's clinical observations and concerns that there were some infection prevention and control related service inefficiencies and failures that were being experienced in the unit as a result of poor diagnostic procedures and 'less than exemplary' practices relating to the management of symptomatic patients. Beyond these clinical observations, recommendations by authors like Gallagher (2013) for organisations to invest in diarrhoea assessment skills for staff, and national drives stipulating that hospitals work towards reducing incidences of healthcare-associated infections (including outbreaks of infectious diarrhoea and vomiting) further supported the need for undertaking this project (National Institute for Health and Care Excellence (NICE), 2011; Norovirus Working Party (NWP), 2012).

As the first step in the project, the research questions in Appendix 1 were formulated and a systematic literature review of empirical evidence was conducted to determine the extent to which current literature answers these questions (see 'PDF-00_Milestone_3', p 5-8). The review revealed that there are currently no AMU specific studies to answer the research questions and that there are also significant gaps in evidence in this field of gastrointestinal healthcare-associated infections. As such, in order to address both the gaps in evidence identified through

the literature review, and the practical concerns raised by the local AMU matron, a study is being proposed with the following aims and objectives:-

Study aims:

1. To identify and describe how AMU doctors, nurses and healthcare assistants manage adult patients with symptoms of diarrhoea and vomiting.
2. To identify and explain the factors that influence how AMU doctors, nurses and healthcare assistants manage adult patients with symptoms of diarrhoea and vomiting.
3. To understand AMU patients' experiences and understanding of the care that they received following an incident of suspected/confirmed infectious diarrhoea and vomiting.

Study objectives:

In relation to hospital-based assessment of diarrhoea and vomiting:

- i. To identify and describe how AMU doctors, nurses and healthcare assistants assess the infective status of adult patients with symptoms of diarrhoea and vomiting in the absence of results from stool microbiology investigations.
- ii. To identify and explain the factors that promote or inhibit the ability of AMU doctors, nurses and healthcare assistants to effectively assess the infective status of adult patients with symptoms of diarrhoea and vomiting.

In relation to hospital-based infection control measures:

- iii. To identify and describe the infection control interventions that AMU doctors, nurses and healthcare assistants implement and perform when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.
- iv. To identify and explain the factors that promote or inhibit the ability of AMU doctors, nurses and healthcare assistants to successfully implement and perform aspired infection control interventions when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting.

In relation to patient involvement and hospital-based infection control:

- v. To describe AMU patients' experiences and understanding of the care that they received following an incident of suspected/confirmed infectious diarrhoea and vomiting and to obtain recommendations for service improvement.

In relation to improving local AMU practice:

- vi. To produce a report for the AMU matron and relevant clinical managers that presents the findings of the study and consequent recommendations.

Method

In order to meet the aims and objectives of this study, an ethnographic approach will be employed. Ethnography can be described as an in-depth study of naturally occurring events within a culture or social group (Murchison, 2010). It seeks to understand the relationship between context, culture and events; where culture can be described as the beliefs, values and attitudes of a specific group of people within a given context. The design will involve the collection of data from multiple sources and utilise various data collection strategies that will enable effective data triangulation which in turn will strengthen the integrity and validity of the study (Nurani, 2008; Shenton, 2004). These data collection strategies will include the following activities: observations of pertinent clinical activities, think-aloud exercises, interviews with patients, doctors, nurses and healthcare assistants, reviews of eligible patients' notes, clinician-led photo walkabouts, and reviews of relevant hospital policies, guidelines and infection prevention and control data.

Although other investigative approaches could have been used, such as a prospective observational study involving active surveillance (Kyne et al, 1998) or a purely interview-based study (Madeo and Boyack, 2010), ethnography has been chosen instead as it allows for the observation and recording of 'naturally' occurring activities surrounding the assessment and management of adult patients with symptoms of diarrhoea and vomiting. This will include the recording of activities that are otherwise taken for granted and not actively considered by the alternative methods highlighted despite the fact that they may have a great influence on the phenomena under investigation (Emerson et al, 2011; Goodson and Vassar, 2011; Hammersley and Atkinson, 2007). The selected method will also allow for the identification of the associations between the clinical cultural environment (which includes team ethos and pertinent hospital policies and guidelines) and naturally occurring events and activities that influence the ability of clinicians to effectively assess and manage adult patients with symptoms of diarrhoea and vomiting (Goodson and Vassar, 2011; Murchison, 2010).

Another reason why this method has been selected is because I (the researcher) work in the local AMU as a clinical member of staff and am therefore familiar with the unit's physical environment, the staff, and their culture. Although it could be argued that such familiarity and involvement impedes objectivity, it is also arguable that this familiarity will allow me to undertake the study as a participant-observer who is uniquely positioned to capitalise on both 'expert' participant and 'unblinded' observer stances. This position will enable me to look at the big picture of what is happening and ask pertinent analytical questions, whilst at the same time being able to draw on my own clinical experiences so as to make sense of the phenomena under investigation (Murchison, 2010).

Participants

Due to the specific nature of the phenomena under investigation, purposive sampling will be used to identify and select study participants from the AMU clinical setting who will be approached with the offer to actively take part in the study (Creswell, 2009). The following eligibility criteria will be used:

Doctors, nurses and healthcare assistants will be regarded as eligible for inclusion into the study if they meet any of the following criteria: (1) if they are involved in the admission, clerking or assessment of AMU patients with symptoms of diarrhoea and vomiting; or (2) if they are involved in the direct provision of care of AMU patients with symptoms of diarrhoea and vomiting.

Patients will be regarded as eligible for inclusion into the study if they meet any of the following criteria: (1) if they were referred to the AMU because of suspected/confirmed infectious diarrhoea and vomiting; or (2) if they developed symptoms of diarrhoea and vomiting (whether expected or unexpected) during their stay on the AMU. However, only patients meeting the preceding criteria who have a good command of the English language and do not lack mental capacity will be eligible for inclusion to participate in interviews.

It is estimated that approximately 40 think-aloud exercises and observations of patient assessment will be captured in this study. To complement these 40 opportunities and to know the documented plan of care post patient assessment, the records of approximately 30 eligible patients will be accessed so that the pertinent data described in the ensuing 'procedures and materials' section may be extracted. These sample sizes are appropriate for the intended purpose of allowing me to provide a valid description of how local AMU clinicians assess the infective status of adult patients with symptoms of diarrhoea and vomiting and the care plans that they

implement post assessment (Aitken et al, 2011; Ericsson and Simon, 1984; Lundgrén-Laine and Salanterä, 2010). With regard to interviews, it is estimated that approximately 30 individuals will be interviewed (twice) throughout the lifespan of the study. This sample size ($n \approx 15$ patients and $n \approx 15$ clinicians) is appropriate for the ethnographic design of this study as a small number of in-depth interviews from both parties will provide adequate data required for the triangulation and validation of the findings derived from other data sources (Hammersley and Atkinson, 2007; Murchison, 2010). Also, it is expected that 15 clinician-led photo walkabouts will be conducted during the study and this sample size is also appropriate for the intended purpose of data triangulation and validation.

Overall, approximately 30 patients and 50 doctors, nurses and healthcare assistants aged 18 and older will be approached to actively participate in the study.

Procedures and materials

As the project time line presented in Appendix 2 shows, the data collection phase is expected to last just over a year (from October 2014 to October 2015). It will begin with a month-long developmental pilot study that will be used to inform and ‘fine-tune’ the data collection strategies and tools that will be used in the formal year-long study. This formal study is expected to commence in December 2014 and will be divided into 4 (2-month long) data collection blocks that are set to coincide with the 4 seasons of the UK’s meteorological calendar as observed by the Met Office (2014). These 2-month blocks will be separated by month-long blocks of interview transcription and preliminary data analysis that will inform successive data collection blocks.

Research awareness and staff prospective consent

As this study will be conducted in an ‘organic’ clinical setting and involve observations of naturally occurring clinical activities, laminated posters alerting staff, patients and visitors that an observational study is taking place will be displayed on the unit’s public notice board and in the unit’s staffrooms and information corridors as it will not be feasible for me to individually inform everyone who enters the clinical area that a study is in progress. ‘PDF-01_Research_Poster’ shows an example of the poster that will be used. The poster highlights the general purpose of the study and what it involves.

In order to facilitate the consenting of clinicians whose practice will be observed and those who will be approached with an invitation to participate in other ways in the study, I will attend the clinicians' morning briefings where I will introduce myself to them and deliver a brief verbal description of the study that I will be undertaking and what it involves. Clinician information sheets will be made available to them (PDF-02_Clinician_Info_Sheet) and a period of prospective informed consenting of as many doctors, nurses and healthcare assistants as possible will commence; preferably a week before the beginning of the pilot phase. This will involve asking clinicians to take the supplied information sheets home and take time to read through them. On their next shift, I will then find out if they would be willing to participate in the study. If they are willing to participate, I will then seek their signed consent and keep it on record (PDF-03_Clinician_Consent_Form).

The decision to prospectively consent relevant clinicians is based on the typical operational workflow of the local AMU whereby clinicians are constantly rotated and as such they only find out at the beginning of their shifts in which section of the unit they will be working. As an example, this means that it is possible that today 'Patient 1' will be cared for by 'junior doctor 1', 'nurse 1', and 'healthcare assistant 1', however tomorrow, the same 'Patient 1' will be cared for by 'junior doctor 3', 'nurse 2', and 'healthcare assistant 7'.

Another reason for prospective consenting is based on the fact that AMU staff who are involved in the clerking and admitting of patients usually have a short period of time between knowing about the arrival of a new patient, getting ready for that patient (whilst attending to other inpatients) and actually receiving them. Such a work pattern makes it challenging to then approach clinicians at that moment, ask them to read through an information sheet and then consider being observed when they assess a patient who meets the study's specific criteria.

Observations of practice and think-aloud exercises

Observations of pertinent clinical activities will aim to cover a 24 hour care period. This will involve me undertaking observations in parallel with the shift patterns of AMU nurses who are the main 'named' bedside caregivers in the unit. Their shift patterns include early shifts (07:30 to 15:30), late shifts (12:00 to 20:00), long days (07:30 to 20:00), and night shifts (19:30 to 08:00). Fieldnotes relating to these observations will be captured on either an audio recorder, a reporter's writing pad, or on customised data collection sheets (PDF-04_Observations_Sheets).

As the study aims to specifically understand issues surrounding the care of adult patients with symptoms of diarrhoea and vomiting, I will liaise with the AMU coordinator so that they may notify me of patients who meet the criteria outlined in Box 1.

The AMU co-ordinator will inform me of patients who meet the following criteria: (1) patients referred to the AMU because of suspected/confirmed infectious diarrhoea and vomiting; and (2) patients who develop symptoms of diarrhoea and vomiting (whether expected or unexpected) during their stay on AMU.

Box 1: Patients of research interest

Following a notification, I will proceed to approach the clinicians who will be performing the initial clinical assessment of relevant patients to ensure that they are aware of the study that is taking place and what it involves. I will then find out if they have already been consented and are still willing to participate. Only verbal consent will be sought from previously consented clinicians. If however it is discovered that the clinicians are unaware of the study and are not consented, I will then give them a full verbal description of the study based on the 'clinician information sheet' and furnish them with a copy (PDF-02_Clinician_Info_Sheet). Because of the time constraint in this particular situation, I will only be able to give these clinicians a short period of time to consider whether or not they are willing to participate in the study (10 to 30 minutes). I will then re-approach them and find out if they are willing to participate and at the same time answer any questions that they may have. If they are willing to participate, I will then seek their signed consent to observe and record their interactions with pertinent patients. I will also invite them to undertake a think-aloud exercise either immediately after, or within an hour of the assessment. 'PDF-05_Abridged_Consent_Form' shows the abridged consent form that these clinicians will be asked to sign.

These think-aloud exercises will be loosely based on reflection on practice and will benefit both the research and the clinicians (Somerville, 2004). They will benefit the research by allowing access into the cognitive processes that clinicians use during patient assessment, and they will benefit the clinician by causing them to reflect on their practice; an exercise that is argued as being vital in acquiring and maintaining professional expertise and yet reported as not always performed (Ericsson et al, 2006; Durning, 2013; Mamede, 2008). The clinician will be asked to verbalise (1) what they assessed, (2) how they assessed, (3) their thoughts and feelings during the assessment, (4) the decisions that they made as a result of their thoughts, feelings and observations, (5) their conclusions and recommended plan of care after the assessment, and (6) a

reflection of what they might do differently if a similar diagnostic challenge arose. The think-aloud exercises will be recorded on an audio recorder for further analysis.

For the clinicians who signed the abridged consent form, I will re-approach them later in the same day and offer them the opportunity to participate fully in the study by inviting them (again) to take the supplied information sheet home, read through it carefully, and consider full participation. On their next shift, I will then approach them regarding full participation and if they are willing to do this, I will then ask them to sign the full consent form (PDF-03_Clinician_Consent_Form).

After the clinician is consented, I will proceed with the clinician to the patient's bedside and introduce myself to the patient. I will then give the patient a brief verbal description of the study that is taking place before seeking their verbal consent for me to be present during their interactions with clinicians of research interest. This decision to seek verbal, rather than signed consent is based on the fact that it is the practice of AMU clinicians that is under scrutiny and the patient's consent is being sought with respect to their privacy, dignity and the right to a private consult. For patients whom I will not be able to consent due to either acute illness or a lack of capacity under the terms of the Mental Capacity Act 2005, their personal consultee or nominated consultee (a person who has no connection with the research project) will be approached for their opinion instead. I will give the consultee a brief verbal description of the study that is taking place before seeking their opinion regarding being present during the patient's interactions with clinicians of research interest.

In order to have a record of this taking of verbal consent, the clinician under observation will be asked to make a note in the patient's medical notes that verbal consent has been taken. They will also be asked to make a note of other persons present in the patient's room (or by their bedside) during this consenting process. Depending on the clinician's preference, form 'PDF-20_Generic_Verbal_Consent' will also be made available to them as an alternative media to use in recording the taking of verbal consent.

Following the patient's assessment, if infectious diarrhoea and vomiting is suspected or confirmed, observations of practice relating to the care of the patient will commence over a staggered 24 hour period of care as previously outlined. These observations will encompass observations of general events occurring within the unit whilst particularly focusing on the activities happening around the patient and their isolation room (or bed space) and especially noting the activities of doctors, nurses and healthcare assistants in relation to the implementation

and performance of infection control interventions. As these observations will require me to occasionally shadow doctors, nurses and healthcare assistants as they interact with pertinent patients, signed consent to observe and record these interactions will be sought from unconsented clinicians in a pattern similar to that outlined for consenting clinicians involved in the assessment process. Also, as described before, verbal consent allowing me to be present during staff-patient interactions will be sought from the patient (or if indicated, opinions sought from their consultee) with respect to the patient's privacy and dignity.

It is important here to reiterate that in order for me to effectively observe staff-patient interactions as an ethnographer, especially 'behind the curtain', I will have to shadow relevant doctors, nurses and healthcare assistants whilst assuming one of two stances depending on the situation and with prior agreement between myself and the clinician; either (1) as a pure observer or (2) as a participant observer who avails themselves to assist the clinician with a task. If a situation arises whereby behaviour is witnessed that constitutes professional misconduct or incompetence of a degree that directly threatens patient safety, I will intervene to stop the behaviour. Following such an intervention, I will then discuss my concerns with the clinician(s) involved and subsequently escalate the matter to relevant clinical managers. In emergency situations however, because the priority will be to ensure patient safety, I will fully participate in the delivery of care until patient safety is ensured. Such involvement will however be limited to my scope of practice as an AMU nurse.

During 'quiet' periods whilst observations of practice are being conducted, I will be involved in extracting pertinent data from the medical notes of relevant patients. Box 2 lists the type of data that I will be extracting.

1. Information from doctor's clerking notes.
2. Information from doctor's post take notes.
3. Doctor's daily patient review notes relating to the assessment and management of diarrhoea and vomiting.
4. Information from nurse's admission notes.
5. Nurse's and healthcare assistant's daily patient care notes relating to the assessment and management of diarrhoea and vomiting.
6. Information inserted in diarrhoea and vomiting assessment and management tools/proformas.

Box 2: Data that will be extracted from patients' medical notes

This data will be useful when analysing and triangulating related data that will be collected from observations of practice and/or self-reported patient assessment and management practices. I will also be involved in reviewing the hosting hospital's pertinent policies, guidelines and infection prevention and control data relating to diarrhoea and vomiting.

To enable me to access patients medical notes however, I will have to obtain the consent of pertinent patients or their consultees (if indicated). This will involve me approaching and giving them a verbal description of the study before offering them the opportunity to participate in the study. Those who express interest will be furnished with a 'participant information sheet' (PDF-08_Patient_Info_Sheet) and/or a 'consultee information sheet' (PDF-09_Consultee_Info_Sheet). They will then be given time (minimum 4 hours) to go through the information after which I will re-approach them and find out if they are willing to participate. I will then answer any questions that they may have and the patients who are willing to participate will be asked to sign the patient consent form 'PDF-10_Patient_Consent_Form'; consultees willing to act as consultees and offer advice regarding the patient's participation in the study will be asked to sign the consultee consent form 'PDF-11_Consultee_Consent_Form'. As previously highlighted, it is estimated that the records of approximately 30 patients will be accessed during the study.

At the end of every observation day, I will transfer all audio recorded fieldnotes onto a password protected research computer on my return to the research office so that the recorder will not hold any research data. The research writing pad, audio recorder and customised data collection sheets will be kept on my person at all times, and when not in use, they will be locked away in a secure locker located within the hospital's research facility.

Semi-structured interviews with patients and clinicians

Selected clinicians involved in pertinent assessment and management procedures, and selected patients subjected to these processes will be approached and offered the opportunity to become study informants through 2 semi-structured interviews that will be recorded on an audio recorder and/or on a reporter's writing pad. Only the patients who meet the criteria outlined in the 'Participants' section will be regarded as eligible to participate in interviews.

The first interviews will allow study informants to describe and discuss their experiences and feelings that relate to the phenomena under investigation. 'PDF-12_Clinician_Interview_Schedule_1' and 'PDF-13_Patient_Interview_Schedule_1' are the respective interview schedules that will be used for the first interviews. The second interviews will

be used to discuss the transcripts of the first interviews and my preliminary interpretations of the information provided so as to allow informants to expand on, clarify, or amend any discrepancies. 'PDF-14_Clinician_Interview_Schedule_2' and 'PDF-15_Patient_Interview_Schedule_2' are the respective interview schedules that will be used for the second interviews.

Clinician interviews will either be conducted at the clinician's home, or in a private location within the hospital, and not within the AMU, so as to encourage clinicians to openly discuss their experiences without fear of being heard. Initial patient interviews will most likely be conducted in the patients' isolation rooms because infectious diarrhoea and vomiting requires isolation. When conducting interviews in these isolation rooms, I will adhere to AMU infection control policy. However, as this location might have a negative influence on how openly patients will discuss their experiences (for fear of being heard), the second interview will either be conducted at the patient's home or in a private location within the hospital after they are discharged. In the event that a patient is not in an isolation room during their hospital stay, both interviews will either be conducted at the patient's home or in a private location within the hospital after they are discharged. After every interview, I will transfer all interview audio files onto a password protected research computer on my return to the research office. As outlined before, the research writing pad and audio recorder will be kept on my person at all times, and when not in use, they will be locked away in a secure locker. Anonymised interview data will be transcribed by a local transcription service provider who will adhere to data protection law regarding confidentiality and responsible data disposal (PDF-16_PageSix_Agreement).

As some interviews will likely be conducted at the hospital (in the participants own spare time), light refreshments will be offered to them as a show of gratitude for taking their time to come to the hospital.

Clinician-led photo walkabouts

It is anticipated that clinician-led photo walkabouts will take place during shift cross-over periods in agreement with relevant unit managers. Just like the think-aloud exercises, the photo walkabouts will also be used as reflective exercises for staff as they will involve written reflective components. Using the example of nurses' shift patterns, Box 3 provides an explanation as to why shift cross-over periods have been chosen for the undertaking of this activity.

When nurses in the AMU are on an early shift (finishing at 3.30pm), the nurses on the late shift who will be taking over from them start work at 12pm. This allows for a 3 and a half hour cross-over period which is normally used for staff development. This cross-over period will make for a great opportunity to perform a photo walkabout with the nurses who have consented to participate in this activity.

Box 3: Why shift cross-over periods would be ideal

Instructions describing accepted photos (that is, photos that do not breach staff, patient or visitor privacy, dignity and confidentiality) will be made available to participating clinicians beforehand (PDF-17_Photo_Log_Easier and PDF-18_Photo_Log_Difficult). These instructions will be reiterated before commencing the walkabout. Each clinician will be involved in 2 walkabout exercises; the first will focus on factors (situations, things) that promote the successful assessment and management of patients with symptoms of diarrhoea and vomiting, and the second will focus on the factors that inhibit this success. Clinicians will be asked to label their photos on supplied photo log sheets and briefly describe what they portray (or mean) to them with regard to the factors that promote or inhibit their ability to successfully assess and manage patients with symptoms of diarrhoea and vomiting. I will also take fieldnotes relating to these walkabouts. After every walkabout, I will transfer all the photos onto a password protected research computer on my return to the research office. The research digital camera will be kept on my person at all times, and when not in use, it will be locked away in a secure locker.

Operational definitions

Box 4 presents a list of operational definitions:

Culture – the beliefs, values and attitudes of a specific group of people within a given context.

Eligible staff – doctors, nurses and healthcare assistants will be regarded as eligible for inclusion to participate in think-aloud exercises, interviews, and clinician photo-led walkabouts if they meet any of the following criteria: (1) if they are involved in the admission, clerking or assessment of AMU patients with symptoms of diarrhoea and vomiting; or (2) if they are involved in the direct provision of care of AMU patients with symptoms of diarrhoea and vomiting.

Fieldnotes – captured and preserved accounts of conversations, insights, understandings and observations of clinical activities that are pertinent to the phenomena under investigation; these accounts will be captured and preserved on audio, textual or pictorial media.

System – all the elements that are part of the delivery of care to patients; including tools, medical equipment, work area layout, tasks, processes, the work environment, computer systems, and so on (Gosbee and Gosbee, 2010).

Box 4: Operational definitions

Resources

Box 5 presents a list of the core resources that will be needed in order to successfully conduct this study.

1. Clipboard, multi-coloured ballpoint pens, A4 folders, and reporters writing pads.
2. Shoulder bag to carry research material.
3. Digital audio recorder, digital camera, and SD memory card.
4. Password protected research computer.
5. Information sheets for clinicians, patients, and consultees.
6. Laminated research study notification posters.
7. Consent forms for clinicians, patients, and consultees.
8. Customised photo log sheets.
9. Customised data collection sheets for observations of clinical activities.
10. Faculty of Health Sciences supplied secure research storage locker.
11. University hosted (password protected) 'My documents' folder and encrypted USB memory stick for data backup.
12. NVivo qualitative data analysis software.
13. Dragon Naturally Speaking speech recognition software (for the transcription of audio fieldnotes).
14. Professional transcription services (with a signed non-disclosure agreement and a guarantee that all information relating to each transcription project will be responsibly destroyed within 60 days of the end of the transcription project).

Box 5: The core resources required to conduct the study

Data analysis

A constant comparative method of data analysis will be used for this study (Boeije, 2002; Offredy and Vickers, 2010). This inductive method of analysis, which is rooted in Grounded Theory (Glaser and Strauss, 1967), seeks to generate theories regarding social phenomena by systematically examining (comparing and categorising) various data and drawing new meaning from it. This method is suitable for this study as little is known regarding the assessment and management of patients with symptoms of diarrhoea and vomiting within an AMU setting. It is also suitable because as new data is gathered and analysed against previously gathered data, the resultant findings will inform the ensuing stages of data collection - a process similar to theoretical sampling (Corbin and Strauss, 2008).

To complement this framework of data analysis, qualitative data analysis (QDA) software will be utilised for the management, coding, comparison, and triangulation of collected data; namely NVivo QDA software (Göransson et al, 2007). NVivo allows for the convenient storage, organisation, and quick retrieval of various formats of data as opposed to alternative manual and physical storyboarding methods which would be extremely time-consuming and require large amounts of physical space (Basit, 2003; QSR International, 2013). Only anonymised data will be uploaded into NVivo. Risk assessments have been undertaken in relation to the process of data analysis (PDF-19_Risk_Assessment_Form).

With regard to coding reliability, throughout the study, the researcher will develop and maintain a coding manual that will be regularly reviewed by project supervisors so that feedback that resembles 'inter-rater coding reliability' may be received. Such feedback will allow for the refining of the coding manual so that the categories, major themes and minor themes that will be derived during the data analysis and synthesis process will be reliable and credible.

Ethical issues

As this study will involve human participants and observations of naturally occurring activities, some important ethical issues will need to be considered as part of the moral principles that guide research (Economic and Social Research Council (ESRC), 2005). Box 6 presents these morals principles.

1. Research should be designed, reviewed and undertaken to ensure integrity, quality and transparency.
2. Research staff and participants must normally be informed fully about the purpose, methods and intended possible uses of the research, what their participation in the research entails and what risks, if any, are involved. Some variation is allowed in very specific research contexts for which detailed guidance is provided in Section 2 (p27-33).
3. The confidentiality of information supplied by research participants and the anonymity of respondents must be respected.
4. Research participants must take part voluntarily, free from any coercion.
5. Harm to research participants and researchers must be avoided in all instances.
6. The independence of research must be clear, and any conflicts of interest or partiality must be explicit.

Box 6: ESRC principles of ethical research (ESRC, 2012, p 2-3)

Using these principles as discussion signposts, below is a discourse demonstrating the ethical issues considered during the design of this study.

The integrity, quality and transparency of this study's design will be determined by the authorities from whom ethics approval to undertake the study will be sought; these include the University, the local NHS R&D department, and the local Research Ethics Committee (REC). With regard to maintaining integrity, quality and transparency throughout the study, the study's project supervisors will be met with on a regular basis so that I may report to them regarding the progress of the study and receive guidance (or undergo appraisals) as required.

Issues surrounding consent and informing staff, patients and visitors about the study have already been addressed in the 'Procedures and materials' section. Appropriate information sheets have been designed and they contain sufficient information about the study. This includes information such as my student status and transparency regarding the possible effects that the study might have on respective participants; for example, it has been highlighted that interviews might evoke strong emotions. It is however important to note that although every effort has been made to provide full information regarding the study, broad terms have been used to explain what the study is about and what it will involve without revealing specific details. This decision to withhold specific details is based on the principle of minimising the 'Hawthorne effect' on the specific phenomena under investigation (Adair, 1984). Only by observing these phenomena in their 'close to natural' state can the truth be known about any problems occurring in practice so that relevant support strategies can be recommended and implemented, thereby improving practice. This

decision to withhold specific information is also in line with the ESRC's (2012, p30) statement which states that 'Covert research may be undertaken when it may provide unique forms of evidence or where overt observation might alter the phenomenon being studied.'

Research participants will not be coerced into taking part in the study as outlined in the 'Procedures and materials' section, and to ensure that everyone who will be involved in the study is not harmed, I have undertaken risk assessments with the support of my project supervisors (PDF-19_Risk_Assessment_Form). These risk assessments are in line with the Health and Safety Act 1974 and ESRC (2005, 2012) guidelines, and they encompass a wide variety of potential risks including observing naturally occurring practice, performing interviews, lone working, and data safety.

In undertaking these risk assessments, some ethical dilemmas that I will likely encounter during the study were explored. These dilemmas revolve around the fact that the prompting for this study was as a result of failures in practice that were observed by the unit's Matron. It is therefore likely that I myself will observe 'less than exemplary' practice that might require me to escalate concerns to relevant ward leaders. As such, the risk assessments undertaken have addressed issues such as how I will evaluate the severity of observed 'less than exemplary' practice and the escalatory actions that I will take depending on determined severity.

Data protection and anonymity

Compliance with the Data Protection Act 1998 and the University's data protection policy (with regard to ensuring that research data and its sources remain confidential) has been demonstrated in the 'Procedures and materials' section and is outlined in relevant information sheets. The information includes details of the data handling procedures that will be followed to ensure that raw data is kept confidential and secure. It has also been made clear to the participants that I may have to breach confidentiality under certain special conditions. These conditions are those relating to legal requirements and an overriding duty to the public as outlined in Box 7 (ESRC, 2012; Research Ethics Guidebook, Legal requirements page). Anonymity has been explained as 'linked anonymity'; that is to say that participants will be linked to their data, however to ensure that only I will be able to link data to its source, a coding mechanism which only I will know will be used.

1. Where there is legal requirement (either under statute or a court order) to disclose the information (for instance, notification of certain diseases to public health authorities);
2. Where there is an overriding duty to the public (for instance, the information concerns the commission of a criminal offence or relates to life-threatening circumstances)

Box 7: Conditions under which confidentiality may be breached**Project time line**

The time line for the project is presented in Appendix 2 and has been briefly discussed in the 'Procedures and materials' section. The project, including thesis write up and submission, is estimated to be completed within a 2 and a half year time period. Once data collection is complete, comprehensive data analysis will be performed after which the findings of the study will be disseminated through project reports, journal publications, conference presentations and other relevant media.

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Appendices

Appendix 1: Research Questions

Broad central question:

How are patients with symptoms of diarrhoea and vomiting assessed and managed by Acute Medical Unit doctors, nurses and healthcare assistants and what factors influence these processes? What are the patients' experiences and understanding of diarrhoeal-related care in the Acute Medical Unit?

Project simplified working title:

How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Specific sub-questions:

1. In relation to hospital-based assessment of diarrhoea and vomiting:

- a. How do Acute Medical Unit doctors, nurses and healthcare assistants assess the infective status of adult patients with symptoms of diarrhoea and vomiting in the absence of results from stool microbiology investigations?
- b. What factors (including human factors) promote or inhibit the ability of Acute Medical Unit doctors, nurses and healthcare assistants to effectively assess the infective status of adult patients with symptoms of diarrhoea and vomiting?

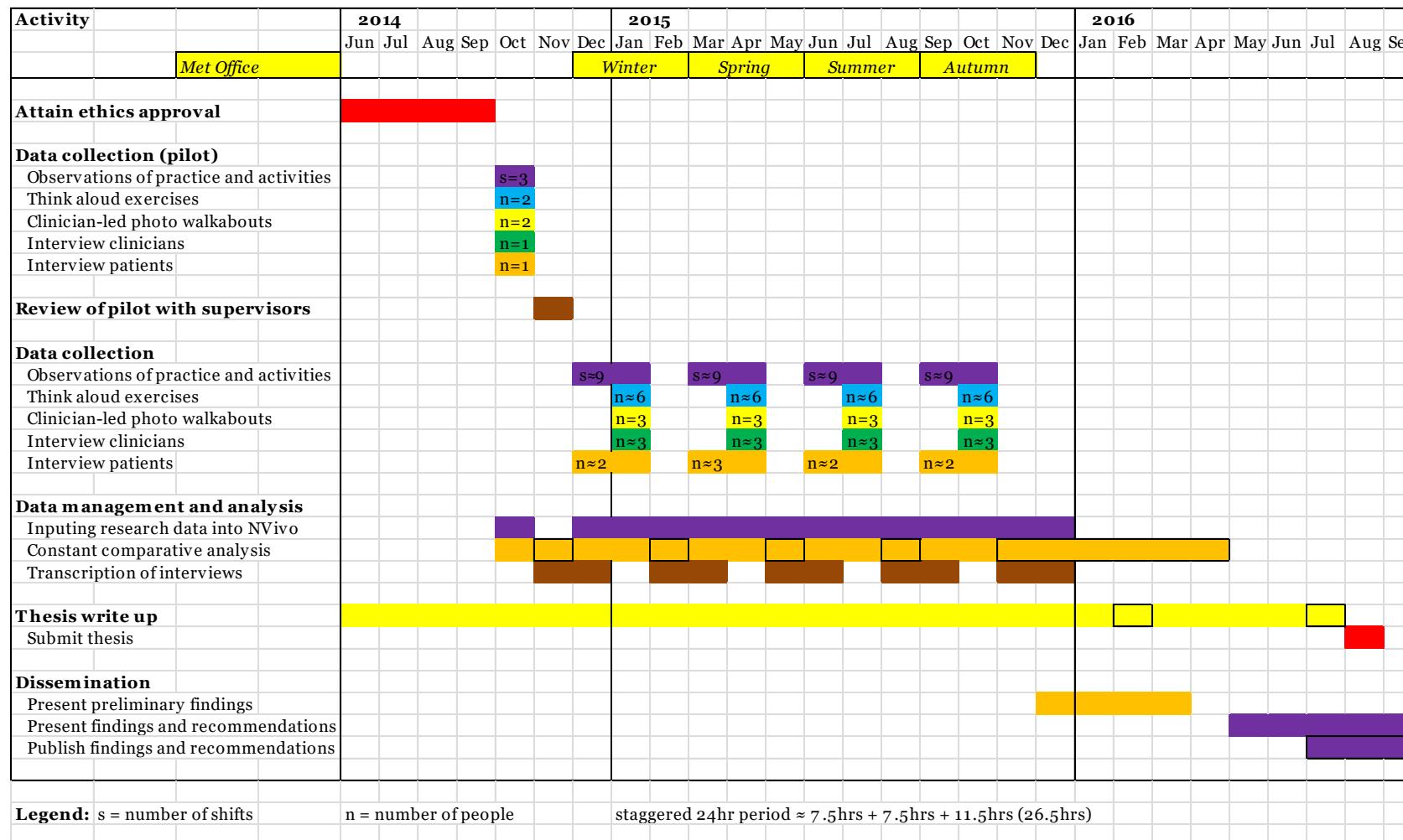
2. In relation to hospital-based infection control measures:

- a. What infection control interventions do Acute Medical Unit doctors, nurses and healthcare assistants implement and perform when caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting?
- b. What factors (including human factors) promote or inhibit the ability of Acute Medical Unit doctors, nurses and healthcare assistants to successfully implement and perform aspired infection control interventions whilst caring for adult patients with symptoms of suspected/confirmed infectious diarrhoea and vomiting?

3. In relation to patient involvement and hospital-based infection control:

What are the patients' experiences and understanding of the care that they received in the Acute Medical Unit following an incident of suspected/confirmed infectious diarrhoea and vomiting?

Appendix 2: Project time line



Appendix 7 - Research poster



UNIVERSITY OF
Southampton

Research Study Notice

How do doctors, nurses, and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

There is a study that is taking place in this unit.

The study is trying to find out how doctors, nurses and healthcare assistants in this unit look after patients who have diarrhoea and vomiting.

To find this out, the people doing the study will do the following things. They will:

1. work or walk together with doctors, nurses and healthcare assistants so as to see how they talk to and work with patients who have diarrhoea and vomiting,
2. observe over long periods of time the things that take place in the unit that make it easy or hard for doctors, nurses and healthcare assistants to look after patients who have diarrhoea and vomiting,
3. interview patients in the unit who have diarrhoea and vomiting,
4. interview doctors, nurses and healthcare assistants and find out more about how they work with patients who have diarrhoea and vomiting,
5. walk around the unit with doctors, nurses and healthcare assistants and take some photos of the things that make it easy or hard for them to look after patients who have diarrhoea and vomiting.

The things that we will learn from this study will likely be used by the hospital to think of new ways to support doctors, nurses and healthcare assistants so that they can improve the way that they look after patients who have diarrhoea and vomiting.

If you would like to help in this study, or if you would like to find out more about it, please contact Mat Moyo (pictured above) using the contact details below:

Email: mat.moyo@soton.ac.uk

Mobile: 07840 375 076

[AMU/notice/v2] [31/10/2014]

[NHS ethics ref: 14/SC/1197]

[NHS R&D ref: RHM MED1205]

Appendix 8 - Form used to record proof of verbal consent



RECORD OF VERBAL CONSENT

Study title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Researcher name: Matsikachando Moyo (Mat)

NHS ethics reference: 14/SC/1197

NHS R&D reference: RHM MED1205

Who was approached for consent/opinion? (please circle): Patient Consultee

Name of Patient

If consultee was approached for their opinion, please print their full name below and specify their relationship to the patient.

Name of Consultee

Relationship to patient

I (*name of clinician*) can confirm that the 'patient's consent' / 'consultee's opinion' has been sought allowing the researcher to be present in the patient's room (or by their bedside) to observe patient-clinician interactions for research purposes.

Position of Clinician
recording verbal consent

Date

Signature

With permission, please make a note the names of other persons present in the patient's room (or by their bedside) during the taking of verbal consent:

Name of Person

[31/10/2014] [pnt_verbal_consent_v1]
Copies: 1 (original) copy to researcher's file, 1 to patient's notes, 1 to master file.

Appendix 9 - Respective interview schedules

9.1 - Semi-structured clinician interview schedule (Interview 1)

9.2 - Semi-structured clinician interview schedule (Interview 2)

9.3 - Semi-structured patient interview schedule (Interview 1)

9.1 Semi-structured clinician interview schedule (Interview 1)

Introductory comments

- i. Thank clinician for taking part
- ii. Outline purpose of interview
- iii. Explain about confidentiality and linked anonymity
- iv. Ask for permission to use audio recorder

Background information

I'm going to begin by finding out a little bit about you.

Doctors and Nurses

- i. Can you tell me how long you have been qualified for?
- ii. Where did you do your training?
- iii. How long have you been working on AMU?

Healthcare Assistants

- i. Can you tell me how long you have been working as a HCA?
- ii. Have you worked anywhere else other than on AMU?
- iii. How long have you been working on AMU?

Main interview

I'm now going to ask you a series of questions to help me understand how YOU personally work with patients who have diarrhoea and vomiting. The questions will also help me to find out more about the things that make either easier or harder for you to look after such patients.

Assessment of patients (Doctors and Nurses)

- i. In the absence of stool microbiology results, how do you assess the infective status of adult patients who have symptoms of diarrhoea and vomiting?
(probe to clarify steps/methods if necessary)
- ii. Can you tell me about any problems that you have experienced when trying to assess the infective status of adult patients who have symptoms of diarrhoea and vomiting?
(probe until topic exhausted – what factors inhibit?)
- iii. Can you tell me about any good experiences that you have had when it was relatively easy or straight forward to assess the infective status of a patient with symptoms of diarrhoea and vomiting? (probe until topic exhausted – what factors promote?)
- iv. What do you think is needed in order to improve the way that AMU doctors/nurses/HCAs assess the infective status of patients with symptoms of diarrhoea and vomiting in the absence of stool microbiology results?

Infection control interventions (All clinicians)

- i. In your daily practice, what infection control interventions do you strive/try to implement or perform when caring for adult patients who have symptoms of suspected/confirmed infectious diarrhoea and vomiting?
(Utilise 24 hour 'cue' cards if necessary)
- ii. Can you tell me about the things/issues/or situations that make it difficult or even impossible for you to implement or perform the infection control interventions that you have mentioned? (probe until topic exhausted – what factors inhibit?)
- iii. Can you tell me about the things/issues/or situations that make it easier for you to implement or perform the infection control interventions that you previously mentioned? (probe until topic exhausted – what factors promote?)
- iv. What do you think is needed in AMU in order to improve compliance with recommended infection control interventions when looking after adult patients who have symptoms of suspected/confirmed infectious diarrhoea and vomiting?

Closing comments

We are nearly coming to the end of the interview...

- i. Is there anything that has not been covered in the interview that you would like to talk about which relates to the assessment of patients with symptoms of diarrhoea and vomiting in AMU?
- ii. Is there anything that has not been covered in the interview that you would like to talk about which relates to the infection control interventions that are implemented in AMU when patients are suspected of having infectious diarrhoea and vomiting?
- iii. Thank clinician for taking part.
- iv. Explain what will happen to the audio recording and transcript.
- v. Arrange a date for the follow-up interview and explain what the follow-up interview will involve.

9.2 Semi-structured clinician interview schedule (Interview 2)

Introductory comments

- i. Thank clinician for taking part
- ii. Outline purpose of interview
- iii. Explain about confidentiality and linked anonymity
- iv. Ask for permission to use audio recorder

Background information

Relevant background information to be sought based on last interview

- [Give transcript of interview 1 – allow time for skim reading]
-
-
-
-

Main interview

Recap on last interview and share the interpretations and/or key messages you derived from the first interview.

Assessment of patients (Doctors and Nurses)

Relay key messages derived from interpretations of the first interview

-
-
-
-
-
-
-

Now, after saying this, are there any parts in my understanding of what you said in the first interview that you think ..mmhh.. that's not exactly what I meant when I said that? or do you think that my interpretation is correct?

(probe for clarification, amendments and/or additions)

Infection control interventions (All clinicians)

Relay key messages derived from interpretations of the first interview

-
-
-
-
-
-
-

Now, after saying this, are there any parts in my understanding of what you said in the first interview that you think ..mmhh.. that's not exactly what I meant when I said that? or do you think that my interpretation is correct?

(probe for clarification, amendments and/or additions)

Closing comments

We are nearly coming to the end of the interview...

- i. Is there anything that has not been covered in this last interview that you would like to talk about which relates to the management of patients with symptoms of diarrhoea and vomiting in AMU?
- ii. Thank clinician for taking part.
- iii. Explain what will happen to the audio recording and transcript.

9.3 Semi-structured patient interview schedule (Interview 1)

Introductory comments

- i. Thank respondent for taking part
- ii. Outline purpose of interview
- iii. Explain about confidentiality and linked anonymity
- iv. Ask for permission to use audio recorder

Background information

I'm going to begin by finding out a little bit about your coming into hospital.

- i. When you first noticed that something wasn't quite right within you, what was your first reaction?
- ii. What made you decide to come into hospital?

Main interview

I'm now going to ask you a series of questions that will help me to understand about your time as a patient in the hospital, especially the time that you spent in the Acute Medical Unit. The questions that I will ask will also help me find out more about your interactions with the doctors, nurses and healthcare assistants in the Acute Medical Unit.

Overall satisfaction

- i. Broadly speaking, how satisfied are you so far (how satisfied were you) with the care and treatment that you are receiving (received) in the Acute Medical Unit?
** Why? **

The information you received about diarrhoea and vomiting

- i. Are you finding it (Did you find it) difficult or awkward to communicate with the doctors, nurses or healthcare assistants in the unit about having diarrhoea and vomiting?
- ii. What information have you been (Whilst in the Acute Medical Unit, what information were you) given about diarrhoea and vomiting?
- iii. Have there been times when you have been (Were there times when you were) given conflicting or contradictory information?
- iv. What things did the doctors, nurses or healthcare assistants in the unit ask you to do in order to help prevent the spread of diarrhoea and vomiting in the hospital?
- v. Purely talking about diarrhoea and vomiting itself, what would you have liked more information about?

How much influence you had

- i. How much influence do you feel like you have (had) when it comes (came) to decisions and activities relating to your care in the unit?
(treatment options / when to perform certain Activities of Daily Living)
- ii. (present) Are there any things in which you would like to have more 'say' when it comes to your care? / (past) Are there any things in which you would have liked to have had more 'say' concerning your care?

Your experience of interacting with medical staff

- i. What do you think about the way that the doctors, nurses, and healthcare assistants in the unit interact with, talk to, and do things with you (interacted with, talked to, and did things with you)?
(probe until topic exhausted – experience of interactions?)
- ii. In your first-hand experience, tell me how you feel (felt) about the relationships between patients and staff in the unit?
- iii. Do you feel (Did you feel) like the staff in the unit are (were) supportive and understanding towards you, or do you feel (did you feel) as though they are (were) indifferent and unsupportive?
(probe until topic exhausted – experience of staff support?)

Best and worst bits of being in the Acute Medical Unit

- i. (present) What would you say are the best and worst parts of your experience in the unit so far? / (past) What would you say were the best and worst parts of your whole experience in the unit?
- ii. Based on your first-hand experience, if you were looking to redesign and improve the care experience of people with diarrhoea and vomiting in this unit where would you begin? Imagine we were setting it all up from scratch. (this question encompasses physical environment, the care journey, staff attitudes and behaviour, etc)? ** Why? **

Closing comments

We are nearly coming to the end of the interview...

- i. Is there anything that has not been covered in the interview that you would like to talk about which relates to your experience of care in the Acute Medical Unit?
- ii. Thank respondent for taking part.
- iii. Explain what will happen to the audio recording and transcript.
- iv. Arrange a date for the follow-up interview and explain what the follow-up interview will involve.

Appendix 10 - Permission to undertake photo walkabouts

6th November 2014

Emergency Medicine
Acute Medical Unit

Mr M Moyo

Dear Mat

I am writing to acknowledge receipt of your email on the 20th October 2014 regarding taking photos for your project. The hospital policy 'Still photography and moving image recording' policy states that to have any patients or people within the images or recordings they must gain written consent prior to doing so. It does however state that with correct handling of images/recordings (ensuring adhering to data protection and patient confidentiality) that this can be carried out within clinical areas.

I am happy for you to take photo's as long as you adhere to the policy. I would also like you to put up some posters in the staff room and MDT office letting staff know what you are doing.

I have discussed this with Matron [REDACTED] and she is in agreement with this.

Please feel free to discuss this with me further if you have any questions.

Yours sincerely

[REDACTED]
Senior Sister
Acute Medical Unit

Appendix 11 - Photo walkabout data collection sheets

Sheet 1 of 2 (promotes)

Photo walkabout log sheet

(looking after patients who have D&V - what makes it easier/facilitates/helps/promotes)

Instructions

The purpose of this exercise is to help jog your memory so that you can think of all the things that make it easier for you to look after patients who have diarrhoea and vomiting.

To ensure that this study protects the privacy, dignity, and rights of patients, visitors and staff in the unit, please take note of the list below which outlines the types of photos that you cannot take.

You cannot take photos of the following:

- people's faces or belongings
- any objects or documents with a person's personal details
- any objects or documents showing the hospital's name or logo
- any objects or documents showing any form of branding

Photo log

<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it easier for you to look after patients who have D&V.
<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it easier for you to look after patients who have D&V.
<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it easier for you to look after patients who have D&V.
<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it easier for you to look after patients who have D&V.

photo_walkabout_easier_v1 (17/03/2014)

Sheet 2 of 2 (inhibits)**Photo walkabout log sheet***(looking after patients who have D&V - what makes it harder/difficult/challenging/problematic)***Instructions**

The purpose of this exercise is to help jog your memory so that you can think of all the things that make it difficult for you to look after patients who have diarrhoea and vomiting.

To ensure that this study protects the privacy, dignity, and rights of patients, visitors and staff in the unit, please take note of the list below which outlines the types of photos that you cannot take.

You cannot take photos of the following:

- people's faces or belongings
- any objects or documents with a person's personal details
- any objects or documents showing the hospital's name or logo
- any objects or documents showing any form of branding

Photo log

<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it difficult for you to look after patients who have D&V.
<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it difficult for you to look after patients who have D&V.
<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it difficult for you to look after patients who have D&V.
<input type="text"/>	Title of photo <i>(researcher log)</i>	Briefly describe how this thing, issue, or aspect makes it difficult for you to look after patients who have D&V.

photo_walkabout_difficult_v1 (17/03/2014)

Appendix 12 - Ethical approval

12.1 - Ethics Committee approval

12.2 - R&D approval

12.1 Ethics Committee approval



Health Research Authority

NRES Committee South Central - Hampshire A

Level 3, Block B
Whitefriars
Lewins Mead
Bristol
BS1 2NT

Telephone: 0117 342 1381

10 November 2014



Dear Mr Moyo

Study title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?
REC reference: 14/SC/1197
IRAS project ID: 150321

Thank you for your letter of 7th November 2014, responding to the Committee's request for further information on the above research and submitting revised documentation.

The further information has been considered on behalf of the Committee by the Chair.

We plan to publish your research summary wording for the above study on the HRA website, together with your contact details. Publication will be no earlier than three months from the date of this opinion letter. Should you wish to provide a substitute contact point, require further information, or wish to make a request to postpone publication, please contact the REC Manager, [REDACTED], nrescommittee.southcentral-hampshirea@nhs.net.

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.

Mental Capacity Act 2005

I confirm that the committee has approved this research project for the purposes of the Mental Capacity Act 2005. The committee is satisfied that the requirements of section 31 of the Act will be met in relation to research carried out as part of this project on, or in relation to, a person who lacks capacity to consent to taking part in the project.

A Research Ethics Committee established by the Health Research Authority

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.

Management permission ("R&D approval") should be sought from all NHS organisations involved in the study in accordance with NHS research governance arrangements.

Guidance on applying for NHS permission for research is available in the Integrated Research Application System or at <http://www.rforum.nhs.uk>.

Where a NHS organisation's role in the study is limited to identifying and referring potential participants to research sites ("participant identification centre"), guidance should be sought from the R&D office on the information it requires to give permission for this activity.

For non-NHS sites, site management permission should be obtained in accordance with the procedures of the relevant host organisation.

Sponsors are not required to notify the Committee of approvals from host organisations

Registration of Clinical Trials

All clinical trials (defined as the first four categories on the IRAS filter page) must be registered on a publicly accessible database within 6 weeks of recruitment of the first participant (for medical device studies, within the timeline determined by the current registration and publication trees).

There is no requirement to separately notify the REC but you should do so at the earliest opportunity e.g when submitting an amendment. We will audit the registration details as part of the annual progress reporting process.

To ensure transparency in research, we strongly recommend that all research is registered but for non clinical trials this is not currently mandatory.

If a sponsor wishes to contest the need for registration they should contact [REDACTED], the HRA does not, however, expect exceptions to be made. Guidance on where to register is provided within IRAS.

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).

Ethical review of research sites

NHS sites

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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).

Approved documents

The final list of documents reviewed and approved by the Committee is as follows:

Document	Version	Date
Copies of advertisement materials for research participants [PDF-01_Research_Poster]	2	31 October 2014
Covering letter on headed paper [IRAS_headed_cover_letter-SIGNED]		29 August 2014
Covering letter on headed paper [IRAS_amendments_cover_letter-SIGNED]		07 November 2014
Interview schedules or topic guides for participants [PDF-15_Patient_Interview_Schedule_2]	1	22 March 2014
Interview schedules or topic guides for participants [PDF-17_Photo_Log_Easier]	1	17 March 2014
Interview schedules or topic guides for participants [PDF-13_Patient_Interview_Schedule_1]	1	22 March 2014
Interview schedules or topic guides for participants [PDF-14_Clinician_Interview_Schedule_2]	1	22 March 2014
Interview schedules or topic guides for participants [PDF-12_Clinician_Interview_Schedule_1]	1	22 March 2014
Interview schedules or topic guides for participants [PDF-18_Photo_Log_Difficult]	1	17 March 2014
IRAS Checklist XML [Checklist_07112014]		07 November 2014
Letter from funder [University_Of_Southampton_Unconditional_Offer]		11 October 2012
Letter from sponsor [Sponsorship_Letter_for_RHM_MED1205]		21 July 2014
Other [PDF-04_Observations_Sheets]	2	22 May 2014
Other [Professional_Indemnity_Insurance_2014-08-08]		07 July 2014
Other [PDF-06_Researcher_Verbal_Consent]	1	02 June 2014
Other [Summary_CV_for_supervisor]		25 August 2014
Other [PDF-07_Clinician_Verbal_Consent]	1	02 June 2014
Other [University_Of_Southampton_Studentship_Offer]		17 September 2012
Other [PDF-19_Risk_Assessment_Form]	1	01 April 2014
Other [MatMoyo-AMU_photo_permission]		06 November 2014
Other [PDF-00_Milestone_3]	v2a	07 July 2014
Other [PDF-20_Generic_Verbal_Consent]	1	31 October 2014
Other [PDF-16_PageSix_Agreement]		18 February 2014
Participant consent form [PDF-05_Abridged_Consent_Form]	2	31 October 2014
Participant consent form [PDF-10_Patient_Consent_Form]	2	31 October 2014
Participant consent form [PDF-11_Consultee_Consent_Form]	3	31 October 2014
Participant consent form [PDF-03_Clinician_Consent_Form]	2	31 October 2014
Participant information sheet (PIS) [PDF-09_Consultee_Info_Sheet]	1	24 March 2014
Participant information sheet (PIS) [PDF-02_Clinician_Info_Sheet]	2	31 October 2014

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Participant information sheet (PIS) [PDF-08_Patient_Info_Sheet]	1	24 March 2014
REC Application Form [REC_Form_01082014]		01 August 2014
Referee's report or other scientific critique report [Milestone_3_PeerReviewFeedback]	1	20 May 2014
Research protocol or project proposal [ERGO_researchprotocol_v3]	3	31 October 2014
Summary CV for Chief Investigator (CI) [Summary_CV_for_student]		24 June 2014
Summary CV for supervisor (student research) [Summary_CV_for_supervisor]		23 July 2014

Statement of compliance

The Committee is constituted in accordance with the Governance Arrangements for Research Ethics Committees and complies fully with the Standard Operating Procedures for Research Ethics Committees in the UK.

After ethical review

Reporting requirements

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
- Notification of serious breaches of the protocol
- Progress and safety reports
- Notifying the end of the study

The HRA website also provides guidance on these topics, which is updated in the light of changes in reporting requirements or procedures.

User Feedback

The Health Research Authority is continually striving to provide a high quality service to all applicants and sponsors. You are invited to give your view of the service you have received and the application procedure. If you wish to make your views known please use the feedback form available on the HRA website:

<http://www.hra.nhs.uk/about-the-hra/governance/quality-assurance/>

HRA Training

We are pleased to welcome researchers and R&D staff at our training days – see details at <http://www.hra.nhs.uk/hra-training/>

14/SC/1197

Please quote this number on all correspondence

With the Committee's best wishes for the success of this project.

A Research Ethics Committee established by the Health Research Authority

Yours sincerely

A large black rectangular redaction box covering a signature.

Chair

Email:nrescommittee.southcentral-hampshirea@nhs.net

Enclosures: "After ethical review – guidance for researchers" [SL-AR2]

Copy to:

A black rectangular redaction box covering a list of recipients.

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12.2 R&D approval

Mr Matsikachando Moyo
Faculty of Health Sciences

01 December 2014

Dear Mr Moyo

ID: RHM MED1205 How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

EudraCT:

Thank you for submitting all the required documentation for Trust R&D approval. I write to inform you that your study has full [REDACTED] R&D approval. Please find attached the Conditions of Trust R&D approval which you are obliged to adhere to.

Please note that according to the 70 day benchmark you should aim to recruit your first patient by 26/01/2015

You are required to keep copies of all your essential documents relating to this study. Please download a copy of the relevant Investigator Site File template from the R&D website:
<http://www.uhs.nhs.uk/Research/For-investigators/Sitefile.aspx>.

Your project is subject to R&D monitoring and you will be contacted by our office to arrange this.

Please note: A condition of approval is that any changes need to be timeously notified to the R&D office. This includes providing copies of:

- . All NRES substantial amendments and favourable opinions;
- . All Serious Adverse Events (SAEs);
- . NRES Annual Progress Reports;
- . Annual MHRA Safety Reports;
- . NRES End of Study Declaration;
- . Notifications of significant breaches of GCP or protocol

Please quote the above RHM No. On any correspondence with our office.

Should you, or any of your team, require training in any of the policies and procedures required to ensure compliance with the conditions of approval, please refer to the R&D Training website [http://www.uhs.nhs.uk/Research/For-investigators/Mandatory-training-governance-and-safety-management.aspx](http://www.uhs.nhs.uk/Research/For-investigators/Mandatory-training-governance-and-safety-management/Mandatory-training-governance-and-safety-management.aspx) for an up-to-date calendar of training events.

Yours sincerely

Research Governance Officer

Appendix 13 - Information sheets

13.1 - Clinician information sheets

13.2 - Consultee information sheets

13.3 - Patient information sheets

13.1 Clinician Information Sheet

Study Title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Researcher: Matsikachando Moyo (Mat) **NHS ethics reference:** 14/SC/1197

Dear Sir/Madam

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read this information carefully and talk to others about the study if you wish.

If you prefer, the researcher will be happy to go through this information sheet with you and answer any questions that you may have. After going through the information, if you decide that you want to take part in the study, you will be asked to sign a consent form.

Thank you.

What is the research about?

This research is part of a PhD project that is being supported by the University of Southampton and University Hospital Southampton NHS Foundation Trust. The researcher is trying to understand how doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting. The researcher will be trying to find answers to important questions such as, 'How do doctors, nurses and healthcare assistants interact with (or work together with) patients who have diarrhoea and vomiting?' and 'What things make it easy or hard for doctors, nurses and healthcare assistants to look after patients who have diarrhoea and vomiting?' These questions are important to us because we do not fully understand how our doctors, nurses and healthcare assistants work together with patients who have diarrhoea and vomiting and the challenges that either parties face. The things that will be learnt from this study will be added to existing research knowledge and may be used locally to help the people that work in this hospital to think of new ways to support Acute Medical Unit doctors, nurses and healthcare assistants so that they can improve the way that they look after patients who have diarrhoea and vomiting.

Why have I been chosen?

This study is interested in how doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting. You have been chosen because you are a doctor / nurse / healthcare assistant in the Acute Medical Unit who is interacting with patients who have diarrhoea and vomiting.

Do I have to take part?

It is up to you to decide whether or not to take part in this study. If you decide to take part, you are still free to withdraw at any time without giving a reason. A decision not to take part, or decision to withdraw at any time will not affect your legal rights.

What will happen to me if I take part?

If you decide to take part, the researcher will ask you to sign a consent form after which the following 4 things will be possible:

- The researcher will shadow you and **observe your interactions** with the patients who have diarrhoea and vomiting and take some fieldnotes.
- If you are assessing a patient for the first time (i.e. admitting, clerking or post taking), you will be invited to undertake a **think-aloud exercise** after the assessment whereby you will be asked to verbalise (1) what exactly you assessed, (2) how you assessed, (3) your thoughts and feelings during the assessment, (4) the decisions that you made as a result of what you were thinking, feeling and observing, (5) your conclusions and recommended plan of care after the assessment, and (6) your reflection of what you might do differently if a similar diagnostic challenge arose. This exercise will be captured on an audio recorder for future analysis and will complement the researcher's fieldnotes.
- You will be offered the opportunity to take part in two **photo walkabouts** of the Acute Medical Unit where you will be taking the photos of things (including items that symbolise situations/conditions) that make it easy or hard for you to assess and manage patients who have diarrhoea and vomiting. (i.e. the first walkabout will focus on factors that make this task easy, and the second will focus on factors that make the task hard.)

As part of this walkabout you will be provided with sheets of paper on which you will be able to label, in your own words, the titles of your photos and write (or dictate onto an audio recorder) a description of what the photo represents to you in terms of what

makes it easy or hard for you to care for patients with diarrhoea and vomiting. These sheets of paper (and audio recordings) will complement fieldnotes.

Please be aware that even though you will be the one taking these photos, the photos themselves will belong to, and be owned by the researcher. Furthermore, when taking the photos you will be reminded not to take photos of any identifiable information. Nonetheless, in the event that identifiable information is captured in a photo by mistake, the photo will either be destroyed or the identifiable information will be digitally blurred or blotted out to conceal the captured details.

- You will be invited to participate in two **interviews**. In the first interview you will be asked to describe and discuss your experiences of caring for patients who have diarrhoea and vomiting, and in the second you be asked to expand on, clarify, or amend any of the researcher's preliminary interpretations of the first interview. Both interviews will be held in a private location within the hospital unless you prefer that the interviews be conducted at your home. Both interviews will be captured on an audio recorder and will complement fieldnotes.

Please note that the second interview is an optional follow-up interview that will be mainly used to help the researcher affirm and/or amend the findings that they will have derived from the first interview. You are therefore free to decline to participate in this second interview although your participation will be greatly beneficial with regard to validating the researcher's findings.

Will there be any refreshments available for hospital-based interviews?

Yes. If you agree to take part in interviews, and if you decide to be interviewed at the hospital, light refreshments will be offered to you as a way of thanking you for coming all the way to the hospital to attend the interview. The researcher will make separate arrangements with you to find out what foods you can and cannot eat (including any food allergies that you may have).

Are there any benefits in my taking part?

It cannot be promised that this study will benefit you directly, however, what will be learnt from this study will be added to existing research knowledge and may be used locally to help the people that work in this hospital think of new ways to:

1. better support Acute Medical Unit doctors, nurses, and healthcare assistants as they look after patients who have diarrhoea and vomiting; and
2. improve both the care and care experiences of patients in the Acute Medical Unit who have diarrhoea and vomiting.

What are the possible disadvantages and risks of taking part?

Taking part in the think aloud exercise may take up to 10 minutes of your time depending on whether you think aloud during or after interacting with patients of interest. The photo walkabout may take up to 30 minutes of your time and it will make you think of both good and difficult aspects of your clinical practice which might stir some emotions.

Speaking to the researcher during the interview may take up to an hour of your time. Sometimes talking about your experience(s) may make you remember both good and difficult aspects of the experience(s) which might stir some emotions. Audio recorded interviews will be transcribed by a local transcription service provider who has provided a non-disclosure agreement which can be shown to you upon request. The audio files will not have your name (or any other personally identifiable information) on them that could be used to identify you except your voice.

As all information gathered from this study will be kept strictly confidential, it is not anticipated that taking part in observations of practice will disadvantage you in any way.

Will my participation be confidential?

Yes. Ethical and legal practice will be followed and all information which is collected about you and from you during the course of the research will be kept strictly confidential. Procedures for handling, processing, storage and destruction of data will comply with the Data Protection Act 1998. Observational, think-aloud, walkabout, and interview notes will be stored anonymously using a code of letters and numbers that only the researcher can decode so that no one else but the researcher will be able to link you to your data. Only the researcher and the people who check the quality of the study will have access to these notes. Information captured on paper will be stored in a secure locker located in the hospital's research facility and all electronic data (textual, audio, and photographic) will be stored in a computer folder that is located within a University password protected research computer.

Audio recorded interviews will be transcribed by a local transcription service provider who has provided a non-disclosure agreement which can be shown to you upon request. The audio files will not have your name (or any other personally identifiable information) on them that could be used to identify you except your voice. The audio files will be delivered directly to the transcription service provider via their website. For data security, delivered audio files will be encrypted during transfer through the provider's online system. To maintain security during the delivery of completed transcripts, the provider will encrypt and email the transcripts to the researcher.

Only the researcher and the service provider will know the encryption password. All audio files and transcripts will then be deleted from the service provider's system within 60 days of the end of the transcription project.

All information captured through this research will have all identifying material removed from it before being used to produce research findings and/or reports. No individual persons will be identified in any of the reports that will be produced as a result of this research. For example, feedback comments will be generalised as follows: '...nurse 7 had this to say...'

Research data will be retained by the University of Southampton for a minimum of 10 years in line with the University's Research Data Management Policy requirements after which the data will be disposed of securely.

Please be advised that the researcher may be required to disclose the confidential information that you provide to appropriate authorities if the information is reportable by law, for example, if the information concerns the commission of a criminal offence or relates to life-threatening circumstances.

What will happen to the results of the research study?

What is learnt from this study will be used to produce project reports (including a PhD write up). These reports will be shared in meetings and published in relevant medical and scientific journals. Your involvement in the study will remain confidential at all stages.

Who is organising and funding the research?

This research is part of a PhD project that is being sponsored and funded by the University of Southampton and University Hospital Southampton NHS Foundation Trust.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee. These people are there to protect your safety, rights, wellbeing and dignity. This study has been reviewed and given favourable opinion by the NRES Committee South Central - Hampshire A.

What happens if I change my mind?

If you decide that you do not want to carry on taking part in the study, you may withdraw at any time without giving a reason. Withdrawing from the study will not affect your legal rights.

What if I have a concern about this study?

If you have a concern or a complaint about this study you should contact 'The Research Governance Manager' at the Research Governance Office (Address: University of Southampton, Building 37, Highfield, Southampton, SO17 1BJ.
Tel: +44 (0)23 8059 5058; Email: rgoinfo@soton.ac.uk.)

If you remain unhappy and wish to complain formally, 'The Research Governance Manager' can provide you with details of the University of Southampton Complaints Procedure.

Where can I get more information?

If you have any questions, or require more information, please contact Matsikachando Moyo (Mat) using the following contact details:
Faculty of Health Sciences, Mailpoint 11, Level A, South Academic Block, Southampton General Hospital, Tremona Road, Southampton, SO16 6YD.
Tel: +44 (0)7840 375 076; Email: mat.moyo@soton.ac.uk.

Thank you for taking the time to read this information.

13.2 Consultee Information Sheet

Study Title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Researcher: Matsikachando Moyo (Mat) **NHS ethics reference:** 14/SC/1197

Dear Sir/Madam

You are being invited to act as a 'consultee' for someone who is unable to make a decision for themselves. You are being asked to advise the researcher about this person's wishes and feelings as to whether they themselves would have wished to join this research. Before you decide, it is important for you to understand what it means to be a consultee, as well as why the research is being done and what it will involve. Please take time to read this information carefully and talk to others about the study if you wish.

If you prefer, the researcher will be happy to go through this information sheet with you and answer any questions that you may have. Please take time to decide whether you wish to be a consultee. Thank You.

What does it mean to be a consultee?

A consultee is someone who knows a person with a mental incapacity well and is willing and able to offer an opinion as to what that incapacitated person's wishes would have been if they did not have a mental incapacity. You do not have to act as a consultee if you do not want to. If you decide to act as a consultee, you will be asked to sign a consultee consent form.

If you think that this person would not have wanted to take part, then the researcher will respect this. Please remember that you are being asked to consider what the person's wishes would have been if they were being asked to take part in this research.

Think about the aims of the research and what taking part will mean for this person.

Please be aware that at any time during the research, you (or the patient) can decide that they would no longer like to take part.

Why have I been asked to be a consultee?

You may have been chosen because you know the patient personally, either as a friend, partner, or relative, and they would trust you to help with this decision. Or, you may be a member of the care team who looks after the patient (such as member of care home staff or another healthcare professional) and you have the patient's best interests in mind.

What is the research about?

This research is part of a PhD project that is being supported by the University of Southampton and University Hospital Southampton NHS Foundation Trust. The researcher is trying to understand how doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting. The researcher will be trying to find answers to important questions such as, 'How do doctors, nurses and healthcare assistants interact with (or work together with) patients who have diarrhoea and vomiting?' and 'What things make it easy or hard for doctors, nurses and healthcare assistants to look after patients who have diarrhoea and vomiting?' These questions are important to us because we do not fully understand how our doctors, nurses and healthcare assistants work together with patients who have diarrhoea and vomiting and the challenges that either parties face. The things that will be learnt from this study will be added to existing research knowledge and may be used locally to help the people that work in this hospital to think of new ways to support Acute Medical Unit doctors, nurses and healthcare assistants so that they can improve the way that they look after patients who have diarrhoea and vomiting.

Why has this person been chosen?

This study is interested in how doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting. He/she has been chosen because he/she is a patient in the Acute Medical Unit who has been reported as having had an incident of diarrhoea and vomiting either before or during their hospital admission.

Do patients have to take part?

No. Patients can decide if they want to take part or not. When patients are unable to decide, we are asking for advice from other people. If you want to help by giving advice, you can keep this information sheet. Your advice will be recorded on a consultee consent form. At any time, the patient (or you) can decide that they would no longer like to take

part in the study. A decision not to take part, or a decision to withdraw from the study at any time, will not affect the standard of care that the patient receives.

What will happen to the patient if they take part?

If the patient takes part in the study, the researcher will collect some information about their care in the hospital from their patient notes and by speaking to their healthcare staff. This will include their age, their sex, why they are in hospital, how they are being looked after, and any other details that are important to this study.

Are there any benefits in my taking part?

It cannot be promised that this study will benefit the patient, however, what will be learnt from this study will be added to existing research knowledge and may be used locally to help people who work in this hospital think of new ways to:

1. better support Acute Medical Unit doctors, nurses, and healthcare assistants as they look after patients who have diarrhoea and vomiting; and
2. improve both the care and care experiences of patients in the Acute Medical Unit who have diarrhoea and vomiting.

What are the possible disadvantages and risks of taking part?

It is not anticipated that there will be any disadvantages to the patient taking part in this study. If the patient takes part, the researcher will collect some information from their patient notes which will be kept strictly confidential.

Will participation be confidential?

Yes. Good practice will be followed and all information about the patient will be handled in private. All of the patient's details will be kept strictly confidential. Also, if any details about the patient leave the hospital they will have their name and address taken off so that no-one will know it is about them.

Information about the patient that is important to this study will be collected from their patient notes and by speaking with their healthcare staff. All this information will be stored safely in a locked cabinet and on a computer file. The computer will be protected by a password. Only certain people will have access to view the patient's information with their name on it; these are the researcher and the people who check the quality of the research.

Research information will be kept by the University of Southampton for a minimum of 10 years in line with the University's Research Data Management Policy after which the information will be disposed of securely.

What will happen to the results of the research study?

What is learnt from this study will be used to produce project reports (including a PhD write up). These reports will be shared in meetings and published in relevant medical and scientific journals. The patient's involvement in the study will remain confidential at all stages.

Who is organising and funding the research?

This research is part of a PhD project that is being sponsored and funded by the University of Southampton and University Hospital Southampton NHS Foundation Trust.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee. These people are there to protect the safety, rights, wellbeing and dignity of patients. This study has been reviewed and given favourable opinion by the NRES Committee South Central - Hampshire A.

What happens if there is a change of mind?

At any time, the patient (or you) can decide that they would no longer like to take part in the study. A decision to withdraw from the study at any time will not affect the standard of care that the patient receives.

What if there is a concern about the hospital?

If the patient (or you) have a concern or a complaint about the care that the patient received (or is receiving) whilst in the hospital, you should speak to the ward manager or contact the 'Patient Advice and Liaison Service (PALS)' using the following contact details: Mailpoint 81, C Level, Centre Block, Southampton General Hospital, Tremona Road, Southampton, SO16 6YD. Tel: +44 (0)23 8079 8498.

What if there is a concern about this study?

If you have a concern or a complaint about this study you should contact 'The Research Governance Manager' at the Research Governance Office (Address: University of Southampton, Building 37, Highfield, Southampton, SO17 1BJ.
Tel: +44 (0)23 8059 5058; Email: rgoinfo@soton.ac.uk.)

If you remain unhappy and wish to complain formally, 'The Research Governance Manager' can provide you with details of the University of Southampton Complaints Procedure.

Where can I get more information?

If you have any questions or if you require more information, please contact Matsikachando Moyo (Mat) using the following contact details:
Faculty of Health Sciences, Mailpoint 11, Level A, South Academic Block, Southampton General Hospital, Tremona Road, Southampton, SO16 6YD.
Tel: +44 (0)7840 375 076; Email: mat.moyo@soton.ac.uk.

Thank you for taking the time to read this information.

13.3 Participant Information Sheet

Study Title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Researcher: Matsikachando Moyo (Mat)

NHS ethics reference: 14/SC/1197

Dear Sir/Madam

You are being invited to take part in a research study. Before you decide whether or not to take part, it is important for you to understand why the research is being done and what it will involve. Please take time to read this information carefully and talk to others about the study if you wish.

If you prefer, the researcher will be happy to go through this information sheet with you and answer any questions that you may have. After going through the information, if you decide that you want to take part in the study, you will be asked to sign a consent form.

Thank you.

What is the research about?

This research is part of a PhD project that is being supported by the University of Southampton and University Hospital Southampton NHS Foundation Trust. The researcher is trying to understand how doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting. The researcher will be trying to find answers to important questions such as, 'How do doctors, nurses and healthcare assistants interact with (or work together with) patients who have diarrhoea and vomiting?' and 'What things make it easy or hard for doctors, nurses and healthcare assistants to look after patients who have diarrhoea and vomiting?' These questions are important to us because we do not fully understand how our doctors, nurses and healthcare assistants work together with patients who have diarrhoea and vomiting and the challenges that either parties face. The things that will be learnt from this study will be added to existing research knowledge and may be used locally to help the people that work in this hospital to think of new ways to support Acute Medical Unit doctors, nurses and healthcare assistants so that they can improve the way that they look after patients who have diarrhoea and vomiting.

Why have I been chosen?

This study is interested in how doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting. You have been chosen because you are a patient in the Acute Medical Unit who has been reported as having had an incident of diarrhoea and vomiting either before or during your hospital admission.

Do I have to take part?

It is up to you to decide whether or not to take part in this study. If you decide to take part, you are still free to withdraw at any time without giving a reason. A decision not to take part, or decision to withdraw at any time will not affect the standard of care that you receive or your legal rights.

What will happen to me if I take part?

If you decide to take part, the researcher will ask you to sign a consent form after which the following 2 things will be possible:

- The researcher will be able to **access your medical records** and collect research information about your care as a patient in the hospital who has had (or has) diarrhoea and vomiting.
- You will be invited to participate in two (2) **interviews**. In the first interview you will be asked to describe and discuss your experiences as a patient in the Acute Medical Unit who has had (or has) diarrhoea and vomiting. In the second interview, you will be asked to expand on, clarify, or amend any of the researcher's interpretations of the first interview. The first interview will most likely take place in the hospital whilst you are still a patient in the hospital. The second interview will most likely take place after you have been discharged from hospital and can either be held in a private location within the hospital or at your home address, depending on your preference. Alternatively, both interviews can be conducted after you are discharged from hospital and they can either be held in a private location within the hospital or at your home address, again, depending on your preference. Both interviews will be captured on an audio recorder so that they can be studied.

Please note that the second interview is an optional follow-up interview that will be mainly used to help the researcher affirm and/or amend the findings that they will have derived from the first interview. You are therefore free to decline to participate in this second interview although your participation will be greatly beneficial with regard to validating the researcher's findings.

Will there be any refreshments available for hospital-based interviews?

Yes. If you agree to take part in interviews, and if you decide to be interviewed at the hospital, light refreshments will be offered to you as a way of thanking you for coming all the way to the hospital to attend the interview. The researcher will make separate arrangements with you to find out what foods you can and cannot eat (including any food allergies that you may have).

Are there any benefits in my taking part?

It cannot be promised that this study will benefit you directly, however, what will be learnt from this study will be added to existing research knowledge and may be used locally to help the people that work in this hospital think of new ways to:

1. better support Acute Medical Unit doctors, nurses, and healthcare assistants as they look after patients who have diarrhoea and vomiting; and
2. improve both the care and care experiences of patients in the Acute Medical Unit who have diarrhoea and vomiting.

What are the possible disadvantages and risks of taking part?

Speaking to the researcher during the interview may take up to an hour of your time. Sometimes talking about your experience(s) may make you remember both good and difficult aspects of the experience(s) which might stir some emotions. Audio recorded interviews will be transcribed by a local transcription service provider who has provided a non-disclosure agreement which can be shown to you upon request. The audio files will not have your name (or any other personally identifiable information) on them that could be used to identify you except your voice.

With regard to your patient notes, it is not anticipated that there will be any disadvantages to you as a result of the researcher having access to your notes. All the information that the researcher will collect about you will be kept strictly confidential.

Will my participation be confidential?

Yes. Ethical and legal practice will be followed and all information which is collected about you and from you during the course of the research will be kept strictly confidential.

Audio recorded interviews will be transcribed by a local transcription service provider who has provided a non-disclosure agreement which can be shown to you upon request. The audio files will not have your name (or any other personally identifiable information) on

them that could be used to identify you except your voice. The audio files will be delivered directly to the transcription service provider via their website. For data security, delivered audio files will be encrypted during transfer through the provider's online system. To maintain security during the delivery of completed transcripts, the provider will encrypt and email the transcripts to the researcher. Only the researcher and the service provider will know the encryption password. All audio files and transcripts will then be deleted from the service provider's system within 60 days of the end of the transcription project.

All information captured through this research will have all identifying material removed from it before being used to produce research findings and/or reports. No individual persons will be identified in any of the reports that will be produced as a result of this research. For example, feedback comments will be generalised as follows: '...patient 6 had this to say...'

Research data will be retained by the University of Southampton for a minimum of 10 years in line with the University's Research Data Management Policy requirements after which the data will be disposed of securely.

Please be advised that the researcher may be required to disclose the confidential information that you provide to appropriate authorities if the information is reportable by law, for example, if the information concerns the commission of a criminal offence or relates to life-threatening circumstances.

What will happen to the results of the research study?

What is learnt from this study will be used to produce project reports (including a PhD write up). These reports will be shared in meetings and published in relevant medical and scientific journals. Your involvement in the study will remain confidential at all stages.

Who is organising and funding the research?

This research is part of a PhD project that is being sponsored and funded by the University of Southampton and University Hospital Southampton NHS Foundation Trust.

Who has reviewed the study?

All research in the NHS is looked at by an independent group of people called a Research Ethics Committee. These people are there to protect your safety, rights, wellbeing and dignity as a patient. This study has been reviewed and given favourable opinion by the NRES Committee South Central - Hampshire A.

What happens if I change my mind?

If you decide that you do not want to carry on taking part in the study, you may withdraw at any time without giving a reason. Withdrawing from the study will not affect the standard of care that you receive or your legal rights.

What if I have a concern about the hospital?

If you have a concern or a complaint about the care you received (or are receiving) whilst in the hospital, you should speak to the ward manager or contact the 'Patient Advice and Liaison Service (PALS)' using the following contact details:

Mailpoint 81, C Level, Centre Block, Southampton General Hospital, Tremona Road, Southampton, SO16 6YD. Tel: +44 (0)23 8079 8498.

What if I have a concern about this study?

If you have a concern or a complaint about this study you should contact 'The Research Governance Manager' at the Research Governance Office (Address: University of Southampton, Building 37, Highfield, Southampton, SO17 1BJ.

Tel: +44 (0)23 8059 5058; Email: rgoinfo@soton.ac.uk.)

If you remain unhappy and wish to complain formally, 'The Research Governance Manager' can provide you with details of the University of Southampton Complaints Procedure.

Where can I get more information?

If you have any questions, or require more information, please contact Matsikachando Moyo (Mat) using the following contact details:

Faculty of Health Sciences, Mailpoint 11, Level A, South Academic Block, Southampton General Hospital, Tremona Road, Southampton, SO16 6YD.

Tel: +44 (0)7840 375 076; Email: mat.moyo@soton.ac.uk.

Thank you for taking the time to read this information.

Appendix 14 - Consent forms

14.1 - Clinician consent form

14.2 - Consultee consent form

14.3 - Patient consent form

14.1 Clinician consent form

CLINICIAN CONSENT FORM

Study title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Researcher name: Matsikachando Moyo (Mat)

NHS ethics reference: 14/SC/1197

NHS R&D reference: RHM MED1205

Please complete this form by placing your initials in the box next to each statement:

1. I confirm that I have read and understand the information sheet dated 31/10/2014 (info_clin_v2) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason.
3. I give permission for the researcher to observe my interactions with patients who have diarrhoea and vomiting for the purpose of collecting research data.
4. I understand that the researcher may wish to invite me to undertake a think aloud exercise after the process of assessing relevant patient.
I am 'willing' / 'not willing'* to undertake a think aloud exercise.
(* please delete as appropriate)
5. I understand that the researcher may wish to invite me to take part in a photo walkabout of the AMU whereby I will be the one taking the photos. I understand that even though I will be the one taking these photos, the photos themselves will belong to / and be owned by the researcher.
I am 'willing and agree' / 'not willing'* to take part in a photo walkabout.
(* please delete as appropriate)
6. I understand that the researcher may wish to interview me as part of my taking part in this research.
I am 'willing' / 'not willing'* for the researcher to interview me.
I am 'willing' / 'not willing'* for my interview to be audio-recorded.
(* please delete as appropriate)
7. I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be made anonymous.
8. I agree to take part in the above study.

Name of Participant

Date

Signature

Name of Person taking consent

Date

Signature

14.2 Consultee consent form

CONSULTEE DECLARATION

Study title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Name of researcher: Matsikachando Moyo (Mat)

NHS ethics reference: 14/SC/1197

NHS R&D reference: RHM MED1205

Please complete this form by placing your initials in the box next to each statement:

1. I (consultee) have been consulted about's participation in this research project. I confirm that I have read and understand the information sheet dated 24/03/2014 (info_cns_v1) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. In my opinion he/she would have no objection to taking part in the above study.
3. I understand that I can request that he/she is withdrawn from the study at any time without giving any reason and without his/her care being affected.
4. (If appropriate) I understand that relevant sections of his/her medical notes and data collected during the study may be looked at by responsible individuals who check the quality of the study from the University of Southampton or from regulatory authorities where it is relevant to his/her taking part in this study. These individuals may have access to his/her records.
5. I understand that information collected about the patient during their participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be made anonymous.

Name of Consultee

Signature

Date

Address of Consultee

Relationship to Participant

Name of Person
witnessing declaration

Signature

Date

14.3 Patient consent form

PATIENT CONSENT FORM

Study title: How do doctors, nurses and healthcare assistants in the Acute Medical Unit look after patients who have diarrhoea and vomiting?

Researcher name: Matsikachando Moyo (Mat)

NHS ethics reference: 14/SC/1197

NHS R&D reference: RHM MED1205

Please complete this form by placing your initials in the box next to each statement:

1. I confirm that I have read and understand the information sheet dated 24/03/2014 (info_pnt_v1) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.
2. 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 care being affected.
3. (If appropriate) I understand that relevant sections of my medical notes and data collected during the study may be looked at by responsible individuals who check the quality of the study from the University of Southampton or from regulatory authorities where it is relevant to my taking part in this research. I give permission for these individuals to have access to my records.
4. I understand that the researcher may wish to interview me as part of my taking part in this research. I also understand that I may include someone else (eg. spouse, partner, or friend) in the interview.
I am 'willing' / 'not willing'* for the researcher to interview me.
(* please delete as appropriate)
5. (If applicable) I also understand that the researcher may wish to record my interview on an audio-recorder.
I am 'willing' / 'not willing'* for my interview to be audio-recorded.
(* please delete as appropriate)
6. I understand that information collected about me during my participation in this study will be stored on a password protected computer and that this information will only be used for the purpose of this study. All files containing any personal data will be made anonymous.
7. I agree to take part in the above study.

Name of Participant

Date

Signature

Name of Person taking consent

Date

Signature

Appendix 15 - Risk assessments undertaken

Research Risk Assessment Form

IMPORTANT

If you have any queries please contact the Faculty Health and Safety officer, [REDACTED]

Please read the following before completing this form

- i. If this is a student project this risk assessment needs to be completed by the student (applicant) and supervisor (reviewer).
- ii. If this is a staff project this risk assessment needs to be completed by the Principal Investigator (applicant) and reviewed by the head of the actual research programme/area/unit relevant to the proposal.
- iii. If this is a staff project and the risk assessment is completed by a Research Assistant/Fellow, then it needs to be checked by the Principal Investigator and reviewed by the head of the actual research programme/area/unit relevant to the proposal. If the Principal Investigator is head of the actual research programme/area/unit relevant to the proposal, then the Director of Research needs to be the reviewer.
- iv. If the Principal Investigator completes the risk assessment and the applicant is the head of the actual research programme/area/unit relevant to the proposal then it needs to be reviewed by the Director of Research (reviewer).
- v. If you are an international student undertaking your research fieldwork entirely within your own country this risk assessment needs to be completed by you (applicant) and supervisor (reviewer)

Once complete, the risk assessment form should be uploaded via the University Ethics system ERGO at www.ergo.soton.ac.uk

Applicant Name:	Matsikachando R. Moyo				
Project Title:	How are adult incidents of diarrhoea and vomiting assessed and managed by Acute Medical Unit clinicians?				
Type of project: (Please tick or insert X)	Staff		Student	<input checked="" type="checkbox"/>	
Supervisor's Name: (if relevant - see point i above)	[REDACTED]				
Principal Investigator's Name: (if relevant- see point iii above)	Matsikachando R. Moyo				
Who will this risk assessment/research involve: (please provide a brief description of your proposed sample and/or research site)	The principal investigator is a doctoral student from the University of Southampton and an honorary member of clinical staff at [REDACTED]. This risk assessment will involve the principal investigator and the research sample (NHS Patients and Staff) in the Acute Medical Unit at [REDACTED].				
Where appropriate list the individuals doing the work	Matsikachando R. Moyo				

Does the work/research involve lone working: (for example working outside of office hours in your office or a lab-based environment) or conducting interviews with subject in their own homes in which case please complete Forms RA2, RA3 and RA4 as necessary with this assessment.

Yes **No**

Health & Safety Risk Assessment

Work task / activity		Ethnographic research study in the Acute Medical Unit (AMU) at [REDACTED].				
Assessor(s)	Matsikachando R. Moyo	Responsible Manager			Date	24/03/2014
Faculty	Faculty of Health Sciences	Academic Unit/Team	Inn. and Lead. In Health Sciences	Location	[REDACTED]	
Brief description of task / activity	<p>Data collection will involve the following activities: (1) observations of clinical activities in the AMU, (2) clinician think-aloud exercises in the AMU, (3) interviews of patients, doctors, nurses and healthcare assistants (hospital/home), (4) clinician-led photo walkabouts in the AMU, (5) reviews of relevant hospital policies, guidelines and infection prevention and control data, and (6) reviews of relevant patient notes.</p> <p>Interviews will either be conducted at the participants' homes or the interview participants will travel to the hospital for interviews. Data analysis and project report write ups will be performed by computer.</p>					

Additional notes (e.g, references, persons at risk, risk factors, etc.) [optional]	
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Declaration by responsible manager: I confirm that this is a suitable & sufficient risk assessment for the above work activity / task.

Signed	████████	Print Name	████████	Date	1.4.14
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Declaration by users: I confirm that I have read this risk assessment, will implement the controls outlined herein, and will report to the responsible manager any incidents that occur or any shortcomings I find in this assessment.

Signed	Matsikachando R. Moyo	Print name	Matsikachando R. Moyo	Date	24/03/2014
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	
Signed		Print name		Date	

Hazards and reasonably foreseeable worst case consequences	Inherent risk (no controls) From matrix (mark with X)		Controls (measures to reduce risk)	Residual risk (with controls) From matrix (mark with X)	
Researching in the AMU: Slips, trips and falls Aggression towards researcher Fire from electrical equipment Risk of infection -causing either physical injury, emotional trauma, or ill-health	High	X	As an honorary member of clinical staff, the researcher should follow appropriate AMU health and safety policies and infection control policies.	High	
	Medium		Researcher to be aware of AMU physical environment and wear appropriate footwear. Researcher to be aware of AMU fire bells and location of fire alarms and exits. Researcher to be aware of appropriate Personal Protective Equipment to wear.	Medium	X
	Low		If aggressive behaviour is experienced, researcher should cease observing and follow appropriate AMU conflict resolution policy.	Low	
Researching in the AMU: Observations of poor practice requiring response from service providers and/or local authorities.	High		It is not possible to control naturally occurring events.	High	
	Medium	X	The researcher will have to determine the severity of observed poor practice so as to decide an appropriate course of action to take. Observations of life threatening practice will warrant immediate escalation to relevant authorities and clinical managers. Observations of poor practice that breaches professional codes of conduct but is not life threatening will be reported to relevant authorities. Observations of poor practice that breaches hospital policy but is not life threatening will be communicated in the form of a report to relevant clinical managers.	Medium	X
	Low		In all the above situations project supervisors will be informed as soon as possible for appropriate debriefing.	Low	
Interviewing participants (in general): Discussion of a sensitive topic with potential to cause distress to interviewee Aggression or unacceptable physical contact by interviewee causing physical injury and/or emotional trauma	High		If interviewee begins to show signs of distress then offer to cease interview and signpost them to appropriate support services (including their GP).	High	
	Medium	X	If interviewee becomes aggressive then cease interview and leave at earliest opportunity. If interviewee 'touches' the researcher in a manner that is 'unacceptable' to the researcher - researcher to state they do not want to be touched and/or cease interview and leave.	Medium	
	Low		In the above situation, project supervisors will be informed as soon as possible for appropriate debriefing.	Low	X

Hazards and reasonably foreseeable worst case consequences	Inherent risk (no controls) From matrix (mark with X)	Controls (measures to reduce risk)	Residual risk (with controls) From matrix (mark with X)
Interviewing participants (in the hospital): Slips, trips and falls Fire from electrical equipment Food allergy -causing physical injury, ill-health and/or emotional trauma.	High	<p>Researcher to be aware of physical environment of interview room and advise participant appropriately regarding wearing appropriate footwear.</p> <p>Researcher to be aware of health and safety policies of interview location: including fire bells and location of fire alarms and exits.</p> <p>Researcher to provide housekeeping instructions before starting interview and appropriate advise on fire safety.</p> <p>Researcher to enquire if participant has food allergies so as to provide appropriate refreshments.</p>	High
	Medium X		Medium
	Low		Low X
Interviewing participants (in the hospital): Interviewee is travelling alone -risk of breakdown, accident or threat to personal safety.	High	<p>Researcher will contact interviewee by telephone to check on arrangements for meeting. If researcher is 'concerned' in any way about the content of the phone call, these concerns will be discussed with research supervisors.</p> <p>When making interview arrangements, researcher to advise participant to carry a charged mobile phone.</p> <p>Researcher to arrange daytime interviews so that the participant does not travel to and from the hospital when it is dark.</p>	High
	Medium X		Medium
	Low		Low X
Interviewing participants (in their home): Researcher visiting homes of strangers to carry out interviews -risk of physical injury and/or emotional trauma. -risk of breakdown, accident or threat to personal safety.	High	<p>Researcher to log interview with Research and Enterprise Services Office.</p> <p>Researcher to complete Lone Interviewing Contact Procedure Form (RA4) and confirm a line of contact and action to be taken if they do not return home/call nominated person after the interview.</p> <p>Researcher will have map indicating area of interview.</p> <p>Researcher will contact interviewee by telephone to check on arrangements for meeting. If researcher is 'concerned' in any way about the content of the phone call, these concerns will be discussed with research supervisors.</p> <p>Researcher should carry a charged mobile phone.</p>	High
	Medium X		Medium
	Low		Low X

Hazards and reasonably foreseeable worst case consequences	Inherent risk (no controls) From matrix (mark with X)	Controls (measures to reduce risk)	Residual risk (with controls) From matrix (mark with X)
Interviewing participants (in their home): Interviewee(s) is/are letting a stranger into their home -risk of physical injury and/or emotional trauma.	High	<p>Researcher will carry and show University ID to interviewee on meeting them at their home.</p> <p>Researcher may also need to carry a letter of authentication from the Faculty of Health Sciences (available from the Research and Enterprise Services Office).</p> <p>If researcher has any concerns when they arrive at the interview destination they should cancel the interview and discuss with research supervisors.</p>	High
	Medium X		Medium
	Low		Low X
Lone working: Observing practice over long hours Working on computer for long periods of time -risk of observer fatigue, musculoskeletal pain, and sore and strained hands, wrists, and eyes.	High	<p>When observing practice, the researcher should take breaks before the onset of fatigue.</p> <p>When working on the computer over long periods of time, the researcher should take short and frequent breaks away from the computer.</p> <p>Researcher should assume correct posture when sitting down and stretch occasionally away from observation post or computer work station.</p>	High
	Medium X		Medium
	Low		Low X
Data management: Transporting raw data from research location to research office Working on raw data in research office -risk of confidential data being lost or viewed by unauthorised persons.	High	<p>Researcher to carry appropriately sized and comfortable shoulder bag with buckle or locking mechanism that can accommodate required research material.</p> <p>Researcher to always keep research material that is not in use in the bag.</p> <p>Researcher to either keep the bag on their person or place it in a secure locker within the AMU.</p> <p>When working on raw data in the research office, the researcher should not leave confidential material unattended.</p> <p>If raw confidential data is not in use, the researcher should keep it in the secure locker within the research office.</p>	High
	Medium X		Medium
	Low		Low X

To be completed by the Reviewer			
Can the risks be further reduced?		Further precautions/additional controls required	Date to be completed
YES	<input type="checkbox"/>	NO	<input checked="" type="checkbox"/> x
Reviewer name		Reviewer Signature	Date
Jacqui Prieto		[REDACTED]	1.4.14
Part 3: To be completed by the Applicant (if required)			
3a. Please outline how you have addressed the reviewers comments:			
<p><i>Please resubmit your study protocol along with this form to the original reviewer</i></p>			
Applicant name		Applicant signature	Date
Part 4: To be completed by the Reviewer (if required)			
4a. Are the precautions now satisfactory?		Yes	No
Reviewer name		Reviewer Signature	Date
Date reassessment required		Tuesday, 12 May 2015	

Appendix 16 - Non-Disclosure Agreement



████████ - NON-DISCLOSURE AGREEMENT

This Non-Disclosure Agreement (the "Agreement") is entered into and is effective as of 18th February 2014 ("the Effective Date") by and between M █████ Moyo, University of Southampton, Faculty of Health Sciences (hereinafter referred to as "THE CLIENT") and, █████ (hereinafter referred to as █████)

In consideration of the disclosure of the Confidential Information, it is agreed as follows:

1. Definition of Confidential Information

1.1 THE CLIENT plans to disclose to █████ certain confidential information for transcription services ("the Purpose"). In this Agreement, the term "Confidential Information" shall mean any information in any form relating to the Purpose which is provided directly or indirectly by THE CLIENT.

1.2 Confidential Information shall not include information that █████ can demonstrate:

- is now or subsequently becomes generally available to the public through no fault or breach on the part of █████;
- was rightfully in his/her possession prior to disclosure to █████ by THE CLIENT.
- is independently developed by █████ without the use of any Confidential Information.
- █████ rightfully obtained from a third party unconnected to THE CLIENT who has the right to transfer or disclose it.

2. Non-Disclosure and Protection of Confidential Information

2.1 █████ agrees that, except as provided for in this Agreement, he/she will not disclose the Confidential Information or use such Confidential Information other than for the Purpose.

2.2 █████ agrees not to use Confidential Information for any other purpose or any third party's benefit without the prior written approval of an authorised representative of THE CLIENT in each instance.

2.3 █████ agrees to use reasonable care, but in no event no less than the same degree of care that it uses to protect its own confidential and proprietary information of similar importance, to prevent the unauthorised use, disclosure, publication or dissemination of Confidential Information.

2.4 █████ may disclose Confidential Information if required by law, provided that █████ will take reasonable steps to give THE CLIENT sufficient prior notice in order to contest such requirement by notifying THE CLIENT of such demand.

3. Ownership of Confidential Information

All Confidential Information created by THE CLIENT remains the property of THE CLIENT and no licence or other rights to Confidential Information is granted or implied hereby.

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4. **Warranty**
THE CLIENT warrants that it has the right to disclose the Confidential Information to [REDACTED].
5. **Accuracy of Information**
All information is provided "as is" and without any warranty, express, implied or otherwise, regarding its accuracy or completeness.
6. **Return of Materials**
[REDACTED] will return (or, at THE CLIENT's request, destroy) all materials, in whatever form or format, which contain Confidential Information, immediately upon THE CLIENT's request.
7. **Term**
[REDACTED]'s duty to protect Confidential Information expires five (5) years from the date of disclosure of Confidential Information or five (5) years from the Effective Date, whichever is later.
8. **Compliance with Export Regulations**
[REDACTED] certifies that no Confidential Information, or any portion thereof, will be exported to any country in violation of any relevant export regulations.
9. **No Contract for Purchase or Sale**
Neither party has an obligation under this Agreement to purchase or offer for sale any product or service, including, but not limited to, any product or service that is the subject of or that incorporates any Confidential Information.
10. **Remedies**
[REDACTED] hereby acknowledges that unauthorised disclosure or use of Confidential Information could cause irreparable harm and significant injury to THE CLIENT, which may be difficult to ascertain. Accordingly, [REDACTED] agrees that THE CLIENT will have the right to seek and obtain immediate injunctive relief to enforce obligations under this Agreement in addition to any other rights and remedies it may have.
11. **Non Assignment**
[REDACTED] is not entitled to assign, pledge or transfer this Agreement to any other party in any manner whatsoever without the prior written consent of THE CLIENT.
12. **Entire Agreement, Variation and Governing Law**
This Agreement constitutes the entire agreement with respect to the Confidential Information disclosed herein and supersedes all prior oral and written agreements concerning such Confidential Information. This Agreement may not be amended except by written agreement signed by authorised representatives of both parties. This Agreement will be governed by and construed in accordance with the laws of England and the parties hereby submit to the jurisdiction of the High Court of Justice in England.

Signed: [REDACTED]

Title: Director

Date: 21st February 2014

Non-Disclosure Agreement 20/06
Company registration no: [REDACTED] | VAT no: [REDACTED]

Appendix 17 - Service improvement suggestions letter

Health
Sciences

UNIVERSITY OF
Southampton

The AMU Management Team.
Acute Medical Unit,
[REDACTED]

Monday, 2 March 2015

Dear AMU Management Team

Ref: Service Improvement suggestions arising from current research

As you are aware, I am currently undertaking research in AMU regarding how doctors, nurses and healthcare assistants in AMU look after patients who have diarrhoea and vomiting. I am writing to you as something exciting has happened during the initial phase of data collection. More specifically, early data collection has revealed some relatively easy and actionable suggestions for service improvement. My supervisors and I have decided that these suggestions be put forward to you. There are 4 suggestions in Attachment 1 of this letter, which are presented in the following manner: (i) a brief summary of the problem to be solved, (ii) the suggestion for improvement, and (iii) a brief rationale supporting the suggestion.

I hope that you will find these suggestions useful. I would also like to take this opportunity to thank all those who have participated in the study so far. Data collection is ongoing at the present time and I would encourage all doctors, nurses and HCAs to get involved. Your contributions are warmly appreciated.

Yours sincerely,

[REDACTED]

Mat Moyo
Clinical Doctoral Research Fellow
Faculty of Health Sciences
email: mat.moyo@soton.ac.uk

Matsikachando Moyo | [REDACTED] | Email: mat.moyo@soton.ac.uk

Attachment 1: Four possible suggestions/solutions to some identified problems

1. The need for ready access to information and guidance regarding the care of patients with diarrhoea and vomiting		
Problem to be solved: It is not always easy to access the trust guidelines and related information about the care of patients with diarrhoea and vomiting at the times when decisions about treatment options and patient movement are being made.	Suggestion/Solution: To ask the AMU Infection Prevention Link Staff to create a folder(s) dedicated to diarrhoea and vomiting guidelines and resources - and raise awareness regarding where to find the folder(s). Attachment 2 offers ideas as to what could be included inside such a folder(s).	Rationale/Reasoning: An easily accessible folder (or folders in all areas of AMU) would provide useful prompts for junior staff about what key actions to take and things to consider when looking after patients with potentially infectious diarrhoea and vomiting.
2. The need for vomit bowls in all side rooms		
Problem to be solved: When a patient needs a vomit bowl, staff cannot always provide one quickly enough, as they are located in the sluice rather than the patient's room. This is especially problematic for patients being nursed in isolation given the need to remove PPE and wash hands before leaving the room.	Suggestion/Solution: To have a small supply of vomit bowls in each AMU side room.	Rationale/Reasoning: The lack of ready access to vomit bowls inside rooms wastes time and can result in the patient soiling either their bedding or clothes thereby creating more work. The issue also appears to be associated with staff feeling rushed to leave the room so as to quickly find a bowl thereby making compliance to hand washing and other isolation precaution measures secondary.
3. e-Quest information and teaching sessions delivered for clinical staff		
Problem to be solved: On some occasions, the microbiology lab rejects clinical samples due to insufficient information on e-quest forms. This can delay diagnosis and treatment options for the patient and may also result in infection that was present on the patient's admission to hospital being incorrectly categorised as hospital-acquired rather than community-acquired infection.	Suggestion/Solution: Provision of information for staff on how to adequately fill in E-quest forms to ensure samples sent are processed. Invite a representative from microbiology to deliver teaching sessions on what details they expect and require from staff collecting and sending urine and stool samples.	Rationale/Reasoning: To reduce the incidents of clinical samples being rejected by the microbiology lab.
4. Stocking up the cannulation and venesection trolleys in AMU 1, 2, and 3		
Problem to be solved: When cannulation and venesection trolleys in AMU 1, 2, and 3 are not stocked up with the required equipment for routine procedures, time is wasted locating it from elsewhere (e.g. GP AMU). This is particularly difficult for medical staff who don't always know where else to find it.	Suggestion/Solution: To designate responsibility for stocking up the cannulation and venesection trolleys to the HCs - including having the trolleys checked on a daily basis. Also, maybe stick laminated instructions on trolleys as to where replacement equipment can be found in each area of AMU.	Rationale/Reasoning: To improve efficiency by reducing the amount of time that is currently being wasted by medical staff trying to locate equipment for routine procedures.

Attachment 2: What AMU diarrhoea and vomiting folders might look like

Based on the clinical challenges raised by participants who have so far taken part in the study, the folder should ideally contain (among other things) the following resources:

- (1) guidance on how to fill in the 'Good Practice Guide' (Isolation Pro forma) and 'Isolation Risk Assessment Tool',
- (2) information regarding where to find actichlor for decontamination of equipment (and/or how to prepare it),
- (3) patient/relative leaflets regarding diarrhoea and vomiting related precautions, and
- (4) a checklist reminding nursing staff to: change isolation signage to green, print out E-Quest stool sample forms with sufficient information, insert into the patient's bedside notes a stool/vomit chart and fluid chart, and supply patients and/or their relatives with leaflets regarding diarrhoea and vomiting related precautions.

Appendix 18 - The process followed in developing the themes of the findings presented in Chapter 7

18.1 Factors that promote or inhibit the infective status assessment of patients with symptoms of diarrhoea and vomiting in the AMU

The findings reported in this section are from data collected from doctors, nurses, observations of practice, patient medical notes, and pertinent hospital policies. Healthcare assistants were not asked about factors that influenced their ability to effectively assess the infective status of patients with symptoms of diarrhoea and vomiting as they were not involved in the formal assessment process. As no papers were identified in the literature review relating to this topic area, the factors presented in this section are being presented as new knowledge.

To begin with, the factors that were identified as either promoting or inhibiting clinician ability to effectively assess the infective status of patients with symptoms of diarrhoea and vomiting were respectively collated into two tables. One table contained promoting factors (Appendix table 1, page 302), the other contained inhibiting factors (Appendix table 2, page 303). Within these respective tables, three broad categories were formulated under which related factors could be grouped and analysed. These broad categories were:

1. system and organisational factors (including culture),
2. factors relating to the physical environment and the equipment/resources within that environment, and
3. factors to do with teamwork and being human.

Having accomplished this task, steps were then taken to group the factors contained within respective tables into themes that could be easily described. Subsequently, 12 themes were identified that encompassed the factors that were observed and reported as promoting effective patient assessments, and 14 were identified that encompassed the factors that were observed and reported as inhibiting effective patient assessments. These themes are presented in Appendix table 3 (page 312).

BROAD CATEGORIES >>	System and organisational factors (including culture)		Factors relating to the physical environment and the equipment / resources within that environment		Factors to do with teamwork and being human		
	Systems and processes	Unit culture, workload and expected work outputs	Unit design and layout	Equipment and resources	The clinician	The team	The patient and how they present
Promote effective patient assessments (*) - these factors fall into more than one category	<ul style="list-style-type: none"> Good patient referral from ED or GP Use of the diarrhoea and vomiting assessment tool Adequately filled in stool chart Stool samples sent off promptly for testing When all essential elements of an assessment are performed promptly Easy access to patient information (past and present) 	<ul style="list-style-type: none"> Senior / expert support 	<ul style="list-style-type: none"> When the patient is located in an isolation room that has all the required resources to facilitate an assessment 	<ul style="list-style-type: none"> (*) When the patient is located in an isolation room that has all the required resources to facilitate an assessment 	<ul style="list-style-type: none"> Expert level of clinical experience Good level of knowledge of a patient and their medical history (*) When the patient is located in an isolation room that has all the required resources to facilitate an assessment 	<ul style="list-style-type: none"> (*) Senior / expert support (*) Adequately filled in stool chart Prompts (reminders) from coordinator to carry out systematic assessment (*) Stool samples sent off promptly for testing An MDT approach to assessment (having a second opinion) (*) When all essential elements of an assessment are performed promptly 	<p>Patients that are:</p> <ul style="list-style-type: none"> Good history givers Compliant with care plans Not cognitively impaired Not shy and/or openly report symptoms The presence of a prime cause for diarrhoea Sudden onset diarrhoea in a well-known inpatient

Appendix table 1: factors that promote infective status assessments of patients with symptoms of diarrhoea and/or vomiting in the AMU

BROAD CATEGORIES >>	System and organisational factors (including culture)		Factors relating to the physical environment and the equipment / resources within that environment		Factors to do with teamwork and being human		
	Systems and processes	Unit culture, workload and expected work outputs	Unit design and layout	Equipment and resources	The clinician	The team	The patient and how they present
Inhibit effective patient assessments (*) - these factors fall into more than one category	<ul style="list-style-type: none"> Poor patient referral from ED or GP Difficulty accessing patient information (past and present) Time wasted looking for resources to help perform assessment Rejected stool samples 	<ul style="list-style-type: none"> Competing priorities, constant interruptions, and heavy cognitive workload Waiting for the next incidence of diarrhoea and vomiting (disregarding first episode) 		<ul style="list-style-type: none"> Not having enough equipment that is used for patient assessment in the unit Time wasted looking for resources to help perform assessment 	<ul style="list-style-type: none"> Novice level of clinical experience Clinician embarrassment to ask patient personal questions (*) Competing priorities, constant interruptions, and heavy cognitive workload Diarrhoea and vomiting not a priority Lack of confidence to challenge prior impression of potentially infective diarrhoea 	<ul style="list-style-type: none"> Absent or inadequately filled in stool chart Team members losing printed laboratory testing request cards Poor information sharing between staff (*) Poor patient referral from ED or GP Different understanding of what diarrhoea is (*) Rejected stool samples 	<p>Patients that are:</p> <ul style="list-style-type: none"> Inconsistent and/or poor history giver Cognitively impaired Non-compliant with care plans (*) Different understanding of what diarrhoea is Patients who are embarrassed (shy) about their symptoms Patients with tricky gastro intestinal conditions White coat syndrome – patient's diarrhoea suddenly stops

Appendix table 2: factors that inhibit infective status assessments of patients with symptoms of diarrhoea and/or vomiting in the AMU

Factors promoting effective patient assessments	Factors inhibiting effective patient assessments
<ul style="list-style-type: none"> • A good patient referral from the emergency department or community doctor (including good information transfer) • Using the diarrhoea and vomiting assessment tool and guidelines • Support and prompts from senior (or expert) colleagues • Having a second opinion from members of the multidisciplinary team • Patients who are good historians and provide adequate information during assessment • Easy access to patients' medical information that can aid the assessment process • The presence of a prime cause of diarrhoea, • Well known in-patients who suddenly develop diarrhoea • Patients who are compliant with care plans and communicate essential information to staff • Adequately completed assessment aids (patient charts/records) • Timely performance of all essential assessment tests and investigations • When the patient is being cared for in an isolation room 	<ul style="list-style-type: none"> • A poor patient referral from the emergency department or community doctor • Deficient history taking • Different definitions and understanding of diarrhoea • Information required to perform assessment not in one location • Absent or incomplete assessment aids • Patients who are non-compliant to clinician requests • Patients with conditions that predispose them to diarrhoea • Not having enough resources to aid the assessment process • Competing workload priorities and constant interruption • Time wasted looking for resources to help perform assessments • Waiting for the next episode (misunderstanding policy guidelines) • Subcultures and subordinate culture (some clinicians not feeling able to communicate or challenge initial diagnostic impressions) • Poor communication between staff regarding the need for an assessment • The laboratory rejecting stool specimens* <p><i>*factor/theme noted despite being outside of the present study's interest</i></p>

The themes highlighted in similar colours represent related themes that were merged together to create overarching headings.

Appendix table 3: Themes of the factors promoting or inhibiting the infective status assessment of patients with symptoms of diarrhoea and/or vomiting in the AMU

It is important to highlight at this stage that the identified promoting and inhibiting factors (presented in Appendix table 3) were not always opposites of each other. This was because some factors did not have comparable opposites. Furthermore, it was also reflective of the fact that when presented with questions that ask what positively or negatively impacts a process, people tend to give answers that reflect what is personally important to them and is at the forefront of their minds based on their experiences (Zaller and Feldman, 1992).

A process of comparison and amalgamation of the themes that were collated in Appendix table 3 was then undertaken. This yielded 18 overarching themes of factors identified as affecting the infective status assessment of patients with symptoms of diarrhoea and vomiting in the AMU. These themes are presented below. The themes of promoting factors are listed first, followed by the themes of inhibiting factors. Where directly opposite promoting and inhibiting themes were identified, these are listed under one heading. For example, the broad heading 'The quality of a patient referral from the emergency department or community doctor' was used to represent the patient referral themes identified on both the promoting and inhibiting factors sections presented in Appendix table 3.

1. The quality of a patient referral from the emergency department or community doctor
2. The diarrhoea and vomiting assessment tool
3. Support and prompts from senior (or expert) colleagues
4. Second opinions from members of the multidisciplinary team
5. The cognitive state of patients and their willingness and ability to communicate essential information
6. Access to pertinent patient medical information
7. The presence of a prime cause of diarrhoea and how well clinicians knew the patient
8. The quality of patient monitoring (adequately completed versus absent or incomplete assessment patient charts/records)
9. When the patient is being cared for in an isolation room
10. Deficiencies in the history that was taken
11. Different definitions and understanding of the term 'diarrhoea'
12. Not having enough resources to aid the assessment process
13. Competing workload priorities and constant interruption
14. Time wasted looking for resources to help perform assessments
15. Waiting for the next episode (misunderstanding policy guidelines)
16. Subcultures and subordinate cultures (some clinicians not feeling able to communicate or challenge initial diagnosis impressions/suggestions)
17. Poor communication between staff regarding the need for an assessment
18. Timely performance of essential tests assessment investigations

18.2 Factors that promote or inhibit the infection prevention and control management of patients with symptoms of diarrhoea and/or vomiting in the AMU

The findings reported in this section are from the data collected from doctors, nurses, healthcare assistants, observations of practice, and pertinent documents from the hosting hospital. Several factors were identified that either promoted or inhibited clinician ability to successfully implement and/or perform aspired infection prevention and control interventions. These factors could be placed under the same three broad categories identified as affecting clinician ability to effectively assess the infective status of patients with symptoms of diarrhoea and vomiting (D&V). See Appendix tables 4 and 5 (next two pages).

Steps were then taken to group the factors contained within respective tables into themes that could be easily described. Subsequently, 12 themes were identified that encompassed the factors that were observed and reported as promoting successful implementation or performance of infection prevention and control interventions, and 17 were identified that encompassed the factors that were observed and reported as inhibiting successful implementation or performance of these interventions. These themes are presented in Appendix table 6 (page 317).

Similar to the preceding section, the identified promoting and inhibiting factors were not always opposites of each other. This was because some factors did not have comparable opposites.

BROAD CATEGORIES >>	System and organisational factors (including culture)		Factors relating to the physical environment and the equipment / resources within that environment		Factors to do with teamwork and being human		
	Systems and processes	Unit culture, workload and expected work outputs	Unit design and layout	Equipment and resources	The clinician	The team	The patient and how they present
Promote successful intervention implementation or performance (*) - these factors fall into more than one category	<ul style="list-style-type: none"> Good patient referral from ED or GP Good staffing Isolation care posters/signs (visual reminders) Education boards Infection Prevention refresher sessions 	<ul style="list-style-type: none"> Senior / expert support 	<ul style="list-style-type: none"> Availability of isolation rooms Having isolation rooms with shower room and toilet facilities 	<ul style="list-style-type: none"> When the patient is located in an isolation room that has all the required equipment to follow precautions Availability of hand washing facilities Availability and easy access to personal protective equipment, pads, pyjamas, soap, water, sinks, bins, macerator Stocked up resources Fully stocked isolation rooms Single patient use equipment 	<ul style="list-style-type: none"> (*) When the patient is located in an isolation room that has all the required equipment to follow precautions Being organised when delivering care The fear of catching D&V (*) Education boards (*) Infection Prevention refresher sessions 	<ul style="list-style-type: none"> (*) Senior / expert support Good communication regarding diagnosis and precautions (*) Good patient referral from ED or GP 	<p>Patients that are:</p> <ul style="list-style-type: none"> In an isolation room Compliant with care plans Not cognitively impaired Independently mobile and self-caring

Appendix table 4: factors that promote successful implementation or performance of D&V related infection prevention and control interventions in the AMU

BROAD CATEGORIES >>	System and organisational factors (including culture)		Factors relating to the physical environment and the equipment / resources within that environment		Factors to do with teamwork and being human		
	Systems and processes	Unit culture, workload and expected work outputs	Unit design and layout	Equipment and resources	The clinician	The team	The patient and how they present
Inhibit successful intervention implementation or performance (*) - these factors fall into more than one category	<ul style="list-style-type: none"> Poor patient referral from ED or GP Specimen box (with collected, unlabelled specimens) being kept at nurses station Guidelines and protocols not readily available Poor staffing 	<ul style="list-style-type: none"> Competing priorities (multiple tasks), constant interruptions, and heavy cognitive workload Poor staff training on policy and protocols (waiting for next episode, cannot make up decontamination solution) Prioritising patient acuity over precautions 	<ul style="list-style-type: none"> Lack of available isolation rooms Isolation rooms with no toilets or shower rooms Misleading alcohol gel placement Unideal placement of waste bins No working surfaces (to on) in isolation rooms Small-sized rooms (tight working space) 	<ul style="list-style-type: none"> Not easily accessible personal protective equipment, vomit bowls, decontamination materials Broken masher, sink, buzzer, air-conditioner Resources not stocked or promptly restocked 	<ul style="list-style-type: none"> (*) Competing priorities (multiple tasks), constant interruptions, and heavy cognitive workload (*) Prioritising patient acuity over precautions (*) Poor staff training on policy and protocols Cutting corners to save time Unclear or mixed guidance regarding situations not addressed in guidelines 	<ul style="list-style-type: none"> Poor information sharing between staff Failure to reflect in and on practice (*) Poor patient referral from ED or GP Deficient initial assessment Poor communication regarding diagnosis and precautions Not supplying patients with resources to help them assist in care Not promptly changing isolation posters/signs when patients are discharged 	<p>Patients that are:</p> <ul style="list-style-type: none"> Cognitively impaired Non-compliant with care plans Dependant and require high level of nursing input Patients with tricky gastro intestinal conditions Potentially infectious patients being cared for in bays Relatives not adhering to recommended precautions

Appendix table 5: factors that inhibit successful implementation or performance of D&V related infection prevention and control interventions in the AMU

Factors promoting successful implementation or performance	Factors inhibiting successful implementation or performance
<ul style="list-style-type: none"> The quality of a patient referral from the emergency department or community doctor (Good referral) Good communication between staff regarding diagnosis and recommended precautions Support and prompts from senior (or expert) colleagues (Infection Prevention Team, coordinators) Isolation rooms with en-suite facilities and essential physical resources Availability and easy access to essential physical resources (including human resources) Availability and optimal placement of equipment and assistive resources The cognitive state of patients and their willingness and ability to perform interventions (cooperative, independent, self-caring) Patients having their own equipment The fear of catching an infection Being organised when delivering care Refresher sessions and education boards Visual cues and posters 	<ul style="list-style-type: none"> The quality of a patient referral from the emergency department or community doctor (Poor referral) Deficiencies in admission/initial assessment Poor communication between staff regarding diagnosis and recommended precautions Potentially infectious patients being cared for in bays and areas accessible to the public Poor unit layout and design of isolation rooms Guidelines and protocols not readily accessible Unavailability and difficulty accessing essential physical resources Unhelpful and/or misleading placement of equipment and assistive resources Poor staff training and awareness or understanding of policy (including confusion over waste segregation) Unclear or mixed guidance regarding scenarios/situations not addressed in guidelines Competing workload priorities and constant interruption (cutting corners to save time) Prioritising patient acuity over infection prevention and control interventions Failure to reflect in/on practice and get organised before tending to a patient The cognitive state of patients and their willingness and ability to perform interventions (non-cooperative, bedbound, requiring assistance) Not actively involving patients in infection prevention and control related aspects of care Relatives not adhering to recommended precautions Broken clinical and mounted equipment inhibiting best practice

The themes highlighted in similar colours represent related themes that were merged together to create overarching headings.

Appendix table 6: Themes of the factors promoting or inhibiting the implementation or performance of D&V related infection prevention and control interventions in the AMU

A process of comparison and amalgamation of the themes that were collated in Appendix table 6 was then undertaken. This yielded 21 overarching themes of factors identified as affecting the infection prevention and control management of patients with symptoms of diarrhoea and vomiting in the AMU. These themes are presented below. The themes of promoting factors are listed first, followed by the themes of inhibiting factors. Where directly opposite promoting and inhibiting themes were identified, these are listed under one heading.

1. The quality of a patient referral from the emergency department or community doctor
2. Communication between staff regarding diagnosis and recommended precautions
3. Support and prompts from senior (or expert) colleagues
4. Unit layout and design (including the design of isolation rooms)
5. Availability and access to essential physical resources (including human resources)
6. Availability and location of essential equipment and assistive resources
7. The fear of catching an infection
8. Reflection in/on practice and being organised when delivering care
9. Reminders - Refresher sessions and education boards
10. Visual cues and posters (including door signs and the door itself)
11. The cognitive state of patients and their willingness and ability to perform interventions
12. Potentially infectious patients being cared for in bays and areas accessible to the public
13. Deficiencies in admission/initial assessment
14. Guidelines and protocols not readily accessible
15. Poor staff training and awareness or understanding of policy
16. Unclear or mixed guidance regarding scenarios/situations not addressed in guidelines
17. Competing workload priorities and constant interruption (cutting corners to save time)
18. Prioritising patient acuity over infection prevention and control interventions
19. Not actively involving patients in infection prevention and control related aspects of care
20. Relatives not adhering to recommended precautions
21. Broken clinical and mounted equipment inhibiting best practice

The respective overarching themes of the factors affecting patient assessment practice and those affecting the implementation and performance of infection prevention and control interventions were then collated into a table for the purpose of final comparison and amalgamation. This process of comparison and amalgamation yielded 13 broad themes of factors identified as affecting infection prevention and control practice in the AMU with respect to the assessment and management of patients with symptoms of diarrhoea and vomiting. Table 25 (pages 128-129, main text) shows this collation.

Appendix 19 - Email feedback and invitation from laboratory manager (this email is used with permission)

6/1/2018 RE: Presentation

RE: Presentation

Sent: 16 May 2018 07:49
To: Moyo M.R.

Yes of course you can.

How does Sept 20th sound? I have the rooms booked on that day and I think my scheduled speaker is 'reluctant', that sounds better than kicking and screaming !

BW
j

From: Moyo M.R. [mailto:Mat.Moyo@soton.ac.uk]
Sent: 15 May 2018 19:38
To: [REDACTED]
Subject: RE: Presentation

Dear [REDACTED],
What an honour.

Yes, absolutely. I would be happy to present at your Pathology CPD Club.

Your email was such a pleasant surprise I'm compelled to ask your permission to use it as evidence of positive feedback for my revalidation portfolio and PhD Thesis.

[REDACTED]

Thank you for your email.

Kind regards,
Mat Moyo
Clinical Doctoral Research Fellow and Infection Prevention Nurse
University of Southampton and University Hospital Southampton NHS Foundation Trust

From: [REDACTED]
Sent: 15 May 2018 07:42
To: Moyo M.R.
Subject: Presentation

Dear Mat,
I heard your presentation at the IPC conference at The Royal Marsden last week.
I really enjoyed it and wondered if you would be willing to repeat it to the RMH Pathology CPD Club.
I arrange monthly presentations for Pathology staff on topics which are relevant and/or interesting.
Root cause analysis and CAPAs are part of everyday life but your approach is slightly different and I think people will find it interesting.
Besides which I rather like the idea with putting out a poster with a sheep on it.
We video link across both sites so speakers can speak from either Sutton or Chelsea, the time slot is the 1 hour 12-1pm lunch break and includes any Q&A.
If this is something you might be willing to do, please let me know and we can talk about dates.
Best wishes
j

[REDACTED]

Laboratory Manager
Microbiology

<https://www.outlook.soton.ac.uk/owa/?ae=item&t=IPM.Note&id=RgAAAAAvaNMRICKNSYPS9hXLQJlwBwA%2fz%2f6Oos5WTYefBcigt6b6AJA3OVEfAABZCgG>

Glossary of Terms

Charting: Entering summarized and/or subject specific data into a Microsoft Word matrix.

Code: A descriptive or conceptual label that is assigned to excerpts of raw data in a process called 'coding'.

Data: Qualitative data usually needs to be in textual form before analysis. These texts can either be elicited texts (written specifically for the research), or extant texts (pre-existing texts, such as patient notes or policy documents), or can be produced by transcribing interview data, or creating field notes while conducting participant-observation or observing social situations.

Indexing: The systematic application of codes from the agreed analytical framework to the whole dataset.

Matrix: A Microsoft Word document containing numerous tables into which summarized and/or subject specific data are entered to facilitate critical analysis and synthesis.

Themes: Interpretive concepts or propositions that describe or explain aspects of the data, which are the final output of the analysis of the whole dataset. Themes are articulated and developed by interrogating data categories through comparison between and within data sources. Usually a number of categories would fall under each theme or sub-theme.

Transcript: A written verbatim (word-for-word) account of a verbal interaction, such as an interview or conversation.

Adopted from:

Gale N. K., Heath G., Cameron E., Rashid S. and Redwood S. (2013) Using the framework method for the analysis of qualitative data in multi-disciplinary health research. *BMC Medical Research Methodology* 13(1): 1-8

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