Learning with and from Others in Clinical Practice

Linda Rosemary Gregory

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I certify that the work in this thesis has not previously been submitted for a degree nor has it been submitted as part of requirements for a degree except as fully acknowledged within the text.

I also certify that this thesis has been written by me. Any help that I have received in my research work and the preparation of the thesis work itself has been acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

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Signature of Candidate

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List of Abbreviations

AHPRA   Australian Health Professionals Registration Authority

ANT   Actor Network Theory

CNC   Clinical Nurse Consultant

ED   Emergency Department

HETI   Health Education and Training Institute

IV   Intravenous

MIMS   Monthly Index of Medical Specialties

NG   Nasogastric

NMBA   Nursing and Midwifery Board of Australia

NSW   New South Wales

NUM   Nurse Unit Manager

PACE   Patient with Acute Condition for Escalation

PD   Peritoneal Dialysis

PPE   Personal Protective Equipment

RN   Registered Nurse

SPC   Supra Pubic Catheter

TIA   Trans Ischaemic Attack

TPN   Total Parenteral Nutrition

UWSD   Underwater Sealed Drain

VHP   Human Papillomavirus

Abstract

This empirical study is set against the backdrop of the contemporary acute healthcare landscape in Sydney, Australia. Patients who are admitted to hospital today present with chronic disease and multiple co-morbidities that create a complex and unpredictable work environment. As registered nurses practice in this context, they are confronted with a multitude of information sources, then required to administer several complex medications at a time together with managing the increased use of technology. The research reported in this thesis examines how and what registered nurses learn as they carry out everyday work in this dynamic environment.

Adopting a qualitative, focused ethnographic approach, this study collected data at one single study site in the natural setting of an acute care medical ward. Nine registered nurses were observed when providing clinical care to their assigned patients on the ward. Throughout the observations, the researcher conducted informal discussions with the nurses to enrich understandings of what was observed. Resulting descriptive data from the observations were used as the basis for one-to-one, semi-structured interviews conducted immediately after each observation period.

Drawing on contemporary theories of workplace learning, spatial theory and sociomateriality, this research shows that nurses drew on several strategies to learn from knowledge challenges that arose during practice. Each strategy involved creating different relationships between spaces, objects and other nurses in the ward. Further, nurses made practical meaning of patient information in sociomaterial ways using a clinical handover sheet. Practices based around the sheet allowed nurses to bring specific patient information and expertise into meaningful contact so they could act on knowledge challenges and continue patient care. Thus, learning was enabled for nurses because they rendered the clinical

handover sheet as an epistemic or boundary object. Awareness of what nurses do during times of uncertainty and not knowing—together with understanding how nurses make practical meaning of patient information—is crucial for the profession. These findings are particularly important in the context of acute care, so that more experienced nurses can provide better support and assistance to their colleagues in order to sustain a safe and high standard of patient care.

Chapter 1: Introduction and Background

1.1 Introduction to the Study

I begin this chapter by presenting a background to the contemporary acute healthcare landscape. Given the multiple treatment options currently offered to patients who present to hospital with chronic disease and multiple complex co-morbidities, nurses are required to have knowledge and skills that go beyond any particular specialty (NSW Ministry of Health 2012). In recent years, much attention has been focused on patient safety and the delivery of patient-centred care. As a result, there has been an extraordinary increase in the amount of information available to nurses that govern the way nurses deliver practices. As an extra safety net, numerous evidence-based protocols and guidelines have been produced to support complex or high-risk practices. Due to the current challenges with the diverse and complex casemix in acute care, nurses in this area are frequently working from a premise of uncertainty or lack of knowledge. Within this messy practice environment, it is difficult to determine how nurses learn to make meaning of such complex information or know how to act when confronted with uncertainty or knowledge challenges.

In order to understand how nurses respond to such situations, this study sought to explore how and what registered nurses (RNs) learn as they carried out everyday work in an acute care setting. To see the relationship between learning and working, data were collected as RNs delivered nursing care directly to their patients. This study was based in Australia in a New South Wales public hospital, which constitutes the main policy context. This study also contributes to the wider literature in the field of workplace learning and nursing.

In this chapter, I present the contemporary acute care landscape to illustrate the context in which nurses practice. Following this, I provide an outline of the research problem, a statement of the aim and the three research questions. A summary of the study is described, followed by the

key arguments and the reasons that make this research important, before an overview of the entire thesis is presented.

1.2 Background to the Current Healthcare Landscape

This study is set against a backdrop of increasing complexity of patient care in an acute hospital environment. Current provision of patient care is very complex and unpredictable due to the ever-increasing patient acuity and decreasing length of stay for patients (Duffield et al. 2015). In today's health system, acute care wards must accommodate several different clinical specialties. Conversely, until the late 1990s, the early 1950s model applied, which focused on treating system-based episodes of illness (NSW Ministry of Health 2012). Factors such as increasing age, rising rates of chronic disease, increases in co-morbidities and growing multi-morbidities coupled with high acuity directly affects the work undertaken by nurses (Chaboyer et al. 2008). As a consequence, patients admitted to acute care wards today require a more focused and higher level of care. As RNs perform practices in this context, they are confronted with a multitude of information sources, required to administer several complex medications at a time coupled with managing an increased use of technology in order to deliver patient care. The need for continuing professional development and lifelong learning in such a context is paramount, not only to maintain a high standard of care but also for patient safety.

In the last decade, there has been a series of high-profile reports about unexpected and excessive iatrogenic harm to patients (Hor 2011). Such extensive media reports compelled the New South Wales (NSW) State Government to launch an inquiry in 2008 into the public hospital system. With the inquiry came not only a renewed interest in patient safety and the quality of patient-centred care, but also an increase in the scrutiny of the competence of frontline practitioners such as nurses.

A major catalyst for these concerns was the rise in deaths of deteriorating patients. Garling (2008) reported that problems generally occurred overnight when patients were under the care of junior practitioners who did

not detect early signs of deterioration or simply lacked the experience to manage the problem. Another area of concern was that any postgraduate and vocational training was carried out on an *ad hoc* rather than a planned basis, or was too often cancelled due to patient core business pressures. In his report, Garling (2008, p. 9) commented that:

> This is especially serious in circumstances where junior medical officers and junior nurses are frequently the only professionals on duty through the night to care for patients.

Garling argued that the safety and quality of care provided to patients in public hospitals is dependent upon the skill of practitioners. Skillsets relied on the quality of undergraduate professional training and how well practitioners continued to be trained within the hospital, after initial employment.

As a result of these findings, recommendations were put forward to establish the NSW Institute for Clinical Education and Training (now known as the Health Education and Training Institute or HETI) to provide continued post-vocational education. HETI's mandate was to design, implement, conduct and evaluate postgraduate clinical education and training for all postgraduate professional clinical staff in order to enhance workforce skills. A number of guiding principles required HETI to follow an approach that would be multidisciplinary. Further, programs were to be delivered by the most appropriate and suitable person regardless of the profession or specialty. Additionally, a minimum amount of time was to be rostered for training purposes. This would comprise formal teaching by currently employed senior clinical staff, self-directed e-learning modules, simulation training conducted by senior clinical staff at simulation centres in facilities, and clinical staff observing experienced practitioners as role models, demonstrating clinical skills as they were being performed (Garling 2008, p. 11).

Garling (2008) was also concerned with the lack of consistency across hospitals regarding standards of care, and so recommended that the

Australian Commission on Safety and Quality in Health Care be established to protect the public from harm and to improve the quality of health service provision. Its objective was to guarantee that relevant systems were in place to ensure health practitioners met minimum standards of safety and quality. Standards included medication safety, management of blood and blood products and clinical handover. From the standards, a plethora of policies and protocols were produced to guide practices. These were in addition to the policies and procedures already implemented by the NSW Ministry of Health and others at a local level. This meant that nurses were required to interpret many new sources of information so that they could practice within the scope and guidelines of policy in order to deliver nursing care effectively.

The public expects that nurses maintain and update their professional knowledge and clinical skills to remain current in practice (Takase, Maude & Manias 2006; Webster-Wright 2009). Since Garling's 2008 report was published, it seemed that the official solution to ensure frontline practitioners were competent was to increase continuing professional development and training. Continuing professional learning is now a mandatory requirement and a responsibility for all registered and enrolled nurses as part of professional registration, although prior to July 2010, continuing professional learning was not a requirement by law. Following Garling's report, the Nursing and Midwifery Board of Australia (NMBA) decreed that to protect the public from further harm caused by practitioners, nurses and midwives must participate in at least 20 hours of continuing professional development each year. This was to ensure that practitioners maintain, improve and broaden their knowledge, expertise and competence in clinical practice. Acceptable activities ranged from conferences, workshops and seminars to tertiary, vocational and other accredited courses or mandatory learning activities in the workplace in the area of practice (Nursing & Midwifery Board Australia 2015).

However, according to Boud and Hager (2012), the primary purpose of short courses and seminars is to deliver content only. Few focus on

ensuring that learning is the outcome. Boud and Hager suggested that courses and seminars were preferred because they were easier to measure in hours than was learning from practice. Boud and Rooney (2011) claimed that while these programs have a place in specific circumstances, any professional learning that occurs on the job remains unaccounted for. Indeed, because of its inconspicuousness, learning on the job is not recognised or acknowledged by nurses or professional bodies as 'learning'.

1.3 Statement of the Problem

This chapter has explained some of the complexities of working in the acute care hospital environment. RNs in this present-day work climate are faced with increasing expectations for performance, competence and accountability. However, it is not possible for nurses to know *everything* required for practice, and no amount of professional training or continuing professional development can completely prepare nurses for clinical care work.

Nevertheless, this ever-changing work environment requires nurses to continually respond to uncertainty and new knowledge challenges in practice. Mayor, Bangerter and Aribot (2012, p. 1958) defined such uncertainty as the variety (or the number of exceptions) and the degree of difficulty of the task. This increases information requirements for nurses in order to complete the task. According to French (2006) and Scott et al. (2008, p. 350), sources of uncertainty stem from:

- simply not knowing what to do or how to act
- not being able to make meaning of complex information
- sudden patient deterioration
- being faced with the inherent unpredictability that is involved in nurses' work
- the complexity of working with other disciplines (different responsibilities and personalities involved)

- not knowing what will come up next or how the shift will end.

It is my argument that uncertainty and not knowing is extremely frequent in real practice. Nurses are persistently inundated with unfamiliar situations, new patient information, protocols and policies based on the best evidence for care (much of which they are not automatically aware of). In addition, nurses are frequently confronted with situations in which they do not know what to do or how to act. No amount of training will resolve this. My concern in this thesis is to explore how nurses cope with uncertainty and not knowing, and under what circumstances is it acceptable not to know how to do something. How do nurses make meaning of all the information available to them in the ward? How and what do nurses learn as they go about their everyday work in this environment?

While Boud and Hager (2012) argued that learning is a normal part of doing one's job, there has been little attention or recognition in the literature of how nurses actually learn from doing everyday work or how nurses resolve knowledge challenges that arise (Bjørk, Tøien & Sørensen 2013). According to Boud and Hager (2012), most learning occurs through the demands of practice when addressing problems and challenges that arise with co-workers and others, drawing on the expertise that is accessed in response to the uncertainty. However, studies about workplace learning tend to describe the processes and factors for learning (Billett 2004; Eraut 2004; Eraut 2007), but do not discuss how and what is actually learned. No studies have previously been undertaken in Australia to understand how learning happens in acute care as RNs provide care to their patients. There is also a lack of research on how nurses deal with uncertainty and knowledge challenges.

1.4 Aim of the Study

The aim of this study was to examine nurses as they were working in acute care in order to:

- identify practices that produced learning

- reveal what nurses learned
- show and describe the factors that influenced how nurses learned as they carried out everyday work in acute care.

1.4.1 Statement of the research questions

To achieve the research aim, the overarching question for the study is:

1. How and what do RNs learn as they carry out everyday work in acute care?

To explore this in more detail, two secondary questions are asked:

a) How do RNs overcome knowledge challenges that arise in everyday work?

b) How do RNs make practical meaning of patient information?

To answer these questions, my intention was to use a spatial approach to help understand the interface between everyday practice and learning. Although spatial theory is not an explicit theory of learning, I used this lens because it illuminates areas that may not be otherwise noticed (Gregory, Hopwood & Boud 2014). Spatial theories 'generate questions about where and how knowledge emerges; how learning is negotiated through movements and locations, and how it is integrated in in the making of spaces' (Fenwick, Edwards & Sawchuk 2011, p. 11). As a result of answering such questions, we see that space is not simply a static container in which action takes place, but it is space itself that is constituted through practices (Mulcahy 2006). As I will argue in this thesis, when we take this spatial approach, we find that nurses learn by redefining ward spaces into pedagogic spaces in order to cope with knowledge challenges when they arise. Since spaces are socially and materially produced, it is the sociomaterial effects and relations of space and time that are instrumental. As a result, we see the dynamic tensions between the sociomaterial and space. This element makes the spatial approach an important theoretical tool for explaining the social, the assembly of

relations and the patterns of practices that take place as nurses perform everyday work (McGregor 2004).

Later in the thesis, I draw on ideas from sociomateriality to focus on the clinical handover sheet, which was a critical tool used by nurses on the ward. Historically, nurses' used the clinical handover sheet as a resource so they could refer to it at a later point in time in order to know about patients admitted to the ward. So as to prepare for the handover at report time, the patient's name, room number and diagnosis were written down on a blank piece of paper before the handover commenced. During the formal part of the handover, each individual nurse would record any other relevant information on the sheet that they might be required to know for the oncoming shift in order to provide care to their patients.

With the introduction of computer technology and the increasing pressure on nurses to reduce the length of time it took to deliver the handover of patient care, an electronic version of the handover sheet was developed. It was assumed that if this information was recorded electronically and updated prior to the shift, then this would save time at the formal clinical handover. As a result of this move, each nurse now produces the sheet by adding new patient information or revising the existing information on the sheet prior to each handover. At the formal clinical handover, nurses regularly use different coloured ink to add more information, highlight the importance of information or to notice the priority in which nursing care should be carried out.

Hence, I found that a focus on sociomateriality highlighted the situated use of material artefacts such as the clinical handover sheet; drawing attention to what was being learned together with the conditions and processes happening while learning took place. Also, because practical meaning was central to the use of the clinical handover sheet for nurses, I defined this term as follows, using the example of a blood pressure reading. If a RN observed that the patient's blood pressure reading on the blood pressure

machine was 160/98, the significance of this for the patient (who has a longstanding history of cardiac disease) is that he is currently hypertensive. In terms of practical meaning, the blood pressure result (or reading) relates to how the nurse is going to act on this new knowledge about the patient. Thus, for knowledge to become meaningful, nurses need to take action on what they discover, and so meaning-making occurs through the processes that nurses use to link information with practice (Daley 2001a, p. 47).

Throughout the thesis, I use the terms 'information' and 'knowledge' interchangeably, in keeping with a practice-based studies approach in relation to practical meaning (Gherardi 2009). According to Savolainen (2009, p. 2), people access information sources and absorb information that they require to put into practice. This information comprises 'epistemic work as an inherent part of action or practice, in other words information can be understood as "knowledge in practising"' (Manidis & Scheeres 2013; Savolainen 2009, p. 9). I also use the term 'complex' in this thesis, to convey that there are multiple elements involved or, rather, that a problem is multifaceted, creating an environment in which it is difficult for someone to know what to do.

In this thesis, I unpack how nurses endeavour to resolve uncertainty and not knowing in order to uncover learning. One of the main findings is that when nurses were dealing with uncertainty, it was acceptable for some problems to be resolved in a public space, such as the patient's bedside. However, I found that not knowing about something was socially construed by nurses to be unacceptable for them to manage in a public space. Thus, to avoid this and to keep their professional image intact, nurses withdrew to a private space so they could consult with peers or utilise other resources, away from the gaze of patients and relatives. However, I argue that uncertainty and not knowing is not resolved simply by finding another person with the right knowledge or looking up the right protocol. Additional training is also not the solution, because nurses have

to deal with uncertainty and not knowing so frequently that it would be impossible to train for emerging knowledge challenges in advance.

As a solution, this thesis proposes that nurses are able to change relationships between themselves, patients, tools and other people to overcome uncertainty and knowledge challenges, thus creating lived spaces of learning at work. Further, while there is an abundance of protocols and patient information sources available, these do not tell nurses what to do, how to make meaning out of these or how to act. I argue that nurses create meaning from information and learn by employing practices that transform the clinical handover sheet into an epistemic or boundary object.

1.5 Significance of the Study

When I first embarked on this research, I anticipated my findings would relate solely to resources that nurses could use to support their learning. However, after completing the study, I found my results to be more significant, and that they contribute to knowledge in the following ways:

- The literature review revealed a scarcity of observational studies exploring nurses' learning at work, and no such studies conducted in Australia. No studies used a spatial or sociomaterial approach to illuminate how learning transpired or to describe what was being learned. This thesis addresses this gap in knowledge.
- This thesis contributes to understanding how nurses learn on the job during times of uncertainty and not knowing. This knowledge will assist nurse educators to develop their own practice in order to support other nurses learning as they work.
- This thesis provides an account and adds to the evidence that learning is occurring during work practices. There is potential to capture this learning in some way so it can be accounted for as part of continuing professional development records for re-Registration

with Australian Health Professionals Registration Authority (AHPRA).

- This thesis contributes to our understanding about the various practices nurses undertake in order to learn in a complex, information-laden environment.

- The results of this thesis show that a big part of the team leader's role is teaching and facilitating learning when nurses do not know how to proceed. This study adds to the literature about this function of the team leader's role, which has been primarily overlooked in previous studies.

- This thesis also demonstrates the important role that the clinical handover sheet accomplishes as 'an artefact of knowing' for the nurse. This may have implications for clinical handover practices and the way that they are carried out. While there is a push for nurses to use electronic sources, this study provides strong evidence of the rich and potential value that the clinical handover sheet has to offer towards learning.

1.6 Organisation of the Thesis

There are eight chapters in this thesis. Chapter 1 serves as an introductory chapter. Chapter 2 examines the literature concerning learning in the workplace and nursing. Although some studies have examined nurses' learning on the job, the evidence supporting how and what they learn in an acute care environment remains unconvincing. Chapter 3 explains the conceptual framework used in this study. Several theoretical constructs were used to guide the analysis around the research questions. Chapter 4 presents the research methodology used to explore the relationship between nurses as they do work in acute care and their learning. The research design and different methods used are described. Chapter 5 describes the key public and private spaces in the acute care ward and how they shape and direct nurses' learning. The findings and discussion of the study are presented in chapters 6 and 7. Chapter 8 is the conclusion, where the answers to this research are presented, the

significance and implications highlighted and directions for future research are proposed.

Chapter 2: Review of the Literature

Section 2.1 provides an overview of Chapter 2 and describes the literature search strategies used for the review. Studies examined were published between 1995 and 2015. The workplace-learning literature is reviewed in section 2.2, followed by a review of the literature concerning nurses' learning at work (section 2.3). Attention is paid to studies carried out in the acute care setting, as this was the context for the study. Further exploring nurses' learning, I focus on studies that discuss how nurses use tools and other resources to enable learning on the job. Studies that discuss the role of the team leader are also examined in order to determine what is already known about the function and significance of the role in the ward setting. Next, because clinical handover is a focus for Chapter 7, and an essential part of nurses' work, I review and discuss what is known in this domain of clinical practice, with reference to the clinical handover sheet. As space is a central element of my conceptual framework, I then review and discuss studies previously carried out on hospital work and space (section 2.4). I then draw conclusions about the literature and explain in what way this thesis builds on previous research work (section 2.5).

2.1 Introduction

This thesis sits within the domain of nurses' workplace learning. As this thesis concerns nursing in an acute care setting, the literature is extensive and relatively diverse. To examine the issues identified and to address the research questions (see section 1.4.1), I divide the focus of the literature review into three main categories: workplace learning, nurses' learning at work and hospital work and space. Because the focus of this thesis is about nurses and learning, I expand this field to include literature about tools and resources that nurses use to assist them during work. I also include studies focusing on the team leader, in order to capture any references to learning, given that nurses' responses to the team leader

emerged as a significant key feature of the findings of this study. Because clinical handover is discussed in detail in Chapter 7 as part of my analysis relating to practices involving the clinical handover sheet, I also include this field of literature as part of my review. Therefore, the aim of this chapter is to explore and to determine the current state of the literature within these categories and to show where this thesis sits within these fields.

2.1.1 Literature search strategies

Databases that were searched included Cumulative Index of Nursing and Allied Health Literature (CINAHL), EBSCO, Informit, ProQuest, Education Research Complete, Gale, Professional Development Collection, Sage, Science Direct (Elsevier), Wiley and Journal@ Ovid. Inclusion criteria incorporated simple keyword searches such as 'workplace learning', 'work and learning', 'work-based learning', 'workplace learning and nursing' and 'nurses' learning'. These were used to capture references in any form over a period of 20 years (publications between 1995 and 2015). Other search terms used to discover literature about space were 'hospital space and work', 'space and nurses', 'space and workplace learning' and 'spatiality and nurses'. Additional search approaches included examining the reference lists of appropriate articles selected and searching specific journals relating to the topic areas; for example, the *Journal of Workplace Learning* and *Nurse Education Today*. Initially, an appraisal of the abstract determined whether the full text would be retrieved and downloaded for closer examination (Gijbels et al. 2010). Abstracts and reference lists of articles were also parsed for keywords that did not come up under the original search terms. Similar searches were conducted for literature about resources, tools and role of the nursing team leader and clinical handover (the clinical handover sheet).

2.2 Workplace Learning

Traditionally, nurses' learning was thought to take place at sites involved with delivering formal education programs, such as universities or TAFEs

(Technical and Further Education Colleges). However, over the last two decades, there has been a growing interest and much theorising about workplace learning in general (Berg & Chyung 2008; Billett 2001b, 2004; Boud & Middleton 2003; Ellinger & Cseh 2007; Eraut 2007; Koopmans, Doornbos & Eekelen 2006; Solomon, Boud & Rooney 2006). Since this area will be discussed in more detail in Chapter 3, this section will address only the most significant developments. I draw on the work of several key researchers—such as Lave and Wenger, Billet and Eraut—who have been particularly influential towards theorising workplace learning.

My research affiliates with those studies that foreground the social dimensions of practices and relations together with the emergent nature involved with workplace learning. One theory that has been most influential in the exploration and theorising of learning at work comes from a participatory perspective, which stresses the social and communal dimensions of learning. Lave and Wenger (1991) introduced the seminal concept of 'legitimate peripheral participation' to describe learning through participation and practice (situated learning) over time. This theorisation places emphasis on the social dimensions of learning, which is crucial not only for a newcomer when they commence work but for all learners at work. New members of the group gradually become full members of the community via participation in a network of social relations. According to Lave and Wenger (1991), learning is an integral part of social practice and becoming a full member of the community and participating enables learning to take place. As a newcomer 'the processes, relationships and experiences which constitute the participant's sense of belonging underpin the nature and extent of subsequent learning' (Fuller et al. 2005, p. 51).

Various studies have highlighted the importance of the social and relational dimensions involved in workplace learning. In one study focusing on who is involved in learning in workplaces and the ways that workgroups learn as part of their normal work, Boud and Middleton (2003) found that learning often occurred unprompted by deliberate facilitation in the workplace and that informal interactions with peers were prime ways of

learning. In another study concerning the lived experiences of public sector workers swapping stories and informally chatting during work, Boud, Rooney and Solomon (2009, p. 325) noticed that the 'role of talk' was critical to everyday learning, supporting social relationships with others. In another study, Timma (2007) showed that workers learned through the sociality of work and through the 'doing of the task' (2007, p. 164) as they were undertaking performative assessments. Learning occurred due to the ways in which workers came to understand work practices through speaking, acting and connecting meaning with actions. While social relations and participation are central to learning and relevant to this thesis, this approach relies on the context where the community is located being stable. In Chapter 1, I highlighted that the context in which nurses work was both complex and unpredictable, and therefore unstable. Hence, learning for nurses in this environment is multifaceted. A limitation of this perspective is that it does not account for the constant change that produces chaos in nursing work.

My research in this thesis also aligns with studies that stress the importance of working alongside others. Some substantial work has been accomplished by Eraut (2000) about the nature of informal learning at work. Eraut (2004) claimed that the majority of learning that occurred in work was produced as a result of doing things and/or actively seeking opportunities to learn. He proposed that this could take place implicitly; that is, it could occur without the learner being aware or having the intent to learn, or may be less deliberate. Therefore, learning emerged as part of doing work. In a later study, which investigated informal learning in the workplace by professionals (ranging from the early years through to mid years of employment), Eraut (2004) examined how and what was learned at work by professionals. Eraut found that this involved participation in group activities, working alongside other people to observe and listen, tackling challenging tasks and working with clients or patients.

Primarily, Eraut (2000; 2004) found that the factors influencing learning of professionals (such as nurses) included the challenge and value of the

work, feedback and support and having confidence and commitment. The difficulty or challenge of work (individual or collaborative) compounded by the opportunities that arose for observing and working alongside people who had more expertise were also found to be important factors that shaped learning (Eraut 2000). This was because they were able to provide adequate feedback, support and advice on the spot. Contextual factors such as the allocation and structuring of work was also another important component. All of these dynamics influenced and shaped how professionals learned during work. However, Eraut (2004) concluded overall that the most important requirement for learning was having the confidence to do things and being proactive with seeking out opportunities to learn. Again, these claims all indicate that learning emerges as professionals attend to the daily business of doing work. Learning is not planned but occurs as practices unfold and as opportunities arise for observing, receiving feedback and attending to challenging tasks under the guidance of others.

Studies that emphasised the importance of the workplace as a learning environment also closely align with my research in this thesis; in particular, studies that highlighted the significance of affordances within the environment. Billett (2004) offered a noteworthy contribution to this field by drawing attention to the significance of the workplace as a learning environment. He argued that the way in which a workplace affords opportunities for learning influences how individuals elect to engage in such activities. What is central to us understanding workplaces as learning environments is the support and guidance that is provided by the workplace (Billett 2001b). For example, support and guidance could be in the form of mentoring, modelling, coaching and questioning. In addition, cultural practices, social norms, workplace affiliations, cliques and demarcations play a role in an individual's ability to participate in learning activities, either by impeding or enabling participation. The individual also elects to engage in the process of how and what they will learn.

Similarly, there are a number of prevailing working conditions that maintain an environment that is conducive towards learning. The learning environment is described as being designed for learning readiness when conditions and practices are likely to facilitate, or learning in and through work activities. Based on this premise, Ellström, Ekholm and Ellström (2008 p.86) claimed that there are two types of learning environments within workplaces, declaring that these environments are either enabling or constraining. An enabling learning environment is one that enables individuals to alternate between 'reproductive and developmental learning'. In contrast, a constraining learning environment is one where conditions and practices impede 'reproductive and developmental learning'. According to Ellström, Ekholm and Ellström (2008), there are both structural and subjective aspects involved with the learning environment. The structural aspects comprise conditions and practices such as the division of labour, task characteristics, tools, procedures and prevailing norms and values. The subjective aspects represent how these components are experienced, understood and evaluated by the learner. Thus, the type of learning environment at work plays a significant role in the individual's outcomes for learning. The affordances of the workplace as a learning environment are crucial for supporting learning. Hence, the workplace is important for regulating the extent to which professionals engage with the challenge or task at hand, which ultimately influences how and what is learned.

Thus far, I have provided an overview of the most commonly accepted knowledge claims. More recently, new and less certain theorising has addressed the emergent nature of learning in the workplace and how learning is intertwined with practice. More specifically, Johnsson and Boud (2010, p. 359) proposed that an 'emergent model of learning at work is one that develops as a collective generative endeavour from changing patterns of interactional understandings with others'. They suggested that 'new properties and behaviours emerge from people who work together in situations that cannot be predicted in deterministic or causal ways' (2010,

p. 360). Similarly, in a study about how doctors and nurses manage knowledge about patients in an Australian hospital Emergency Department (ED), Manidis and Scheeres (2013) found that new knowledge and information continually emerged as care took place. Nurses and doctors drew on existing practice and tailored this to what was taking place with their patient in the ED. This current thesis is situated among such research that explore the ways in which learning is entangled in practice, perceiving learning as partially unpredictable and emergent.

2.3 Nurses' Learning at Work

Understanding the way nurses learn at work has been the subject of much interest in the last decade. However, an initial search of the literature revealed few studies that specifically explored learning by RNs as they performed work in the clinical environment. Nevertheless, there was a significant amount of literature concentrating on certain aspects of clinical teaching and the provision of support for nurses in the clinical environment. For example, literature focused on areas such as preceptorship and mentorship (Carlson, 2015; Cummins 2009; Myrick, Yonge & Billay 2010; Ockerby et al. 2009), clinical supervision (Blomberg & Bisholt 2015; Davey et al. 2006; O'Connell et al. 2013), competency development (Embo et al. 2015; Franklin & Melville 2015; Hengstberger-Sims et al. 2008; Pijl-Zieber et al. 2014; Yanhua & Watson 2011), the clinical learning environment (Chan & Ip 2007; Henderson et al. 2010), learning from errors in daily work (Bauer & Mulder 2007) and transitioning new graduate nurses and their experiences that related to education in a particular way (Lea & Cruickshank 2015; Manias, Aitken & Dunning 2005a, 2005b; Seeley, McKenna & Hood 2015). These areas of study were excluded for the purposes of the current study, to allow a specific focus on nurses' learning in the acute care environment.

Once I began reviewing the nurses' learning literature, further sub-fields were defined. These included learning by student nurses during their clinical placement (Grealish & Ranse 2009; Henderson et al. 2010;

Smedley & Morey 2010) and post-registration nurses' learning at work (Berings, Poell & Gelissen 2008; Bjørk, Tøien & Sørensen 2013; Campbell, Nilsson & Pilhammar Andersson 2008; Daley 2001b; Eraut 2007; Skår 2010).

In the following section, I examine and critique the literature that concerns only RNs learning, to identify existing knowledge that can be built on or a knowledge gap that the present study can address.

2.3.1 Opportunities for learning

Several studies have focused their attention on the opportunities that arise for informal learning for nurses working in hospital wards. Campbell, Nilsson and Pilhammar Andersson (2008) identified three opportunities for nurses working night duty: during the clinical handover report; the personal assessment round with patients (where the nurse is able to form his or her own impression of the patient's health status); and later during the assessment of the patient's condition, before the nurse informs the medical officer (as nurses need to report their understanding about their assessment verbally back to the doctor). Hence, nurses learn from seeing variations in their patients' conditions but 'for this to be meaningful, the nurse must know what to look, listen and feel for' (Campbell, Nilsson & Pilhammar Andersson 2008, p. 350). Unfortunately, this study was not theoretically informed by any specific learning theory, except to state that learning results from experiencing something and being able to perceive variations in a phenomenon. The study has relevance to this thesis regarding how nurses make meaning of patient assessment information, which is discussed in Chapter 7.

In a more recent study, Bjørk, Tøien and Sørensen (2013) explored the opportunities for informal learning by nurses in a hospital surgical ward. They found that opportunities 'were not only dependent on the initiative of the learner to take up opportunities but also on responses from colleagues and the areas where nurses met' (2013, p. 430). This corresponds with findings by Eraut (2004). The results from this former study are closely

connected to my thesis. However, I seek to understand what and how nurses are learning rather than identify informal learning opportunities.

Bjørk, Tøien and Sørensen (2013) identified particular spaces in the ward that afforded opportunities for learning, such as the staff room, meeting rooms, patient rooms and attendance at ward rounds. However, my study addresses spaces in the ward in a different way and is underpinned by theory in order to analyse more closely what is taking place in terms of learning. Bjørk, Tøien and Sørensen (2013) suggested that the clinical handover in particular provided multiple learning possibilities, because it was a forum wherein discussion about patients or their medications could be held. In Chapter 7, I further explore discussions during clinical handover to examine how learning takes place and what nurses are learning as a result of handover practices. Conversely, Bjørk, Tøien and Sørensen only mention that the handover was a good opportunity for learning and fail to elaborate on how nurses achieve this.

Bjørk, Tøien and Sørensen (2013) also argued that various physical structures—such as open doors leading to specific workspaces—are important because they trigger impromptu conversations about work. This creates a space and opportunities for staff to mingle, allowing questions and stimulating informal discussions and answers. In their conclusions, the authors drew attention to the usefulness of spaces such as the medication room for learning, but space was not the focus of the study. They also did not use any theoretical ideas to help explain the importance of space in nurses' learning or finding opportunities to learn. The small scale of the ward as the research site was reported to be a limitation in this study.

2.3.1.1 Learning experiences and the work environment

It is important to consider how the work environment influences and shapes learning for nurses. Skår (2010) explored the meaning of nurses' experiences with their work as a learning environment using a qualitative hermeneutic approach. Findings indicated that the experiences of workplaces as a learning environment involved nurses being able to

participate in the work, being able to engage in interpersonal relations and being able to access important knowledge resources. While the work situation determined the learning activity, the author found that 'nurses' learning experiences were linked to the opportunities that the type of work provided as the nurse developed a personal engagement with learning' (2010, p. 8). It was through nurses' relations with their co-workers that they were able to develop or construct their own knowledge. However, access to knowledge was dependent on the activity and how the workplace was structured. Unfortunately, Skår does not elaborate on how the nurse makes meaning of information accessed or how this informs the nurse's actions in response to the situation. Rather, the emphasis of this particular study concerned the workplace as a potential learning environment rather than how the nurse seeks to deal with challenges as a stimulus for learning. Other drawbacks to this study was the variability among the different sites of work (acute hospital ward and two nursing homes), and that in total there were only 11 nurses that participated.

A noteworthy contribution by Jantzen (2008) explored positive learning experiences among first-line nurses in an acute care setting. An inductive narrative inquiry research design was used to obtain data. Positive experiences were expressed as colleagues who were 'heroes and helpers'. Heroes were thought of as mentors, and helpers were seen to be there to support and assist. Heroes and helpers were further described as 'open', 'affirming', 'encouraging', 'receptive' and 'respectful'. In contrast, nurses who were seen as a hindrance were labelled constantly interfering and critical. Negative experiences described by the cohort related to episodes of mistakes, errors and misjudgements that occurred as an unexpected outcome in nursing work. The study highlighted that for a positive learning experience, it is important to have supportive processes in place that are conducive towards learning. This study did not examine the workplace as a positive or negative learning environment, because it was not a focus of this thesis.

2.3.1.2 Learning from each other

As discussed, authors have highlighted the importance of learning from other colleagues in the workplace. Hunter et al. (2008), however, investigated how nurse clinicians learn with and from each other in the workplace. Using ethnography, this study was conducted in an Australian neonatal intensive care unit with 32 nurses, 14 registrars, 5 allied health practitioners, a nurse educator, clinical nurse consultant, nurse manager, 5 senior medical specialists and one administrative officer. Fieldwork was carried out over a 12-month period. Tools used during the data collection process were observations and in-depth interviews with participants.

Whilst the initial intent of the study sought to explore nursing and the processes used to learn in a neonatal intensive care unit, other health professionals such as doctors were drawn into the results. Yet, as this was not the central focus of the study, further exploration of this perspective was not pursued. Four workplace-learning dimensions were found to occur: orientation of nurses by being buddied or preceptored with a more experienced practitioner, orientation of medical registrars' through nurses' eyes, preceptoring and decision-making. Nurses were also found to be key resources for learning for others (medical registrars' and or specialist consultants), teaching ventilation techniques and the way the unit operates. However, while the study described the processes that hospital nurses used as part of workplace-learning practices, it did not provide any detail about what was being learned. The study showed that practitioners from other disciplines as well as nursing were rich and valuable sources for learning. While orientation and preceptorship are not a focus of this thesis, Hunter et al.'s study highlights the importance of knowledge and involvement in workplace-learning activities by practitioners from all disciplines within the acute care hospital environment. A shortcoming of Hunter et al.'s study was that it only focused on new nurses coming to the unit to work. In addition, there was no discussion of the processes that

take place in relation to how and what experienced nurses learn during work, which are the perspectives that I explore in this thesis.

2.3.1.3 Learning from clinical practice

Learning from practice is well recognised in the literature (Boud & Hager 2012; Hager 2011b; Reich & Hager 2014). Daley (2001b) took a clinical perspective when exploring how clinical nursing practice facilitated learning for nurses. Data collection involved semi-structured interviews with participants who had attended a continuing education program to determine what was learned and how this was incorporated into practice. Unfortunately, the type of continuing education program was not disclosed in the study. Findings revealed that learning for nurses was dependent upon the nurse's ability to draw on important components from the experience, then to learn those and to apply them if a similar situation arose. It was also identified that when challenges arose in nurses' own knowledge, this triggered a reflective process that caused nurses to examine concepts embedded within their own personal values and beliefs (what they knew, how they should act). The study provided little insight into practical knowledge or skills learned in clinical practice. While this work adds to nurses' personal knowledge that can be applied during practice, this perspective was not relevant to this study.

Later using an interpretivist approach, Daley (2001a) examined how knowledge became meaningful to practice in four professions (20 social workers, 20 lawyers, 20 adult educators and 20 nurses). Data was collected via semi-structured interviews and the examination of continuing professional education program documentation, which contained specific planning information detailing 'program objectives, content, timeframes and evaluation strategies' (2001a, p.43). Daley (2001a, p. 41) argued that learners process and make meaning of new knowledge by establishing connections, linking knowledge to previous experiences and the context in which this knowledge is learned. New knowledge was learned by nurses based on the needs of their patients and whether it was relevant to their

practice. Daley's study has a particular bearing on my thesis in terms of meaning-making. I explore these ideas in Chapter 7 through my data and in explaining how nurses make practical meaning of information as they use the clinical handover sheet as part of everyday work.

2.3.2 Studies asking 'how' and 'what'

As explained in Chapter 1, the purpose of my research was to seek to understand how and what nurses are learning in an acute care medical ward. One study in the literature asked similar questions of early career professionals, which included nurses. Eraut's (2007) longitudinal study with 40 newly qualified nurses, 38 graduate engineers and 14 trainee accountants took place over a period of three years. Data were collected through observations and interviews. Eraut examined how and what was being learned and the factors that affected the level and direction of learning efforts. From the findings, the author developed a typology that helped to explain the way early career professionals learn in practice. Eraut (2007, p. 409) divided the typology into three areas. He determined that learning occurred as a byproduct, due to learning activities that were incorporated through work, and due to learning processes that were carried out at or near work.

While Eraut (2007) only focused on early career professionals, in particular transitioning nurses, these findings could be applied to all nurses. Therefore, the first two areas of the typology were more meaningful for me and applicable to this thesis. For example, learning as a byproduct involved nurses participating in group processes such as team meetings or clinical handovers, working alongside and consulting with others, undertaking difficult tasks, problem solving, trying things out, working with patients and refining skills and consolidating the knowledge about what they already knew. The learning activities that were part of Eraut's (2007, p. 409) work focused on nurses asking questions, obtaining information, locating resource people, listening and observing, reflecting, learning from mistakes, giving and receiving feedback and using mediating

artefacts. While the research in my thesis supports these findings, it also highlights other elements of nurses' learning at work that would not have otherwise been noticed. For example, Eraut's typology does not include how nurses make meaning of patient information or explain how nurses deal with uncertainty and not knowing. This thesis extends Eraut's work by focusing on how nurses responded to such challenges as they arose in work to show learning. A limitation of Eraut's study was that there was only a 50% retention rate of nurses over the 3 year period, as they were the most mobile of all participants recruited. This may have influenced the richness of data collected.

2.3.3 On-the-job learning: the nurses' perspective

During the course of work, learning is often not acknowledged because it is regarded as part of the job (Boud & Middleton 2003). In order to gain more insight into learning on the job by nurses, Berings, Poell and Gelissen (2008) conducted two successive studies. The first study involved identifying what was being learned and how learning took place, which was later followed by validation by more senior nurses. Data collection involved in-depth interviews with 20 nurses using a grounded theory approach. Six main categories of learning activities were identified. These were learning by doing one's regular job, learning by applying something new, learning by social interaction with colleagues, learning by theory or guidance, learning by thinking about working experiences and learning through life outside of work (p. 445). Other examples were also provided to give further clarity, such as learning by doing, learning by mistakes or learning by social interaction, including asking questions or asking for feedback. Regarding learning by thinking about work experiences, the nurses gave examples such as reasoning and creating and writing down step-by-step plans. In the second study, (using the same approach to collect data by interviewing supervisors and educators from other hospitals in the Netherlands) another category, learning and collecting information, was added, in which nurses 'evaluate the reliability of information sources, interpret information, look up protocols and ask

questions if necessary' (Berings, Poell & Gelissen 2008, p. 451). The results from this study have some bearing on this thesis by indicating the activities that nurses are involved with when learning. However, these typologies are quite broad and cover many discrete areas. My study takes a closer examination of such activities in order to expose how and what nurses learn. Also, neither of Berings, Poell and Gelissen's studies identified what nurses were learning during these activities.

The existing literature revealed that there are few studies that have focused on nurses' learning in the workplace, particularly in an acute care hospital environment. The studies that have sought to explore this field of enquiry have covered a range of important perspectives, which begin to contribute to our understanding of how and what nurses learn at work in some way. The research so far has drawn attention to the activities in nurses' work that may provide opportunities for learning and the times when learning is an inadvertent consequence of the activity itself. Other people and artefacts were also considered significant. Because of the nature of nursing work, there were many opportunities identified for learning; however, for this to occur, a positive work environment is essential.

Little research has been carried out to date on how and what nurses learn in an acute care environment. While these questions have been asked before and activities were identified, no studies explored and answered these from the perspective of uncertainty, being confronted with a knowledge challenge or getting stuck in practice. In addition, few studies have explained what nurses learn. None of the studies have considered the vast amount of information that nurses must deal with in daily practice, how they must make meaning from this to enact patient care or what they learn from this. No studies have used a spatial or sociomaterial lens to examine learning. Finally, few studies were theoretically informed by any specific learning theory. It is these perspectives that this thesis examines.

The next section examines research on tools and resources that nurses use that may begin to answer questions about how nurses make meaning of patient information.

2.3.4 Tools and resources that nurses use at work

During my observations, I noticed that there were many tools and 'sources of practice knowledge' that nurses drew on to inform and guide practices (Estabrooks et al. 2005, p. 460). As this has implications for learning at work, I included this area as part of my literature review about nurses' learning at work. However, I found that there were few studies that investigated the causes for nurses needing to retrieve and use tools and other sources of knowledge as part carrying out everyday work (Christiansen 2010; O'Leary & Mhaolrúnaigh 2012).

According to O'Leary and Mhaolrúnaigh (2012), pre-processed information in the form of protocols, practice guidelines and drug reference manuals are the most common forms of text used by nurses. Quite often in nursing work, practices are dependent on tools not only for solving problems but also to assist with performing practices and interacting with others (Lundin & Nuldén 2007). There were few studies in the literature that specifically examined how nurses accessed and used tools and resources during times of uncertainty. In one study, Spenceley et al. (2008) conducted a review of the literature to determine what information sources RNs turn to for supporting direct patient care. The results of their review suggested that there was a linear pattern around nurses' information-seeking behaviours to support practice. When the nurses identified that they needed more information, factors such as the decision to find out more information, the time available, other priorities, workload, expectations of co-workers and barriers to access all contributed to whether the opportunity was pursued. However, according to Spenceley et al. (2008), nurses preferred to turn to human sources for information about clinical issues.

In another study, Estabrooks et al. (2005) examined what type of sources of practice knowledge nurses accessed in several acute surgical units using an ethnographic approach (participant observation and interviews). The key resource was accessed via social interaction with other colleagues, because problems were triggered by situations of uncertainty about patient care and required immediate attention to resolve. Nurses in the study viewed peers to be the most helpful because the nurses were more confident with information obtained from the peer. Equally, the internet was also found to be a popular source of information because it was readily accessible and could be more problem-specific as a source of knowledge. Documented sources such as written materials, patient charts, records, policy and procedure manuals, newsletters, communication books and bulletin boards were also significant. While the authors identified information-seeking behaviours and resources nurses accessed, this was not linked to learning as an outcome nor did the authors discuss how nurses made sense of the information once acquired.

Christiansen (2010) also sought to shed light on why nurses use textual knowledge sources in a hospital setting and so collected data through in-depth semi-structured interviews. Nurses revealed that textual sources were used as part of their daily work because they needed to fill knowledge gaps, verify and enhance their performance and further develop their own knowledge base. For nurses, there was a sense of responsibility for updating their knowledge along with knowing not only how to perform a task but also the reasons why. Nevertheless, if the nurse knew how to perform the procedure, they needed reassurance that what they thought was required in relation to the practice was correct. Christiansen (2010) concluded that clinical guidelines functioned more as tools of validation rather than resources that assisted with problem solving. Again, the author did not link this to learning except to state that nurses use textual sources to fill knowledge gaps.

Finally, Spenceley et al. (2008) found that resources accessed in a work setting by nurses needed to be up-to-date and informative. Seeking

information by nurses was spurred on by the urgency of the information needed and the timeliness of a possible resolution. Additionally, the nurses' scope of practice and the specialised nature of work also influenced a greater reliance on information sources to support practice-based decisions. According to Spenceley et al. (2008, p. 465), nurses who were working in the acute care environment more frequently sought out information related to the specific procedural requirements of the work.

The use of resources and tools in supporting decisions around practice issues is another important area when delivering safe patient care. O'Leary and Mhaolrúnaigh (2012) found that nurses sought out different levels of information depending on whether the problem or decision was recognised as routine or non-routine. Unfortunately, their study was not expanded to include learning.

From the literature discussed above, the use of similar tools and resources by nurses aligned with my study. Likewise, access and use of tools and resources were subject to time availability and urgency or type of uncertainty. However, none of the researchers discussed the implications or contributions these sources made towards learning for nurses, except that the desire to learn more is linked to the nurse's wish to strengthen professional repertoires beyond that of problem solving and procedural performance (Christiansen 2010, p. 7). Further, the studies surveyed do not associate the use of tools and information sources with how nurses make sense of information or link these to learning from the type of tasks that nurses encountered at work.

2.3.5 Team leader

Because the team leader is one of the examples drawn on for understanding learning and forms part of the data presented in Chapter 6, this clinical leadership role is part of this review of literature.

Interest in nursing leadership has been steadily growing over the last decade, yet it is still under-researched (Davidson, Elliott & Daly 2006; Lett

2002; Lord et al. 2013; Martin & Waring 2013; Stanley 2006, 2014). In the literature, there has been mixed debate over the definition of 'leadership', because of the distinct ways in which clinical leadership functions in nursing. The term is often used to describe Nurse Unit Managers (NUM) that work in the clinical setting, who have developed the clinical expertise and occupy a leadership position (Lett 2002). Cook and Leathard (2004, p. 437) also used the term 'clinical leader'; however, they define this as an expert clinician who is involved in providing direct clinical care, and who guides others to improve the care they provide. Goldblatt et al. (2008) built on this definition to include the shift leader (also known in Australia as the team leader). They define this particular role as a RN who has been delegated partial authority by the NUM for the shift to manage patient care. Although the team leader has been delegated the authority to develop practice in accordance with patient needs, this authority is restricted to a given shift. In the next shift, another nurse may perhaps be nominated as the team leader, while the preceding shift's team leader operates as a member of the team working back at the bedside. Overall, part of a RN's work involves leading and organising nursing care in the ward. Hence, the outcome of leadership roles such as the team leader contributes to the success of other co-workers in the delivery of quality care to patients (Ekström & Idvall 2015).

While Goldblatt et al. (2008) used the term 'shift leader', their definition is the closest to the role of the team leader, which is the term that I use in this thesis to describe how the role operates in the acute care medical ward. However, altogether there are few studies in the literature that specifically examine the role of the team leader. Goldblatt et al. (2008) explored the experience of being a shift leader in Israel and how nurses viewed the management of their shift from their own experience. A qualitative research design was used to collect data in two stages using in-depth interviews. Findings revealed that being a shift leader meant that the nurse had to be everywhere in the ward at the same time. Nurses used a particular metaphor to describe the role such as 'the nurse has multiple

legs like an octopus…these legs can carry the shift leader in different directions' (Goldblatt et al. 2008, p. 48). In addition, shift leaders felt responsible for managing medical staff, particularly when they were unavailable on the ward; they had a strong commitment to staff and patients whose needs and priorities demanded a holistic approach; there was a need for constant supervision and checking up on the work performed by other nurses; and the boundaries were defined for managing the here and now only. Overall the experience of being shift leader meant that nurses felt a sense of responsibility, which required them to comprehend the complex situation occurring in the ward at any one time. The authors concluded that the experience of being a shift leader was intensely stressful. This study has a significant bearing on my research about the team leader, particularly regarding the role and function of the team leader presented in Chapter 6. However, my main focus is the pedagogical functions of the role and how this supports nurses' learning on the ward.

In addition, Ekström and Idvall (2015) found that newly qualified RNs experienced feelings of inadequacy when in the role of the team leader. New graduates stressed that organising work for the team was difficult without leadership experience. Again the focus in this study was on the importance of leadership skills and not learning how to be a leader.

A study undertaken in Australia by Endacott (1999) examined the role of shift leaders in a paediatric Intensive Care Unit (ICU). While the responsibility for patient care rested with the assigned bedside nurse rather than the shift leader, results suggested that activities fell into four categories: presence, information gathering, supportive involvement and direct involvement. It was found that the main role of the shift leader was to provide advice and support as required and only intervene when their expertise was needed (Endacott 1999, p. 15; Goldblatt et al. 2008). Few studies in the literature focused on the supportive and direct involvement of the team leader at the bedside, which is the perspective that I explore in this thesis.

A number of studies focused on the attributes and the characteristics of work for the team leader. Cook and Leathard (2004, p. 438) identified five attributes relating to the effective clinical nurse leader. First, creativity, which occurs through engaging with the environment in order to seek new possibilities to a situation. To be effective, the nurse needed to take time to understand the current situation on hand. The second quality identified was having an ability to point out new ways of care delivery, which refers to the leader being willing to look at new ways of doing things. Another attribute was the capacity to influence others by providing meaningful information and showing respect. Finally, the last attribute concerned the ability to support others through change. Cook and Leathard (2004) indicated that supporting staff through various circumstances and events promoted effective learning through encouraging ownership of the issue.

Stanley (2006, 2014) identified leadership attributes in two separate studies, six years apart. While the leadership qualities of the team leader was the main focus for most studies in the literature, this was not the focus in my research. However, experience and leadership are important for patient outcomes. These qualities were important in relation to supporting others when they got stuck on the ward. Effective clinical leaders were considered to have clinical competence (being credible, having clinical experience and ability to teach others about clinical issues) and clinical knowledge relating to a particular area or specialty. Also important was being an effective communicator (this extended to having the ability to listen, along with the ability to make decisions). Other attributes included being motivated, being open and approachable, being a role model and having the ability to care effectively for patients, along with being visible or having a presence and being engaged on the ward. Davidson, Elliott and Daly (2006) suggested that central to the team leader's role and function is the ability to demonstrate mentorship, supervision and clinical excellence.

While identifying such traits are important, Lord et al. (2013) argued that leadership does not occur in a void and that social context must also be taken into account. Therefore, we must understand that practice issues,

hierarchical issues, working alongside the powerful forces of the medical model and changing work practices all impact on leadership roles in some way.

All research examined focused on the function of the role and the attributes and characteristics that clinical leaders require to function effectively in the role. Few studies reported on the ways in which the clinical leader contributes to the learning of others on the ward. Most of studies remarked on the support for others in some way, but failed to elaborate further on this part of the role. My study seeks to fill this gap. Nurses on the ward are frequently stuck when not knowing what to do to continue the care. In my research, the team leader position is crucial to nurses on the ward, particularly the pedagogical perspective. However, there has been little acknowledgement about this teaching component of the role in the literature.

The following section reviews the body of literature on clinical handovers to determine what is already known, together with situating my study on the clinical handover sheet within this area of research. Clinical handover is an area that I explore in my analysis and also forms part of the discussion in Chapter 7.

2.3.6 Clinical handover

During the last decade, clinical handover has received a significant amount of attention from researchers. In Australia, recent public enquiries (Garling 2008) have fuelled interest due to evidence of poor or lack of adequate communication between practitioners concerning patient care (Iedema & Manidis 2013). As a consequence of these enquiries, many studies were driven by concern for patient safety and the frequency of adverse events caused through poor communication and/or the quality of the content exchanged (Iedema & Manidis 2013; Johnson, Jefferies & Nicholls 2012; Matic, Davidson & Salamonson 2011; Street et al. 2011).

In the literature, I found that there were a considerable number of terms used for 'clinical handover', including 'handoff', 'signover', 'intershift report', 'change of shift report', 'shift report' and 'sign out' (Lee et al. 2015; Mayor, Bangerter & Aribot 2012; Staggers & Blaz 2013). However, all authors agreed that the definition for clinical handover was 'the transfer of responsibility and/or accountability for patient care from one provider to another through the exchange of information' (Chaboyer et al. 2009; Clarke et al. 2012; Johnson, Jefferies & Nicholls 2012).

My initial review uncovered several strands of clinical handover research. Overall, there were a considerable number of studies that examined the efficacy of clinical handover (Anderson et al. 2015). Numerous studies focused on communication and content (Carroll, Williams & Gallivan 2012; Eggins & Slade 2012; Jefferies, Johnson & Nicholls 2012; Liu, Manias & Gerdtz 2012; Manias & Street 2000; Payne, Hardey & Coleman 2000; Staggers & Mowinski Jennings 2009), the processes and structure of clinical handover (Chaboyer et al. 2009; Clarke & Persaud 2011; Johnson, Jefferies & Nicholls 2012; Matic, Davidson & Salamonson 2011; McMurray et al. 2010), nurses perceptions about handover (Klim et al. 2013; O'Connell, Macdonald & Kelly 2008; Street et al. 2011) and patient perspectives of bedside handover (McMurray et al. 2011).

In my research, I have intentionally chosen to explore the way in which nurses used the clinical handover sheet to explore how practical meaning is made regarding patient information. Therefore, I reviewed the literature about the communication and content delivered during the handover and found there were only a few studies in the literature that shared any connections with this focus area. The next section presents the literature that had the strongest bearing on my study. Then, I show how my study builds on this work, extending beyond what is already known about the use of the clinical handover sheet and how the sheet is central to nurses' learning at work.

2.3.7 Clinical handover sheet

While there was an extensive body of literature on clinical handovers, I found only six studies that specifically drew attention to the clinical handover sheet. Most authors who focused on this object agreed that the clinical handover sheet (often termed 'scraps' of paper by some authors), was primarily used as a personalised work tool for nurses (Hardey, Payne & Coleman 2000; Iversen, Landmark & Tjora 2015; Payne, Hardey & Coleman 2000; Staggers et al. 2012; Staggers & Mowinski Jennings 2009). It was also not uncommon for nurses to use this tool as a source for knowing about the patient, when giving the handover (Iversen, Landmark & Tjora 2015; Staggers & Mowinski Jennings 2009).

Several studies on the clinical handover sheet highlighted the role and the use of the sheet by nurses during practice. Hardey, Payne and Coleman (2000) reported that the use of the clinical handover sheet or 'scraps' was a particular strategy employed by nurses to organise nursing knowledge, which eventually became a unique combination of personal and professional knowledge as they went about providing patient care. The authors found that while some scraps were the most simple, basic 'to do' lists, the main function was to provide an important check for nurses to ensure that they had addressed the needs of their patients and remembered relevant information that needed to be conveyed at clinical handover (p. 213). Further, Payne, Hardey and Coleman (2000) found that the scraps of paper used by nurses were the most important sources of written information used in the delivery of nursing care. These researchers were the first to shift focus from the enactment of clinical handover to examine the role that the sheet played in the assemblage of clinical handover practices. This study has the closest connection with my research on the clinical handover sheet, but did not examine the ways that nurses learned or made practical meaning of information that they received or wrote down on the clinical handover sheet.

More recently Iversen, Landmark and Tjora (2015) found that the clinical handover sheet was a temporary repository for critical work information. It included information that was not recorded in any other system and therefore it was important for nurses to be able to communicate this when required throughout the shift. As a consequence, the sheet was used as an important reference point during discussions. I extend this work further by exploring how the sheet enables learning.

In another qualitative study, nurses' perspectives on the introduction of bedside handover together with the use of written handover sheets were also explored (Johnson & Cowin 2013). Data was collected from registered and enrolled nurses in six focus group sessions. Nurses considered that the clinical handover sheet was just another different form of clinical information that required constant revising. The nurses stated that quite often they received three different patient health information stories, the verbal handover, the written clinical handover sheet and patient's notes, which reflected three different stories that were not consistent.

In a similar study—which may explain the findings by Johnson and Cowin (2013)—Jefferies, Johnson and Nicholls (2012) explored the difference in information that was verbally handed over to nurses compared to information in written notes. Content and textual analysis of two data sets was used to examine examples of nursing documentation and transcripts of the clinical handover in order to 'understand the scope and construction of patient information found in each system of communication' (2012, p.129). Findings revealed that information in nursing notes was less comprehensive and focused on tasks performed. Nurses conveyed more information at verbal handover because they added extra information onto the sheet during the shift as the patient's condition changed. The authors concluded that this could be the reason for differences between oral clinical handover and the information recorded in the nursing progress notes. This study did not report on the clinical handover sheet or connect the sheet with other written forms of documentation by nurses.

While the aforementioned two studies examined handover, few issues were discussed concerning the use of written handover sheets by nurses. As I stated in Chapter 1, nurses must deal with a lot of information at any one time, make sense of the information and then use this to carry out patient care. Neither of these studies explained how nurses do this as they handed over information or provided patient care. The research in this thesis builds on this perspective by showing how nurses make practical meaning of patient information, leading to learning.

From another perspective, Iversen, Landmark and Tjora (2015) examined the reasons why paper-based patient lists (clinical handover sheets) have remained in use by nurses even when some hospitals had transferred to digital records. The study highlighted that patient lists included information that was not available elsewhere and therefore would not be documented (p. 71). The nurses used this information to communicate to others throughout the day to handover care. While this study reported the reasons why nurses continue to use the patient list, the authors did not extend this to include in what way the sheet might facilitate learning. The sheet is still largely considered a work tool only in this study.

Similar results were echoed by Staggers et al. (2012). Nurses defended the use of their written handover sheets, referring to the sheets as their 'brains', using them as their primary reference to give the report to the next incoming nurse. The authors claimed that nurses felt that writing things down helped them to remember the information. Both Iversen, Landmark and Tjora (2015) and Staggers et al. (2012) found that nurses preferred to use paper forms of the clinical handover sheet rather than an electronic version because of its accessibility, and that nurses could use it to record information that they required for the shift. Both studies highlighted that the sheet was used as a work tool that could be referred to 'at a glance' (Staggers et al. 2012, p. 160) and that it worked as a good resource for the nurses. Neither study reported how such practices facilitated learning for nurses or how they made practical meaning of the information on the sheet. Both studies are relevant to my research about the clinical

handover sheet but fail to link it to how and what nurses learn as they use the sheet.

While little has been documented about how the clinical handover sheet may facilitate nurses' learning, two studies sought to examine clinical handover and learning. The first study targeted nursing students rather than RNs. Skaalvik, Normann and Henriksen (2010) explored how oral shift reports stimulated learning among nursing students. Overall, students found professional discussions during handover were helpful in stimulating their learning, but the authors did not explain how this emerges. Other students also thought that this extended to all nurses and not only to students. In an earlier study, Iedema et al. (2009) used a video-reflexive process to assist practitioners to gain insight into the way they communicated and delivered verbal handover. The method allowed participants to use a reflection-on-action approach to their handover practices by enabling them to question and re-design their ways of working (p. 135). However, learning in the study by Iedema et al. (2009) was aimed at practice improvement and communication safety, rather than building and extending nurses' professional knowledge.

There have been few studies that have paid attention to learning and clinical handover. No studies have sought to explore in what ways the clinical handover sheet supports learning. My study builds on this area of research by showing how nurses' practices with and around the clinical handover sheet contribute to learning. Further, my research uses a unique conceptual framework to theoretically reframe the clinical handover sheet as an object, in order to illuminate learning in this context. In doing this, I explore the work that the sheet does in practice as nurses are using it, to explain how this may facilitate learning. This has not been conducted previously in the field of nursing.

In the following section, I shift gears and move away from the learning literature to review and discuss studies previously carried out on hospital

work and space. This focuses more on work than learning, but helps me to build a case about what is already known about this area.

2.4 Hospital Work and Space

In this section, I locate this thesis in the most recent developments in this field. While there has been significant research around hospital work and space, few studies have also examined learning. Further, no studies have used space in the same way that I use it; none has developed space theoretically to connect it to learning as I have with my study. Figure 2.1 indicates the amount of studies that focus on all three areas.
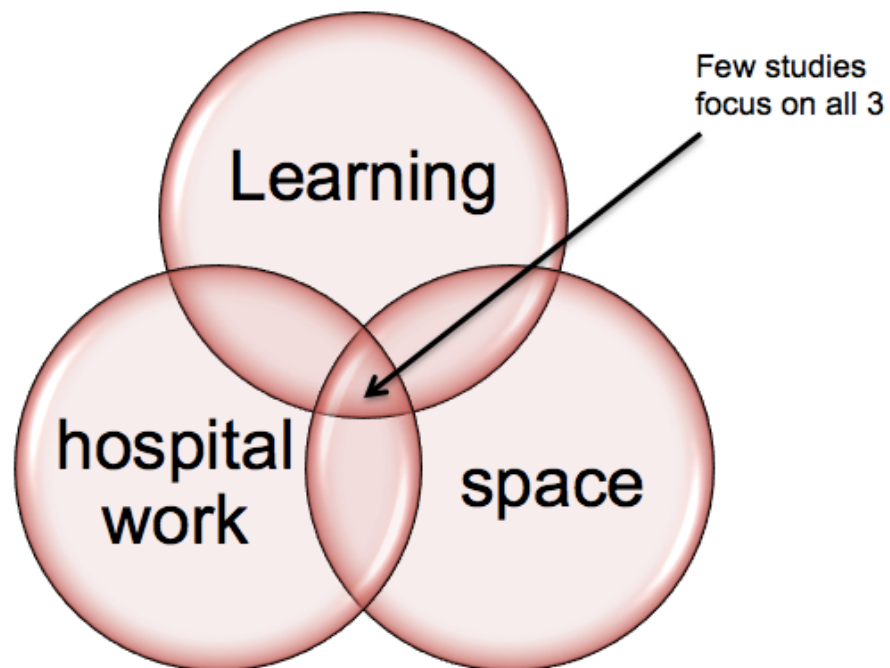
Figure 2.1: Studies with a focus on learning, hospital work and space

In an earlier paper that I wrote with Hopwood and Boud (Gregory, Hopwood & Boud 2014), we explored issues of space, hospital work and learning. This proved fertile and as a result Chapter 6 takes that analysis further. Therefore, it is important for me now to show what has been accomplished in this area in order to position my study alongside those in which a connection has been made between hospital work, learning and space.

Overall, a range of perspectives have emerged concerning spatiality. These perspectives pay particular attention to the spatial functions, meanings and practices within the workplace (Shortt 2015). While organisational studies have led the way in this field, attempts to understand the effects of spatial arrangements in hospitals have been the subject of much scrutiny in recent times. Numerous questions have been raised about the composition of hospital spaces. While there have been several studies carried out on space and learning, these have not been in a hospital context (Edenius & Yakhlef 2007; Fahy, Easterby-Smith & Lervik 2014; McGregor 2004; Mulcahy 2007; Rowe 2015).

The use of situating hospital space into frontstage and backstage (Goffman 1969) spaces has gained some recognition in the literature. According to Shortt (2015), it is the dominant or frontstage spaces, which dazzle, that have been explored, whereas the backstage spaces have been somewhat ignored. In this thesis, I use the idea of front and backstage (although I refer to these as public and private spaces when referring to the space) to understand the purpose, the practicalities and the utilisation of key areas in the ward. I only use the terms 'frontstage' and 'backstage' to point to the person and their actions.

Other researchers have also used the notion of front and backstage to distinguish between public and private hospital spaces (Liu, Manias & Gerdtz 2012; Mesman 2012; Tellioglu & Wagner 2001). Lewin and Reeves (2011) explored how professionals present themselves during collaborative interactions with others in hospital wards. In this study, the front and backstages are defined in terms of activity rather than places located in the ward. For example, frontstage activities were ward rounds and backstage activities were meetings in private areas of the ward. Another variable included *ad hoc* frontstages involving unstructured or unplanned activity that took place in front of patients and *ad hoc* backstage activity that occurred in corridors as quick conversations between professionals. Lewin and Reeves (2011) argued that there are different rules of behaviour that shape how practitioners conduct

themselves in both public and private spaces. This is a useful way to draw attention to areas of the ward that cannot be accessed or viewed by patients. I pursue these ideas further in this thesis to explore learning by nurses.

Several researchers have focused on the effects of spatial arrangements on collaborative work practices. Because spaces are not always neutral zones, they reflect the power relations of a space or provide its inhabitants with a particular view from somewhere (McMahon 1994; Tellioglu & Wagner 2001). In a typical ward, there are two types of spaces: patient spaces and staff spaces. Certain rules govern their access and use. McMahon (1994) observed that there were quite different rules that governed staff spaces in comparison to patient spaces. For example, hospital staff had the right to enter patient spaces but this arrangement was not always reciprocated for staff spaces.

The significance of liminal space in hospitals is also gradually being explored (Iedema et al. 2005). The conceptualisation of the everyday lived experiences of being in spaces on the margins such as lifts, doorways, stairwells and corridors are beginning to be taken more seriously as spaces that should not be ignored. Shortt (2015) described liminal space as a space in between the front and backstage or at the boundary of two dominant spaces. In one study about the corridor space of an outpatient clinic in a large teaching hospital, Iedema et al. (2005) argued that the space was produced and consumed as a liminal space so professions could co-exist. Similar to the argument about backstages (Lewin & Reeves 2011), the corridor is another space where the rules, regulations and professional positions become relaxed, where the known power struggles are adjourned and specialisation between professions is interrupted (Carthey 2008). Iedema et al. (2005) concluded that the corridor is where people can work together, endure contingencies, correspond and make decisions about patient care.

Numerous studies use a spatial lens as the unit of analysis to answer different questions about hospital work. Mesman (2012) used a spatial approach to explore the use of space as a barrier against the transmission of infections in a high-technology Neonatal Intensive Care Unit (NICU). Rather than using all three elements of Lefebvre's spatial triad (see Chapter 3), she used only conceived space to examine the spatial ordering and architecture of NICU space. Specific boundaries mapped sections into open and restricted spaces, clean and dirty places, areas where individuals can move freely or stay put and private and public places (p. 34). Other authors have followed suit in patient safety research by using the design and order of space to understand how clinicians achieved safe communication in intensive care (Hor, Iedema & Manias 2014). Similarly to my study, Tellioglu and Wagner (2001) used spatial arrangements to examine collaborative work practices within the radiological department. In doing this, they separated areas of the radiology department into frontstage and backstage spaces in order to render visible practices that take place in public and private spaces.

Another strand of spatial studies explores the development of professional identity in student nurses. Dalton (2005) used the notion of space to conceptualise the way that nursing students shaped their professional identity during the lived experience of clinical practice. The ward was divided into various spaces by students; that is, the public space of the nursing domain, which contains sub-spaces within it such as the treatment room or pan room. In order to cope with intimate spaces with the patient and the events that may take place in the nursing domain, nursing students retreated to hiding spaces to cope with stressful events. The most common hiding space for students was standing against a physical structure such as a wall. Transitional spaces also allowed students to stand behind something such as another nurse but still be able to observe or move back to the hiding space if necessary. This particular study used the term 'lived experience', which relates to this thesis in terms of what takes place for nurses in lived space.

Other researchers have focused on identity to investigate hospital staff. Halford and Leonard (2003) investigated the spatial constitution of nurses' workplaces and the impact on performance and identity. They explored three dimensions: access to space, bodily movement through space and the different meanings bound to such spaces from a gender perspective. Nurses were found to be confined to the wards, while doctors had the freedom to roam. Little of the ward space belonged to the nurses. However, the endless and territorial relationship that nurses had with ward spaces constructed doctors as visitors. In their own wards, nurses used their bodies to communicate that they were not subservient handmaidens to doctors. As a result, doctors were forced to go to the nurse if they needed something, rather than the other way around. Halford and Leonard (2003) concluded that nurses were actively engaged in communicating their identity, thus using familiarity and territoriality as a source of power when engaging with doctors.

Space has also been taken up in other ways by researchers to investigate nurse-patient relationships through the social construction of space and the way nurses use their bodies to convey meaning within the profession of medicine (Savage 1997), power relationships and how they shape and are shaped by spatial relationships, for example, the proximity to the patient (Malone 2003). Other studies have used space in hospital ethnographies to examine social and political perspectives embroiled in hospital work (Street & Coleman 2012; Sullivan 2012; White, Hillman & Latimer 2012).

In all of these studies, hospital spaces have been used as the unit of analysis in different ways. For example, patient space versus staff space (McMahon 1994), public and private (invisible) spaces in the radiology department (Tellioglu & Wagner 2001), front and backstage as activity either structured or unstructured (Lewin & Reeves 2011), liminal space (Iedema et al. 2005), movement and gender (Halford & Leonard 2003), nurse-patient relationships (Malone 2003; Savage 1997), accessibility

(White, Hillman & Latimer 2012), power relations and communication during ward rounds (Liu, Manias & Gerdtz 2013).

These studies have used only one specific aspect of Lefebvre's (1991) spatial triad—conceived space—with the exception of Dalton (2005), whose study focused on the lived experience of student nurses during clinical placement. I found only one study that focused on two aspects: spatial practices and conceived space. The use of spatial practices exposes what is done within space and in the process of producing space (Carp 2008; Gregory, Hopwood & Boud 2014). Using this as a lens, Liu, Manias & Gerdtz (2013) examined the spatial practices of nurses, pharmacists and doctors in order to expose power relations during communication about medications on a ward round. Findings showed that nurses and pharmacists still occupied peripheral positions on the ward round. In an attempt to work around this, practitioners opted to pursue discourse about the preparation of medications as a way to become involved in the ward round. Ward rounds offer opportunities for learning, particularly when doctors and pharmacists are discussing medications; however, the authors did not investigate this.

All of the studies here show the spatial complexity involved in hospital work. While each perspective has some bearing on this thesis, none of the studies report on learning. As previously stated, none of the studies has used space in the same way that I do, and none has developed space theoretically to connect it to learning. In this thesis, I use the unique combination of space and sociomateriality together with the recent concept of emergent learning to show how nurses learn as they carry out work in acute care.

2.5 Conclusions and Gaps in the Literature

This review has covered literature in the fields of workplace learning, nurses' learning, tools and resources that nurses use at work, the team leader, clinical handover and hospital work and space. I found that the area of nurses' learning in an acute care setting was not as extensive or

up-to-date as one might expect. In fact, many of these studies drew on theoretical approaches that were different to the one that I am using in this thesis, were not very theoretical, or where there was theory, did not benefit from what contemporary theories have to offer.

Little work has been carried out to date on how and what nurses learn in an acute care environment. While these questions have been asked before and activities were identified, no studies explored and answered these questions about learning from the perspective of uncertainty, being confronted with a knowledge challenge or getting stuck in practice. Few studies have explained what nurses learn. None of the studies has considered the vast amount of information that nurses must deal with in daily practice or how they must make meaning from this to enact patient care and, more importantly, what they learn from this.

This thesis answers these questions and builds on what is already known about nurses' learning at work. Thus far, few studies have been undertaken in the area of nurses' learning in acute care hospital work and those studies were relatively small in scale. Further, Lefebvre's (1991) spatial triad has not been used before as a conceptual lens together with sociomateriality to explore nurses' learning during work in the acute care setting. As a result, this thesis illuminates nurses' learning in new ways that have not been discussed before in the literature.

2.6 Chapter Summary

In this chapter, I sought to position this thesis within the literature. I began by situating the review under three main categories: workplace learning, nurses' learning at work and hospital work and space. I expanded these fields to include literature about tools and resources that nurses use as additional sources of practice knowledge during work. In addition, I sought out literature about the team leader, since this position played a significant role in the ward when nurses got stuck. This was followed by a review of the literature about clinical handover practices and the clinical handover sheet.

This review indicates that there had been little work carried out by researchers about how and what nurses learn at work in acute care. The themes that emerged concerning perceived gaps in the literature were primarily that there were few observational studies carried out on RNs in an acute care environment and none of these was conducted in Australia. While there were some studies that sought to determine sources of practice knowledge used, they did not consider how nurses accessed tools and resources during times of uncertainty or how nurses made sense of this information. The studies that focused on the team leader linked this role mainly to coordinating care, not pedagogy. In addition, I found scant literature about the clinical handover sheet and, again, no study sought to understand how the sheet may be linked to nurses' learning. Finally, while ideas about space are gradually being used as a lens to explore hospital work, few studies examine nurses and no studies have used this lens to explore how and what RNs learn in acute care.

In the next chapter, I explain the conceptual framework that guides my analysis in relation to the research questions.

Chapter 3: Conceptual Framework

Section 3.1 provides an overview of the chapter. Section 3.2 introduces the first element of my conceptual framework, where I explain and differentiate between workplace-learning theoretical perspectives, then justify why this study is located within postmodern theory. Section 3.3 describes Henri Lefebvre and his work on the spatial triad. I explain why I adopt space as a tool for analysis and how this is explored in this thesis. Section 3.4 introduces the final element of my conceptual framework and the reason why I looked to sociomaterial ideas to conceptualise and understand how objects could facilitate nurses' learning. I explain in more detail epistemic and boundary objects, how they have been used in other studies and in what way these ideas are developed in this thesis.

3.1 Introduction

The previous chapter reviewed the literature on workplace learning, nurses' learning at work and hospital work and space. This review showed that the ways in which nurses learn as they perform work in acute care has not received much attention. In this thesis, my focus on learning in the workplace is situated within various sites of a hospital acute care medical ward. A clinical workplace is one where the central purpose of the workplace is healthcare delivery to patients admitted to the ward by doctors, nurses and allied health personnel. If learning occurs, it is unintentional (or a secondary intention) and may not necessarily be visible. Therefore, how do we explore nurses learning as they perform everyday work? One way is to focus on locations, people and practices. To guide my analysis, in relation to my research questions, I needed to develop a framework based on the consolidation of the literature on workplace learning, space and sociomateriality. By doing this, I have provided the tools necessary to make sense of key findings and discussion in chapters 5, 6 and 7.

3.2 Conceiving Workplace Learning

In this section, I introduce the first element of my conceptual framework. My intention is to locate my research among current theoretical perspectives within the field of workplace learning. Over the past two decades, numerous theories have been developed to assist us in understanding learning at work. I begin by giving a brief historical account about the development and progression of various theories that have been the most influential for understanding workplace learning. Then, I explain how this links to my study.

According to Hager (2011a), theories about workplace learning can be classified into three main categories: psychological, sociocultural and postmodern (see Figure 3.1).
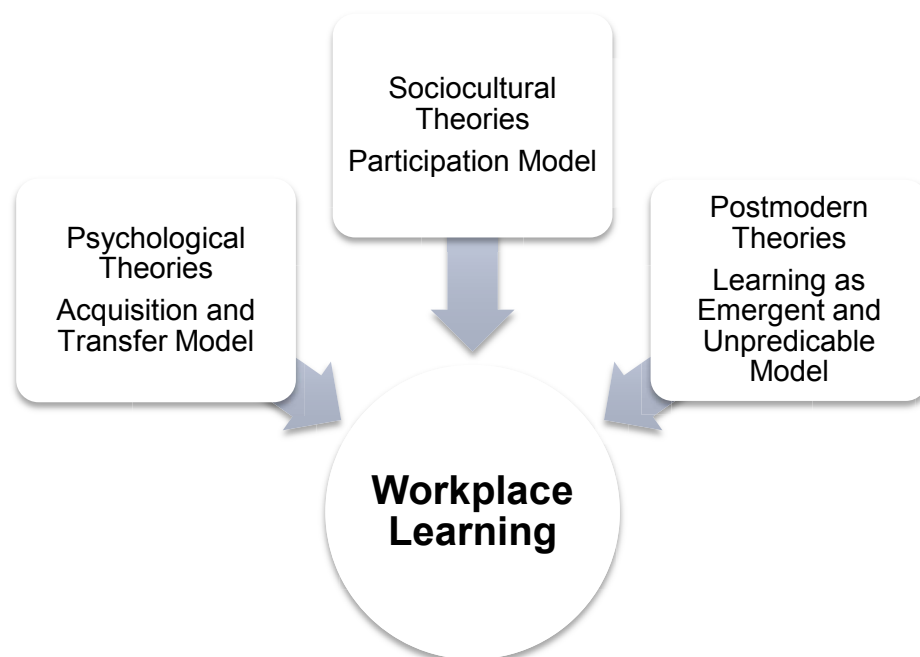
Figure 3.1: Theoretical workplace-learning perspectives

To explain and differentiate between each category of learning, Hager (2011a) described each using a specific metaphor for learning, such as acquisition and transfer, participation and emergent. In the following sections, I detail these genres, tracing the movement of each through to

the present-day space in which learning at work is considered to unfold as emergent and unpredictable.

3.2.1 Psychological theories

Interest in workplace learning began with early behaviourist theories that were mostly influenced through ideas taken from psychology. Theories concerning behaviourism see learning as a 'product or a thing' (Hager 2011a, p.10). Thus, the central concept to this set of theories is that the mind was understood as a container where knowledge transfers in and out (Hager 2011a), as required (often referred to as the acquisition and transfer model).

Predominantly, it was the vocational education sector that embraced these theories about learning. This sector based much of its training on behaviours that could be quantified and taught off-site, in the classroom. During the behaviourism period, learning was exclusively understood by means of observable behaviours. However, as thinking, knowing and understanding were not directly measurable, such activities could not be taken into account. Hager (2011a) argued that there were other problems with this theoretical perspective because work was not always predictable or codifiable.

Behaviourist theorists assumed that 'learning and working were two separate activities, which did not overlap' (Eraut 2004, p.249). However, Eraut (2000; 2004) rejected this idea, arguing that learning does not only occur in formal contexts; rather, for work practice to be efficient, competence required the need for learning to be ongoing on the job. He introduced a typology about non-formal learning at work, explaining that learning takes place via implicit, reactive or deliberative behaviours. Eraut (2004) suggested that work activities that regularly gave rise to learning were those occurring through participation in group activities, working alongside others and tackling challenging tasks. As a result of Eraut's fresh theoretical concepts, theorists began to rethink their views, giving

credence to the idea that learning at work was more complex, opportunistic and spontaneous.

The next branch of theories in this group that emerged were cognitive learning theories. These incorporated concepts about thinking, reflection and understanding that had previously been unaccounted for in the earlier learning theories. Some highly influential ideas were conceived in this period by researchers, such as single-loop and double-loop learning (Argyrus & Schon 1974, 1978) and the reflective practitioner (Schon 1983, 1987). Later, these theories became key seminal works in the field of workplace learning, and are still being employed today. However, psychology-based learning theories were frequently criticised. This is because, inherently it seemed, learning only took place as an individual skill acquisition, which arose from a change in behaviour and cognition.

Marsick and Watkins (1990; 2001) were also instrumental in theorising workplace learning when they introduced ideas concerning informal and incidental learning. They defined informal learning as 'experienced based, non-routine and tacit', emphasising the importance of contextual factors such as organisational culture in relation to learning. This particular theory highlighted experience and reflection as concepts, therefore integrating the following ideas: 'learning from experience, learning by doing, continuous learning for continuous improvement, accidental learning, self-managed learning and the learning organization' (Hager 2011a, p. 19).

In contrast, Dreyfus and Dreyfus (1986) introduced a five-stage model, which later became seven stages in the development of expertise. This model was founded on the idea that informal experiential learning becomes progressively significant over time. This perspective considered context, individual judgement and practices as central to learning.

Following this, there was a shift in the theorisation of learning at work, as learning through practice gradually became recognised as a crucial element. Nevertheless, there were considerable concerns with psychological theories because they located learning and expertise as

occurring solely inside an individual's mind or body. According to Hager (2011a), an added challenge with these ideas was that learning was understood to occur independently of both the learner and the context. This gave rise to the identification of generic skills across occupations. It seemed that once these skills were attained, such abilities were easily transferrable across a diverse network of settings and roles. This led to the prolific development of competence statements for many occupations, including nursing, which attempted to specify practices according to behaviours and attributes.

Thus far, I have outlined learning theories that were largely influenced by psychology. Mostly, these theories supported the notion that knowledge was unequivocally a 'thing' that could be acquired and transferred as needed. However, researchers raised concerns about the situated context where learning occurred, declaring that this aspect had been disregarded. This was soon to be addressed as researchers interests shifted and they enquired into how context influenced learning. In the next section, I give a brief overview of the expansion of sociocultural theories and how these ideas began to transform our understanding of learning at work through participation.

3.2.2 Sociocultural theories

This category of theories arose from ideas based in sociology and social anthropology. In contrast to earlier theoretical perspectives, this category of learning theories emphasised the social aspects of work, situating participation as central to learning. According to Hager (2011a), these theories see learning to be a participatory process rather than a product or process of acquisition. Sociocultural theories reject the idea that the individual is the unit of analysis for understanding learning. Rather, it is the context and performance that are shaped by social, cultural and other organisational influences.

Lave and Wenger (1991) were instrumental in theorising workplaces as 'communities of practice' (p.98). They introduced the concept of 'legitimate

peripheral participation' (p.29) to describe learning through participation and practice (situated learning) over time. New members of the group gradually became full members of the community of practice via participation in a network of social relations. Essentially, the novice learned how to perform in a specific social, cultural and physical environment. Previous theories conceived that learning occurred in an individual's head, but with communities of practice, we see learning as situated in the context of the current environment. In recent times, this concept has been relentlessly criticised for its reliance on participation and lack of detailed explanation about learning (Fuller & Unwin 2003; Hodkinson & Hodkinson 2004).

Cultural-historical activity theory (Engeström 2001) was another influential theory in this group regarding workplace learning. The concept reframes the workplace as an activity system, which becomes the unit of analysis. Factors such as rules, mediating artefacts and division of labour are considered to interact within the activity system. As the challenges of performing work arise, to resolve the issue, the system changes in response amid the context of the social, organisational and cultural factors. In this theory, Engeström argued that learning ensues as the system reacts to the challenges and tensions taking place. Because of its strong reliance on the transfer metaphor for learning, cultural-historical activity theory has received harsh criticism (Hager 2011a).

Fuller and Unwin (2003) build on Lave and Wenger's (1991) original conceptual framework. They identified how expansive and restrictive environments often confront new employees in the workplace. With these two approaches, key features that enable and constrain learning are related to context, culture and learning opportunities arising from participating in work practices. Hager (2011a) suggested that these ideas add another dimension to the participation metaphor.

Billett (2002) was another crucial researcher who was highly influential in theorising learning at work. He proposed various persuasive ideas about

participation because he was dissatisfied with the current participation ideology conceptualised by Lave and Wenger. Billett (2004) produced concepts, which he termed 'workplace affordances' (p.317), to explain ways in which workplaces offer opportunities to participate in work activities and provide access to guidance and how individuals elect to engage in workplace activities (Billet 2001b). Billet significantly extended the conceptualisation of initial sociocultural theories through his work on 'personal agency and relations between individual and social agency'. In this collection of theories, Billett (2001a) added a dimension that includes the learner into the social participatory process rather than seeing the individual and the social as separate entities.

Up to this point, I have focused on theories seeking to understand learning through participation. The initial emphasis for this group of theories has shifted from earlier concepts to include the environmental conditions, enriching this perspective further. Currently, researchers consider that the dynamics relating to context are multifaceted and that more is occurring in learning than just participating in activities. Several critics have argued (Contu & Willmott 2003; Fuller & Unwin 2003) that metaphors such as participation do not fully explain or acknowledge how learning ensues at work because they are too broad. Now, researchers understand learning as more comprehensive. In the next section, I discuss postmodern theories that understand learning to be an ongoing process rather than a process of participation. This final category has emerged within the last five years. The key ideas associated with this area of workplace learning propose that learning is a constant activity that is unpredictable, emergent and unstable.

3.2.3 Postmodern theories

The way researchers have approached workplace learning has changed in the last five years. According to Hager (2011a), there is a 'temporal dimension' that has been unaccounted for in previous theories. He argued that learning at work is perceived to be 'not fully decidable in advance and

is emergent in unanticipated and unpredictable ways' (p. 27). Other researchers, such as Fenwick, Edwards and Sawchuk (2011, p. vi), claimed that there has been another theoretical shift, where researchers now assume the 'social, cultural and personal to be the defining parameters for learning'. This movement has brought attention to sociomaterial practices that 'examine the whole system, appreciating that human and non-human action and knowledge as enmeshed in systemic webs' (Fenwick, Nerland & Jensen 2012, p. 6). What is helpful with this conceptual construct is that it is not only the social but also the material aspects of practice can be specifically traced. Foregrounding materiality helps to avoid putting human actors and human meaning at the centre of practice. What we see instead is that the material world is treated as continuous and embedded in the immaterial and human webs of activity (Fenwick, Nerland & Jensen 2012, p. 6). As such, sociomaterial methodologies recognise that human knowledge and learning are embedded in material action and interaction, which emerge together (Fenwick 2010).

Theories within this postmodern group include complexity theory, which conceives learning processes as occurring within a system such as a work organisation. The key idea is emergence, and understanding that in 'complex adaptive systems, phenomena, events and actors are mutually dependent, mutually constitutive and actually emerge together in dynamic structures' (Fenwick, Edwards & Sawchuk 2011, p. 7). Complexity theory sees learning as a growing capacity to act in flexible, productive and new ways, thus able to change when circumstances demand within the system (Hager 2012). Actor Network Theory (ANT) is another methodology from the same category that is used as a tool for exploring how education is assembled as a network of practices. ANT recognises that multiple worlds may overlap as part of the process. It also regards objects as part of the social network and views all human and non-human entities as effects performed in relations, enabling specificities to be described about how such collectives come together (Fenwick, Edwards & Sawchuk 2011).

Recently, sociomaterial researchers have turned their attention to theoretical constructs about space and spatiality as a tool for analysis, since this highlights the situated use of material artefacts. Here, space is not considered a static container in which practices take place. Instead, practices are being constantly produced. With spatial theories, the entire composition of a particular space is recognised as a combined social and material interaction. That is, humans enact social action through materiality, which simultaneously shapes the nature of the social activity (Dale 2005). According to Fenwick, Edwards and Sawchuk (2011, p. 129):

> spatial theories raise questions about what knowledge counts, where and how it emerges in different time-spaces, how subjectivities are negotiated through movements and locations, and how learning is enmeshed in the making of spaces.

Such conceptualisations have expanded the use of sociomateriality to consider how meanings and materialities are enacted together in everyday practice (Orlikowski 2010). These theories trace not only the social but also the material aspects of practice in order to address questions about learning. According to Fenwick, Nerland and Jensen (2012, p. 6), 'sociomaterial perspectives concentrate on the whole system, where human/non-human action and knowledge are entangled in systemic webs'. They perceive materiality to include objects such as 'tools, technologies, bodies actions, objects, texts and discourses'. Previously, theoretical perspectives relegated the material as insignificant, so materiality then became invisible or subordinate to humans in such a way that there was:

> a blindness toward the question of how educational practice was affected by materials. Sociomaterial approaches offer resources to consider both patterns as well as the unpredictability that makes educational activity possible. They promote methods by which to recognize and trace the multifarious struggles, negotiations and accommodations whose effects constitute the things in education (Sørensen 2009, p. 2).

Hence, work life is solely entangled with material practices and therefore all entities are mutually constituted (Fenwick 2010). With this perspective, we can see that postmodern theoretical conceptualisations take the whole system as the unit of analysis rather than just focusing on the individual.

While Henri Lefebvre's (1991) work was centrally concerned with developing a Marxist thesis—and his work predates that of the more recent, postmodern, approach to workplace learning—his ideas can be seen as coherently complementing the latter (Schatzki 2010). Lefebvre's emphasis on practice, materiality, bodies and emergence, as well as historicity, aligns with key features of what Reich and Hager (2014) outlined as central to the contemporary sociomaterial/practice approach.

More recently, there has been another growing body of researchers focusing on the concept of practice, questioning in what ways learning is entangled in practice. In contrast to the other perspectives, this theoretical conceptualisation uses practice as the unit of analysis. Reich and Hager (2014) proposed that there are six prominent features that are now recognised for theorising and understanding practice. The first feature, introduced by Gherardi (2012), concerns the notion of 'knowing in practice', which is based on a collective and situated process that links 'knowing, working, organising, learning and innovating' (Hager 2011a, p. 421). With this concept, Gherardi focuses on practical reasoning and organising as work practices take place.

The next feature for theorising about practice draws on the sociomaterial arrangements in which practices take place to examine learning. In general, sociomateriality is a common feature to several postmodern theories. According to Reich and Hager (2014), practice theorists perceive the next two features of practice to be both embodied and relational. That is, bodies are an essential component to understanding practice through interactions, usage and coordination and patterned arrangement (Fenwick, Edwards & Sawchuk 2011; Hager, 2014). With relational features,

practices incorporate a variety of relations between both people and materiality, which continually develop and change over time.

The final two features thought to be significant relate to:

> practices that exist and evolve in social and historical contexts suggesting that practices are shaped and governed by complex social forces' and finally that practices are emergent, forever changing and therefore not fully decidable in advance (Hager 2011a, p. 27).

Fenwick (2012, p. 72) explained emergence thus:

> In any complex system comprising of practice, the non-linear dynamics at play mean that a series of choices is available at each moment, to each and every interacting element of the system, human and non-human. Not only are choices being made by these entities in ways that are not accessible to human consciousness, but also the forces affecting these choices are often not visible, or even present, in the system at any given moment.

As I draw on sociomateriality in the study, these comments are of particular relevance because they explicitly describe the emergent nature of practices.

Since researchers began to focus on workplace learning, our understanding of how learning occurs at work has progressively changed over time. Researchers are beginning to acknowledge that learning is much more unpredictable than previously thought and, therefore, bodies and artefacts are equally important to the process. Postmodern theoretical approaches consider that whole systems and practices are essential and have now become the unit for analysis rather than just a specific dimension.

3.2.4 Where is this study located?

A considerable amount of nursing work is very complex and unpredictable, developing as patients are admitted to the acute care medical ward. While

some work can be accounted for in advance, its nature often cannot. As explained in Chapter 1, patients today present to hospital with chronic disease and multiple complex co-morbidities, with an ever-increasing patient acuity and decreasing length of stay (Duffield et al. 2015). Factors such as increasing age, rising rates of chronic disease, increases in co-morbidities and growing multi-morbidities coupled with high acuity directly affects the work undertaken by nurses (Chaboyer et al. 2008). As a result, I locate this study within the postmodern group of theories (sociomaterial, spatial and practice) because these perspectives offer a rich and insightful lens that allows one to better understand the complexity and unpredictable emerging nature that confronts nursing work in the acute care environment. These perspectives focus directly on the whole system, tracing each and every interacting element of the system, both human and non-human (such as space, bodies, relationships and objects).

In the next section, I discuss the second element of my conceptual framework, space. Once I started to analyse my data, I realised that questions of space and practices that I had observed on the ward were particularly significant. As a result, I went to the conceptual sources that I thought would help me to appropriately process what I was noticing in the data. I found Lefebvre's (1991) concepts of space most useful (I had previously been introduced to his work through an earlier paper). In the next section, I briefly explain Lefebvre's spatial triad and how I utilise his concepts in this thesis.

3.3 Theoretical Framing of Lefebvre's Spatial Triad

In this section, I now turn our attention to the second element in my conceptual framework. This construct arose from the work of the late French Marxist philosopher Henri Lefebvre and his theoretical ideas about the 'production of space' (Lefebvre 1991). A number of studies (Carp 2008; Fahy, Easterby-Smith & Lervik 2014; Watkins 2005) had used Lefebvre's spatial triad as a conceptual tool in order to understand the dual enactment of the material and the social (Dale 2005). Fundamentally,

Lefebvre's epistemological theory uses three interrelating aspects of space in order to make obvious the complexities of everyday life (Watkins 2005). This construct deems space as being constituted through human actions and social relations.

After I read these studies, I could see the rich and perceptive potential that this tool offered for analysis and its application to this study. I adopted this conceptual lens from someone who had never written about nursing or learning before, because I was convinced that there was something rich that could be garnered from using a spatial analysis on the data that I had collected.

More recently, while researchers have been taking questions of space more seriously, Lefebvre's ideas have only been briefly mentioned in a minority of workplace-learning areas. Similarly, this insightful approach has not been used to explore nurses working in acute care before, or linked to questions of nurses' learning. Therefore, in order to answer my research questions, I utilise this tool to demonstrate how and what occurred for nurses as practices emerge in relation to learning.

3.3.1 About Henri Lefebvre

Lefebvre was born in 1901 in Hagetmau, Landes, France. In 1920, Lefebvre graduated from the University of Paris (Sorbonne) with a degree in philosophy. Some of Lefebvre's early philosophical ideas developed during the early 1920s, when he became a member of a small group of left-wing students seeking philosophical revolution. This led Lefebvre to eventually join the French Communist Party, membership that led to his removal from his teaching position during the German occupation of France in 1941. Lefebvre then became involved with the French Resistance. According to Elden (2004), these experiences taught Lefebvre a great deal about political struggle and everyday life, thus contributing to his philosophical thinking, shaping his long career as a philosopher. Lefebvre also had a significant influence on sociology, geography, political science and literary criticism. During the twentieth century, Lefebvre

became one of the most prominent French Marxist intellectuals, producing highly influential texts such as *Dialectical Materialism* (1940) and the *Critique of Everyday Life* (1947), which later became profoundly influential in French theory (Elden 2004; Shields 1999). Lefebvre became Professor of Sociology at the University of Strasbourg in 1961, later moving to the University of Paris, Nanterre, in 1967.

3.3.2 Lefebvre's tripartite production of space

A more recent and significant contribution by Lefebvre (1991) was his philosophical work and understanding of the 'production of space'. As a critical geographer, Lefebvre claimed that space was primarily a social product (Taylor & Spicer 2007). In order to make transparent the complexities of everyday life, Lefebvre offered the means to understand the interplay of the social and material in an active, social production of space (Dale 2005). According to Dale (2005, p. 656), two aspects of materiality of life can be connected: the 'physicality' of materiality or its 'thingness', and the 'imaginary' aspect of materiality. The latter expresses the social, cultural and historical meaning.

Lefebvre's (1991) spatial triad revolved around three interrelated aspects of space. Carp (2008) suggested that the relations among these elements expose clues about the process by which people produce space and are influenced by space in everyday life. Thus, the application of Lefebvre's spatial triad uncovers aspects of everyday life that may be hidden or dominated by mainstream practices and perceptions.

In the following sections, I describe each element of Lefebvre's (1991) tripartite theorisation of space, then explain how they apply to my research. Lefebvre uses two names to classify each aspect of his spatial triad (Carp 2008). The first aspect of the spatial triad is spatial practices or perceived space. The second aspect is representations of space or conceived space. The third is spaces of representation or lived space.

3.3.2.1 Spatial practices/perceived space

> Embraces production and reproduction, and the particular locations and spatial sets characteristic of each social formation (Lefebvre 1991, p. 38).

According to Lefebvre (1991), spatial practices (perceived space) are associated with everyday acts connected to occupying a given space that shapes a person's everyday world (Beyes & Michels 2011). Such practices come together with the other elements to ensure levels of cohesion and competence and a specific level of performance usually required for everyday functions of society (Lefebvre 1991; Watkins 2005). Pointing to sequences, habits and patterns of movement in and through physical places, spatial practices (perceived space) draws attention to what is done both within space, and in the process of producing space (Carp 2008; Gregory, Hopwood & Boud 2014). Hence, this 'element of space is empirically observable' (Leary 2009; Lefebvre 1991, p. 413). To understand this aspect of the triad, we need to know the practicalities of the spatial circumstance, and the routines and practices that shape what is being produced. In a hospital, such spatial practices may include knowing the everyday routines and social conventions involved in acute care nursing when administering medications to patients, and knowing the routine for giving the right patient the correct medication at the precise time prescribed.

3.3.2.2 Representations of space/conceived space

> This is the dominant space in society. It is a conceptualized space created by scientists, planners, technocratic sub-dividers and social engineers constructed out of symbols, codifications and abstract representations (Lefebvre 1991, p. 38).

Representations of space (conceived space) are expressed in plans, abstract representations, codes, images and physical manifestations of their designs. This refers to the 'logic and forms of knowledge, and ideological content of codes, theories and conceptual depictions of space'

(Shields 1999, p. 163). It is the mental constructs of physical spaces that are signified here. Representations of space can be understood in the context of this study as the architectural plans that map the hospital acute care ward layout (see Figure 5.2 in section 5.2). Here we see the intended purpose of particular spaces created by the architect who designed the ward. Of particular relevance is the idea that the hospital design for the ward produces boundaries, connections and separations between ward spaces (Fahy, Easterby-Smith & Lervik 2014).

3.3.2.3 Spaces of representation/lived space

> This is the space as directly lived through its associated images and symbols, and hence, the space of inhabitants and users (Lefebvre 1991, p. 39).

This aspect implies the actual experience of living in the everyday course of life (Carp 2008). Lived space is played out in real-life situations, where the real and imagined spaces are materialized through symbols, ideologies and bodies. Lived space can be thought of as a thirdspace (Soja 1996, discussed in the following paragraph), where practices and symbolic meanings come together in lived experience of appropriated space (Gregory, Hopwood & Boud 2014). More importantly, it is the lived space that 'forms, informs and facilitates deviations, diversity and individuality' (Watkins 2005, p. 213) in everyday practice life. To illustrate this element, I use the example of the nurses' performance of everyday work on the ward, the actual encounters with artefacts (needles and syringes) and bodies (patients and professionals from other disciplines) and the social interactions—it is the nurses' lived experiences where 'everything comes together'. Each day these things and bodies will be different. It is in the lived space where nurses enact (constituted through spatial practices) the material, social and meanings associated with a given ward space.

Critical postmodern political geographer, Edward Soja (1996), expanded on Lefebvre's ideas about the 'production of space' to include the notion of

the thirdspace, where he revised the notion of spatiality to include the historical and the social. The thirdspace is concerned with the fullness of the lived experience where:

> Everything comes together…subjectivity and objectivity, the abstract and the concrete, the real and the imagined, the knowable and the unimaginable, the repetitive and the differential, structure and agency, mind and body, consciousness and the unconscious, the disciplined and the trans-disciplinary, everyday life and unending history (Soja 1996, p. 56).

According to Soja (1996, p. 72), the thirdspace cannot be 'understood in isolation' and only obtains meaning when practiced in the lived experience of appropriated space.

Other researchers have also realised the significance of Lefebvre's work on space and as a tool for analysis. Some researchers implemented these ideas to explore, for example, street artists at Edinburgh's Festival Fringe (Munro & Jordan 2013), theatre performance (Watkins 2005), materiality as organisational control (Dale 2005), hyper-organisational space in the novels of J.G. Ballard (Zhang, Spicer & Hancock 2008), liminality and transitory dwelling places at work (Shortt 2015) and town planning (Carp 2008). In this thesis, I use Lefebvre's conceptualisation of space—in particular, lived space—to reveal how nurses' practices shape and produce learning in an acute care medical ward.

While this thesis mainly utilises Lefebvre's ideas about space, I also find it useful to contrast specific spaces in the ward as backstage and frontstage (Goffman 1969). Goffman identified that people engaged in different practices depending on the public/private nature of situations in which they found themselves. In the frontstage, Goffman noticed that individuals show their public face and persona, performing at their best and/or in a particular way. In contrast, backstage performances were more informal and individuals could relax, stepping out of their frontstage character. My use of these terms of Goffman's is not a major deviation into his symbolic

interactionism, but rather a helpful contrast to my Lefebvrian analysis. In this thesis, therefore, I refer to nurses working in the frontstage as a public space and the backstage as a private space when describing the space. My intention here is to make a further distinction between the ward spaces that are highly visible to the public, and those that are not. Specifically, public spaces in the ward are acknowledged as the places where patients and visitors are present in the space. Private spaces are places that are concealed from view, and in my study considered private by the nurses. I found that nurses behaved differently in each. In backstage spaces, nurses were able to prepare for public performances, which were crucial to supporting frontstage activities. Accordingly, there were different rules of behaviour that shaped how nurses conducted themselves for both the front and backstage regions (Lewin & Reeves 2011).

From this point forward, I shall refer to Lefebvre's (1991) triad using the terms 'perceived', 'conceived' and 'lived'. In this thesis, it is lived space that is the central concern. In subsequent chapters, I use Lefebvre's three interrelating aspects of space to make transparent what may be hidden or dominated by mainstream practices and perceptions. I consider Lefebvre's spatial triad a valuable conceptual tool for examining how nurses learn in the various spaces of the ward. I have interpreted and adopted this tool to analyse the different nursing work situations in the acute care medical ward.

Up to this point, I have described the first two elements of my conceptual framework; the next section discusses the last element, sociomateriality.

3.4 Sociomateriality: Sourcing Conceptual Tools for Understanding the Role of Objects

When I was in the field collecting data about clinical handover practices, I noticed how important the clinical handover sheet was for the nurses in the ward (and for learning). The object encompassed causal properties for nurses in seeking knowledge and learning about patients. In order to

conceptualise this in some way, I explored some of the broader sociomaterial theories.

In this conceptual approach, there is an extensive range of theories that embrace sociomaterial concepts. For example, ANT is one methodology that traces the process by which elements come together, assembling networks that influence knowledge, identities, rules, behaviours, technologies, instruments and so forth (Fenwick, Edwards & Sawchuk 2011, p. 10). Complexity theory is another approach for understanding learning processes, taking the position of a systems approach. In complexity theory, the person and context are inextricably united as one. The key theme in this perspective is emergence. Actors are mutually dependent and constitutive, so change occurs from emerging systems effected by deliberate tampering of one element with another (Fenwick, Edwards & Sawchuk 2011, p. 7). However, neither of these theories identify or explore the type of role that a specific object plays in practice and its relationship to learning.

The concepts most useful to my research questions on how the clinical handover sheet functions were epistemic and boundary objects. In the next section, I define and explain in more detail epistemic and boundary objects, how they have been used in other studies and how I am using these ideas in this thesis.

3.4.1 Conceptualising epistemic and boundary objects

To guide my conceptual analysis with particular objects used in practice, I turn to the literature concerning epistemic and boundary objects. I draw on these ideas as a conceptual tool to enable a robust analysis of the work that this particular object (the clinical handover sheet) accomplishes in practice and the outcomes for nurses' learning. The type of work objects perform stems not only from their specific character but also from the unfolding activity itself (Nicolini, Mengis & Swan 2012). An important feature of epistemic and boundary objects is the emergent nature of such objects when in use (Swan et al. 2007).

The concept of epistemic objects was initially described by Rheinberger (1997) and Knorr-Cetina (1997; 2001), who summoned attention to objects' changing, unfolding characters, which are always in the process of being materially defined, frequently acquiring new properties and changing properties they have already. According to Jarzabkowski, Spee and Smets (2013), epistemic objects gain situated meaning within the process of being used. Because epistemic objects possess features that involve the inquiry and pursuit of information and exhibit a character that is 'question generating' (What do we know? What don't we know?) such objects become a driving force for the development of knowledge (Ewenstein & Whyte 2009; Nerland & Jensen 2012, p. 104). Examples of epistemic objects include visual representations (Ewenstein & Whyte 2007), strategy work using maps and spread sheets (Jarzabkowski, Spee & Smets 2013) and practices in professional work (Nerland & Jensen 2012).

Ewenstein and Whyte (2009; 2007; Whyte et al. 2007) have undertaken numerous studies on the role of visual representations as an epistemic object. My reason for focusing on these particular studies is due to the similarity between characteristics embodied by visual representations and the clinical handover sheet, which I argue could also be labelled an 'artefact of knowing' for nurses. Ewenstein and Whyte (2007) proposed that there are two dimensions assisting knowledge work in design representations. Meaning is communicated symbolically (articulating knowledge exchange and the understanding of information). As material entities in practice, practitioners are able to interact and generate knowledge with physical objects either independently or together. Examples of visual representations are photos, drawings, sketches and computer printouts. Modes of expression can range from 'highly detailed and concrete to ambiguous and deliberately vague' (Ewenstein & Whyte 2007, p. 82). In Ewenstein and Whyte's study, visual representations are understood as 'artefacts of knowing' because of their ability to communicate symbols and convey meanings allowing practitioners to

learn more about the design issues with architectural drawings. Because visual representations can be directly interacted with and materially manipulated as part of the hands-on inquiry into the design, they promote a joint process with problem solving (2007, p. 87). Hence, knowledge is formed through practitioner dialogue and negotiation about uncertainties. Likewise, the clinical handover sheet embodies these constituents. The clinical handover sheet can also be multidimensional (Ewenstein & Whyte 2009), meaning that it can possess the properties of both a boundary object and an epistemic object at the same time, depending upon the situated use of the object shaping the activity.

The concept of boundary objects was first introduced by Star and Griesemer (1989) to explain how museum workers managed diversity and co-operation. The term refers to objects that are 'both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites' (Star & Griesemer 1989, p. 393). Therefore, they allow different groups to work together without consensus in a shared space, constructing knowledge through dialogue and negotiation (Ewenstein & Whyte 2007, p. 82). Essentially, collaboration is supported across a diverse group of professionals via the specific capability of the boundary object.

According to Nicolini, Mengis and Swan (2012, p. 614), boundary objects act as 'bridges between intersecting social and cultural worlds thus creating the conditions for collaboration'. With ongoing use in a specific setting, the object acquires particular social characteristics, which gives it more meaning. Boundary objects can also function as a coordinator of perspectives by supporting social collaboration, producing a collective understanding between different stakeholders and contextualising knowledge about the task taking place (Levina & Vaast 2005; Orlikowski 2000). Examples of boundary objects include accounting ledgers (Koskinen 2005, p. 327), visual architectural designs (Briers & Chua 2001), metaphors (Ewenstein & Whyte 2009), processes or methods

(Koskinen 2005), timelines (Swan et al. 2007) and bioreactors (Yakura 2002), which can be in the form of documents.

Many authors have recognised the importance of epistemic and boundary objects in knowledge work. As a consequence, there has been a growing number of researchers using epistemic and boundary objects to answer and explain other interesting questions and challenges. For example, these concepts have been used to explore cross-disciplinary work through objects (Nicolini, Mengis & Swan 2012), visual practices and the use of objects in design (Whyte et al. 2007), visual representations in knowledge work (Whyte et al. 2007), engagement of material artefacts in strategising activities (Jarzabkowski, Spee & Smets 2013), the role of visual representations as epistemic objects (Ewenstein & Whyte 2009), the use of boundary objects in cross-cultural software development (Barrett & Oborn 2010), epistemic practices in professional work (Nerland & Jensen 2012) and the role of objects in biomedical innovation (Swan et al. 2007). Engeström, Engeström & Kärkkäinen (1995) have also used boundary objects to explain boundary crossing in systems from activity theory.

In this thesis, I use these concepts to draw attention to the work that the clinical handover sheet does and how such work enables meaning-making of a vast amount of information while at the same time facilitating learning for nurses. I use the concept of a boundary object to shed light on how, through an object such as the clinical handover sheet, practitioners from different social worlds cooperate, interacting 'back and forth' between the object to communicate information in order to learn about patient care (Star 2010, p. 605). With epistemic objects, I argue that the clinical handover sheet is a visual representation of knowledge. It contains knowledge about the patients admitted to the ward. To explain how an object such as the clinical handover sheet can produce learning, I use the properties pertaining to epistemic objects to expose how learning takes place as nurses do work.

3.4.2 How do we know that learning is taking place?

According to Boud and Hager (2012), learning is assumed to be a normal part of working life and other social activities. Learning takes place via:

> practice in work settings from addressing the challenges and problems that arise. Most learning takes place not through formalized activities but through the exigencies of practice with peers and others, drawing on expertise that is accessed in response to the need. Problem solving in which participants tackle challenges progressively extend their existing capabilities and learn with and from each other (Boud & Hager 2012, p. 22).

For the purposes of this thesis, I show learning by determining how nurses responded to challenges as they arose in work. More specifically, I explored how problems were overcome and/or the changes in the nurses' courses of action. Also, in a postmodern conceptual approach, learning does not require a teacher. I also do not consider that by participating in work that nurses are learning. Learning is not the exchange of knowledge, but rather seeing new ways of knowing emerge in the course of work. I am also not excluding a more recent methodology taken up by the nursing profession known as practice development as a form of learning. However, this perspective was not a focus for my study. Therefore, in my research, if nurses responded to knowledge challenges, I assumed that learning was taking place. In addition, if new knowledge was arising in the course of practice, I assumed that learning had taken place. As I explained in chapter 1, new knowledge is therefore understood as knowing that is subsumed in the doing of practice.

3.5 Chapter Summary

In this chapter, I described and explained the conceptual tools that will guide my analysis in chapters 6 and 7. These concepts inform my sub-questions about how RNs overcome knowledge challenges that arise in everyday work and how RNs make practical meaning from patient information. I then provided a brief overview of workplace-learning theories

in order to position this study among postmodern theoretical perspectives. I explained and justified the reasons why I chose to use Lefebvre's (1991) spatial triad as my second conceptual tool and in what ways the conceptual triad would be applied in Chapter 6. Finally, I defined and justified how I would use concepts from sociomateriality to shed light on the way objects support learning and collaboration between practitioners.

In the next chapter, I explain the methodological approach and research strategies that I used to investigate nurses at work in an acute care setting.

Chapter 4: Methodology

Section 4.1 provides an overview of Chapter 4. Section 4.2 describes the research aim, questions and the clinical and methodological issues considered during the developmental phase of the study design. I justify the methodological approach selected. In section 4.3, I describe my research plan, which includes identifying the researcher position and experience, providing a definition of learning for methodological purposes in relation to this study and describing the research site and access. Then, I explain and justify the research methods used and the recruitment of study participants (section 4.4). Section 4.5 discusses the way data were collected, and I provide a detailed discussion about the ethical considerations and my accountability in the field in section 4.6. Section 4.7 explains the process for analysis.

4.1 Introduction

In the previous chapter, I developed my conceptual framework in order to guide my analysis of the research questions. My framework encompasses three segments that I use to examine how nurses learn as they go about their everyday work in an acute care medical ward. The first segment locates this study theoretically within workplace-learning research by drawing on key elements from the postmodern group of learning theories. Next, I used Lefebvre's (1991) spatial triad as a conceptual tool to explore and understand the dual enactment of the material and the social (Dale 2005) as nurses are working. With the final segment, I draw on ideas from sociomateriality to shed light on how the use of objects can facilitate nurses' learning.

The purpose of this chapter is to describe, explain and justify the methodological approach and research strategies used to explore how nurses learn at work. A focused ethnographic approach (de Laine 1997;

Pole & Morrison 2003) was used to collect data on one single study site: an acute care medical ward in its natural setting. The study sample consisted of nine RNs who possessed sufficient postgraduate clinical experience to participate in the study. Over 135 hours were spent observing participants as they provided clinical care to their assigned patients on the acute care ward. Throughout the observations, I took advantage of opportunities for informal discussion to enrich my understanding of what was observed. Resulting descriptive data from observations were used as the basis for one-to-one, semi-structured interviews (27 interviews consisting of one hour each). These were conducted immediately after each observation period, digitally recorded and transcribed verbatim (27 interview hours). In addition, MAXQDA software was used as the data management tool.

The focus for the study was to examine how RNs learn with and from others as they carry out everyday work. The research was carried out in the natural surroundings of an acute care medical ward, amid acutely ill patients in a large teaching hospital in Sydney. The study draws mainly on concepts from Lefebvre's (1991) spatial triad. However, as mentioned in Chapter 3, I also found it useful to contrast front and backstage (Goffman 1969) characteristics of the ward (see Chapter 5), in order to comprehend the purpose, the practicalities and the utilisation of key spaces. This exposed how the routine of nursing work takes place in an acute care setting. In my research, I preferred to use the terms 'public' and 'private' to distinguish these regions. This is because I wanted to illuminate particular hospital ward spaces that were visible to the public and those that were not; these terms were more descriptive and better suited for this purpose. Therefore, I am using the terms 'private' and 'public' to describe the space.

However, on occasion in Chapter 5, I use the term 'backstage' (Goffman 1969) instead of 'private', because this word describes the space more succinctly. Although the terms frontstage and backstage implies something about a space, I am using these terms in the same way that

Goffman (1969) proposed. That is, these terms are referring to the person and their actions. Goffman identified that people engaged in different practices in these two regions. That is, in frontstage regions, workers show their public face and persona thus by displaying their public face they are performing at their best for people (Halford 2008). However, backstage performances were found to be more informal where workers could relax, stepping out of their frontstage character.

Sociomateriality is also used as a conceptual tool to examine more closely the way artefacts, people and their relations are assembled and the role this plays in how and what nurses learn. To capture the most suitable data to investigate my research questions, I used a qualitative approach that comprised participant observation and semi-structured interviews.

4.2 Aim of the Study

The aim of this study was to examine nurses as they were working in acute care in order to:

- identify practices that produced learning
- reveal what nurses learned
- show and describe the factors that influenced how nurses learned as they carried out everyday work in acute care.

4.2.1 Statement of the research questions

To achieve the research aim, the overarching question for the study is:

1. How and what do RNs learn as they carry out everyday work in acute care?

To explore this in more detail, two secondary questions are asked:

a) How do RNs overcome knowledge challenges that arise in everyday work?

b) How do RNs make practical meaning of patient information?

4.2.2 Developmental phase of the study design

In the next part of this chapter, I describe both the clinical and methodological issues that I considered during the developmental phase of the study design, followed by a justification for the approach that I have used. My intention was to carry out a study which involved observing nurses in the workplace. While I was purposefully looking for nurses who held between 2 to 5 years post registration clinical experience, it was more convenient to invite participants to attend the information sessions from those nurses who were working on the days when the in-service meetings were held. These participants were selected because I wanted to focus on practitioners who had completed the undergraduate program of study in the workplace. Only those nurses in attendance who met the specific criteria had the opportunity to participate.

Because the research site is an acute care hospital ward, where life-and-death situations can occur at any time, a number of concerns were raised during the study design phase prior to going into the field to obtain the respective data. In the following, I discuss deteriorating patients, complexity of the research site and observational sites.

4.2.2.1 Issue 1: The possibility of deteriorating patients

To explore how nurses learn when delivering clinical care to patients in an acute care ward, one of my central concerns prior to collecting data were the potential for a patient's healthcare status to deteriorate during the observational period. Often patients that are admitted to the acute care ward are quite sick. Deteriorating events are frequent and can happen very quickly, triggering a need for the participant (RN) to work swiftly without being hindered or affected by the researcher being close by. Not wanting to put patients at risk by my presence in the ward, I needed to use a research approach that was effective yet safe. I needed to have a strategy where I was able to capture as many situations as possible without being intrusive, so I could reveal the conditions that would make learning possible. Given this primary concern, I acted in an observer-as-

participant role, which was non-invasive and where I, as the researcher, was not in the way of the patients being cared for by the participants (RNs) recruited to the study. This role allowed me to be in the primary role as an observer and still have some interaction with participants (Hays & Singh 2012). In the event of a deteriorating patient, my role as the researcher would cease and reconvene at an appropriate time later, once the episode was over.

4.2.2.2 Issue 2: Complexity and vast size of the research site

Because of the physical nature and complexity of clinical nursing work, combined with the sheer size of a ward that housed 34 inpatients in an acute environment, the problem remained of determining the most suitable way to capture the data. This vast area of the ward mixed with the complexity of patient care presented an undertaking that was not as straightforward as it would appear. Therefore, I believed that observer-as-participant observations would produce the necessary qualitative descriptive data to reveal what happens as nurses carried out work in an acute care ward. The decision to use a focused ethnographic method (de Laine 1997; Pole & Morrison 2003) was based upon primarily the need to select research tools that closely aligned with the conditions described.

4.2.2.3 Issue 3: Observational sites

The discrete location of the study was situated in a busy hospital acute care ward, wherein there are many sites for practice that nurses carry out work. The locations for observations were vast, with multiple workers using the same space at any one time. This raised questions: How then do I record and organise the data in my field notes, and later, during reflection, how do I make sense of all my field notes concerning what I had observed that day? I decided to select for exploration several potential key sites in the acute care ward, such as patient bedrooms, corridors, the medical workroom, write-up bays, the clinical handover room and the medication room. However, it is important to note for non-clinical readers that nursing work is not exclusively located at the bedside with patients. In

an endeavour to resolve the issue about recording observations at multiple sites and for the practicality of the collection of data, I opted to divide the data collection entries into categories when recording my field notes (see Appendix F). I commenced with the participant, then place, then wrote about the event that proceeded, including citing others that became involved in the event (Zaman 2008).

4.2.3 Methodology

Methodology is concerned with the broad theoretical and philosophical framework in which the procedural rules of the type of instruments used corresponds (Brewer 2000, p. 2). The specific framework utilised within the methodology signposts the elements of the epistemology and type of knowledge that each approach produces (Pole & Morrison 2003). The methodology of ethnography was selected because it incorporated a range of qualitative interpretive instruments that would be able to illuminate the way nurses learn during practice. This approach embodies a 'theoretical tradition that places a priority on the importance of situated meaning and contextualized experience as a basis for explaining and understanding social behaviour' (Pole & Morrison 2003, p. 5).

4.2.3.1 Naturalistic inquiry

The study was designed using a qualitative and naturalistic framework to obtain the most suitable type of data to answer the research questions. As explained by Hays and Singh (2012, p. 6), qualitative inquiry in a naturalistic setting highlights the significance of the role that context plays, which allows the researcher opportunities to study how individuals interact with their environment through artefacts, shared encounters, specific positions of the practitioners or disciplines and social structures associated within and between disciplines precisely aligning with this study. From this perspective, the world and reality are seen as human constructs that cannot be studied and understood in isolation from their surroundings (Patton 2002). Therefore, the researcher must get close to the people being studied so as to be better equipped to understand the actions and

activities in the natural everyday environment where the individual lives and works (Athens 2010).

For this reason, a focused ethnographic approach was judged to be the best method for the study, given that the key premise within this phenomenon is that it seeks to construct an understanding of human experience as it is lived, shaped and created (Polit & Beck 2006). Qualitative research strives to give privilege to the perspectives of study participants by illuminating subjective meaning, actions and the context of those being studied (Fossey et al. 2002, p. 723). Using the natural setting of a hospital acute care ward for the study provided the opportunity to observe nurses in their natural working environment as they carried out clinical work. By using an acute care ward as a representative site for practice by hospital-based nurses, I anticipated that circumstances where learning was possible would be exposed as the practitioners carried out their work.

4.2.3.2 Interpretive approach

With naturalistic inquiry, the methodology assumes that there are multiple realities in the natural setting with differences among them that cannot be resolved through rational processes or increased data collection (Erlandson et al. 1993). Interpretive approaches focus predominantly on understanding and explaining the meaning (as reflected in my research questions) of human experiences and actions (Fossey et al. 2002). Data are reviewed and coded to develop broad patterns, categories and themes, in order to add significance and make sense of findings, so the researcher can offer explanations and draw conclusions from the data (Patton 2002). According to Schneider et al. (2003), interpretation involves refining the data, bringing together the researcher's perspective and that of participants. This refining evolves from simple coding into an interpretive inductive analytic process, where the researcher interprets the data in light of their understanding and those provided from other sources,

thus identifying implications and a new understanding of the findings (Plano Clark et al. 2013).

According to Brewer (2000), ethnography is not one particular method of data collection but a style of research that is distinguished by its objectives and approach. Traditionally, ethnography is founded on the notion that the researcher must enter the field and immerse themselves within the research site. They do this for the purpose of gaining first-hand knowledge of people in naturally occurring settings by using methods that capture a certain aspect of the culture and activities (Merriam & Simpson 1995). However, in my study, ethnography was not defined by a continuous extended duration in the field; instead, I deployed targeted approaches appropriate to the phenomenon under investigation and the research questions (Marcus 2007).

Therefore, a more focused ethnographic approach was adopted in order to target recruited participants who normally worked a seven-day rotating schedule. The predominant characteristics of focused ethnography are that it incorporates episodic participation with observations, focusing on a discrete community, organisation or social phenomena, is problem-centred and context-specific, involves a limited number of participants and has the conceptual orientation of a single researcher (Venzon Cruz & Higginbottom 2013). Given the practicality of this approach, I was mindful of participants' accessibility and availability for the study. Therefore, I carried out the observations when nurses were rostered onto the eight-hour morning shift commencing at 7 am. Additionally, I did not strictly adhere to the conventional principles that are associated with traditional ethnography, as I wanted to be able to ask about what participants were doing and why when carrying out work. Mostly, I asked questions directly to the participants during observations to gather more detailed and rich data about the collaborative, interactive and contextual aspects of clinical practice, to reveal learning during work.

A focused ethnographic approach as an interpretive methodology was well suited as a method for my research. The composition of focused ethnography allows the researcher to develop an enriched understanding of the complexities surrounding the issues from the participant's point of view, while at the same time bringing the investigators framework to the study (Venzon Cruz & Higginbottom 2013, p. 38). Thus, by utilising the tools of participant observation and semi-structured interviews, I was able to observe and make transparent the circumstances that made it possible for learning to occur within the clinical context. I observed practitioners directly as they cared for their patients and determined what conditions produced learning (that is, how and why learning events arose). Similarly, every occasion for informal discussion was used to supplement my understanding of what I had observed.

Further, using these tools (observation and interview) enabled me not only to look at sense-making from the participant's point of view, but also to notice things that the participants may not have been aware of or saw as significant. Additionally, the observation-interview approach allowed me to respond directly to the participants about knowledge challenges and meaning-making that arose in practice.

4.3 Research Plan

One single site was selected for my study at a metropolitan teaching hospital in Sydney, NSW: the research was undertaken in one acute care hospital on a medical ward. As I had no intention of comparing wards, only one ward was selected as the study site. Because the selected ward offered a variety of clinical specialties and a complexity that was similar to most other acute wards in the hospital complex, I considered that comparison to another acute care medical ward would not enrich or change my data. I primarily wanted to provide a detailed, context-sensitive account of how nurses learn in practice. The selection of an acute care medical ward as the study site afforded a fruitful context with a diversity of staff, coupled with varying presentations of patients that were

representative of other medical wards. I was cognisant that the ward was exceedingly busy, with a diverse number of activities taking place at any one time. This incessant activity was associated with the medical complexity of acute clinical practice that ultimately provided a rich source of data.

An issue that influenced the selection of the research site was the availability of RNs who met the study criteria to take part in the investigation. Given the size and distinctiveness of the ward that employed a range of experienced nurses (see Table 4.2) to cover the work roster (ranging from newly graduated to eighth-year, thereafter including a number of clinical nurse specialists), this acute care ward proved to be suitable as the study site. My decision to carry out my research at this site was also influenced by the ward being located at the hospital where I was employed, thus making it easier for me to access the research site and recruit participants to the study. Further, this ward was comparable to acute care medical wards in size and complexity found at other metropolitan teaching hospitals in Sydney.

Because I had just commenced work at this hospital, I had no previous working history with potential participants or existing knowledge about the study site. I would be observing with a fresh lens and, therefore, the potential to overlook possible data and events would be minimised. From this design perspective, although my position would be that of an 'insider', it was conceivable that I would be able to immerse myself in the field and observe participants unimpeded by any preconceptions (Bonner & Tolhurst 2002; Brannick & Coghlan 2007). Issues of my position and role are discussed further in the next section.

4.3.1 Researcher position

Hays and Singh (2012) explained that being an insider when carrying out research relates to the investigator possessing knowledge of the organisation and phenomenon of inquiry or the investigator being a person who is already a member of the organisation. This description resembled

my position, where I was an employee with experience of being a RN for 25 years at the time that data were being collected. Brannick and Coghlan (2007, p.68) referred to this specific insider position as having a 'pre-understanding', where the researcher already has knowledge, insight and experience about the organisation before beginning the investigation. However, they asserted that there are some advantages and disadvantages from the researcher position of being an insider. Having knowledge of everyday life, knowing what is legitimate and the type of phenomena that is prohibited, being able to participate freely without drawing distrust and being able to observe what occurs without others being conscious of the researcher's presence, having knowledge of everyday jargon and the ability to draw on one's own experience is advantageous to obtain richer data (Brannick & Coghlan 2007, p.69). Holding the position of an insider by being an employee (although the length of employment was very minimal at the time of the data collection), combined with my previous clinical experience as a nurse, provided some clear benefits. That is, I understood the terrain and intricacies of the nursing profession, clinical nursing work and the context of the acute care ward.

Brannick and Coghlan (2007) argued that being an insider may pose some challenges, particularly with role duality and role conflict. They suggested that to overcome adversities, the use of researcher reflexivity is essential. To counteract the impact of being an insider, by way of being a member of the organisation, the researcher can put processes in place to ensure consciousness of the investigator's impact on both the study site and participants as a result of carrying out the research. When I began my fieldwork, I had just started in my new position as a Nurse Manager at the hospital. Although I was in the role of the researcher, I was also a new employee to the healthcare organisation and had no previous working history, professional relationships or meetings with any of the potential participants. Because I held a management position, I was mindful that care was taken to reduce the view that could have been held by

participants of being seen in a position of authority. My substantive position was in the Nurse Education Department that was located at the other side of the hospital, and so I did not have any direct reports who were employed at the designated study site. To overcome this concern, participants were advised at the outset and were aware that I had experience as a nurse but I had no professional relationship to them other than as researcher at the time. Further, participants were informed that their nursing practice would not be judged or assessed and any data collected were according to the research proposal. Every effort was made to foster a rapport that was formed during the observations with the study participants.

4.3.2 Personal intuitive experience

The hospital where I carried out my research was officially recognised as an acute care principle referral teaching hospital. After 25 years working as a nurse in similar acute care hospitals, I had built up a comprehensive knowledge of the nursing profession and the selected study site setting. My personal knowledge about the context of the study gave me a greater understanding of the subjects, culture, social and practical dimensions of the environment. Having insider knowledge about the nursing profession was valuable, yet equally it could have proved to be a drawback because this knowledge may have hindered my ability as the researcher to comprehend what was being noticed. Brannick and Coghlan (2007, p. 69) pointed out that insider researchers are at risk of assuming too much and consequently 'don't probe enough or may think that they already know the answer and so do not render their current thinking to another framing'. In order to avoid this issue obstructing what I was observing and questioning, I continually reminded myself that even though I was familiar with the context of nursing work, I was not familiar with this specific hospital ward, patient complexity, the way nursing work transpired within the context of this ward or the specific nurses participating in the study. Throughout, I aimed to keep an open mind about the events taking place, asking as many questions as necessary to understand what was going on. In

addition, I used the data from my observations as the basis for the interviews held directly after what was noticed to overcome this alleged disadvantage.

4.3.3 Clarifying learning for the purpose of this study

As explained in Chapter 3, learning does not require a teacher and is not about the exchange of knowledge. If new ways of knowing emerged for the participant during the course of work, then I considered learning was happening. This could be through the following ways:

- if nurses responded to knowledge challenges
- if new knowledge was arising in the course of practice for nurses.

My research plan incorporated a qualitative approach using purposive convenience-sampling techniques. In addition, I took the role of observer-as-participant (Hays & Singh 2012), in order to shadow nurses as they performed routine nursing work. This was followed by in-depth, semi-structured interviews (Kvale 1996). My research strategy as the 'insider' facilitated the collection of data relevant to the study context and therefore was suitable to capture data that linked to my research questions about how nurses learn in practice. No adverse problems arose from my position as an insider-researcher because I had implemented the aforementioned strategies to overcome any potential difficulties.

4.3.4 Study site

The hospital site where I carried out my research provided a range of services in acute and sub-acute healthcare that extended from primary prevention to tertiary-level care across inpatient, outpatient and community settings. The hospital building where the study site was located was fairly new, having only been built within the last eight years, and operated state-of-the-art technology to deliver a high standard of clinical care.

The facility itself was a principle referral public hospital within a Specialty Health Network that delivered acute medical, surgical and diagnostic

services in a variety of specialties: sub-acute services include rehabilitation and palliative care, mental health, drug and alcohol, community and homeless health services; and aged care and community health programs. The healthcare service also specialised in heart/lung transplantation, bone marrow transplantation, cardiovascular services, cancer, neurosciences and infectious diseases. The hospital operated an emergency department (ED) that provided trauma services to the central business district and surrounding suburbs. In total, the hospital fluctuated between 270 to 332 beds depending on ward closures and budgetary restraints at the time (New South Wales Health Service 2011 / 2010). The facility provided healthcare services to adult patients; however, paediatric or maternity patients could be looked after during the initial period only via the ED, before being transferred to another appropriately equipped healthcare facility.

Having decided to conduct the research at the hospital where I worked, there remained the question of which ward to focus on for my study. At the hospital, there was a mix of acute medical/cancer care, surgical, aged care, intensive care, emergency, mental health and day surgery wards that were suitable for the study. An acute medical ward was my desired study site, as I had earlier exposure in relation to the context and complexity of medical patients, in my previous position as a nurse educator. Nevertheless, I was still unfamiliar with the proposed ward as a study site and participants at this particular hospital. Ultimately, the more pragmatic reason for selecting a medical ward over and above a surgical ward was because it enabled me to carry out what was needed for the study. I also acknowledged that the increased movement of patients transferring to other areas of the hospital was more significantly typical in a surgical ward, and the frequency of this may have hindered data collection if the RN was off the ward for prolonged periods of time.

4.3.5 Gaining access to the natural setting

To conduct my investigation, I required access to one of the acute medical wards. Initially, I made an appointment to meet with the NUM to request permission to conduct the study on the ward. At the meeting, I discussed the aims of my study, my role as the researcher, the methods that I would be using to collect data and, by doing this research, what I was trying to determine with reference to questions of learning. At the end of the discussion, I explained the impact, if any, that this study may have on the ward routines and patient care.

I gave the NUM a copy of the participant information sheet (see Appendix A) and outlined what was required of RNs who agreed to participate on the study. I informed the NUM about the interviews post-observations, explaining that each participant would be required to be away from duties on the ward for the one-hour interview on each day of the observations. I also asked permission to use the quiet interview room at the south-end of the ward for the participant interviews, which was granted. At the meeting, I confirmed with the NUM two dates for introductory meetings to be held with the nurses, so the recruitment phase could commence.

The NUM expressed an interest in learning and about my study. He did not seem too perturbed regarding my requests and did not foresee any problems with the participants (the RNs) being off the ward and unable to care for their patients for an hour while they were attending the interview. However, the NUM requested that the RNs must, on each observation day, handover the care of their patients to another RN during their absence from the ward while they were being interviewed. I agreed that I would ensure that the participants were aware of this on the day and so the NUM was keen to support the research, agreeing for me to undertake the data collection on the acute care medical ward.

4.3.6 Acute care medical ward

The acute care medical ward comprised a maximum of 34 inpatient beds, although this number varied at times because it was dependent on the total nursing staff available to care for patients. The patient acuity mix encompassed 11 different medical specialties, such as haematology, blood stem cell transplantation, medical oncology, radiation oncology, nephrology, kidney transplantation, immunology, clinical pharmacology, dermatology, endocrine and drug and alcohol. The number and designation of the nurses working on the acute care medical ward are listed below in Table 4.1. Aside from nurses, doctors and allied health staff (dieticians, physiotherapists, social workers and pharmacists) also came to see their patients for the various teams they were assigned to work with, for example, the drug and alcohol team or the medical oncology team.

Table 4.1 Nurses who work on the ward by designation

Nurse Numbers	Designation
1	Nurse Unit Manager (NUM)
1	Clinical Nurse Educator (CNE)
1	Clinical Coordinator/Team Leader (CC/TL)
1	Clinical Nurse Specialist (CNS)
24	Registered Nurse (RN, study cohort participants Years 2–5)
6	Registered Nurse (RN, Year 1)
6	Endorsed Enrolled Nurse (EEN)
2	Trainee Enrolled Nurse (TEN)

The study site included all areas within the acute medical ward. Observations were conducted throughout the ward in patient bedrooms, ward corridors, the write-up bays, the medical workroom, the medication room, the treatment room, the registrars' office, patient bathrooms, the handover room, the tearoom and wherever else activity for the RN occurred.

4.4 Research Methods

This section explains the research techniques that I used to recruit the study participants, followed by an explanation and justification of the collection of data.

4.4.1 Purposeful selection of participants

Purposeful selection of participants is a sampling strategy in which the researcher's knowledge of the population is used to preselect the subjects to be included in the study cohort on the basis that placing criteria on the selection may typically enrich the data produced (Schneider et al. 2003). The function of purposive sampling is to identify information-rich samples for in-depth examination (Appleton & King 1997). To be recruited to this study, purposeful selection centred on criteria and convenience-sampling techniques used to enlist participants. RNs were required to hold between two-to-five years post-registration clinical experience in an acute care setting. The justification for this prerequisite was to focus on practitioners who had completed the transition from the undergraduate program of study to the workplace. Participants who were working on any of the two days that I held information sessions on the ward and met the study criteria were eligible to be recruited.

4.4.2 Recruitment of participants

As I had already obtained permission from the NUM to conduct the study on the acute care medical ward, two recruitment introductory meetings were held during the ward in-service time period where initial contact was made with potential participants for the study. This convenience sample consisted of the RNs who were working on the ward on the dates that I had prearranged with the NUM. All nurses working on the two days that the information sessions were held were invited to attend the presentation.

At the meeting, I introduced myself and explained the aims of my study and what would be involved for participants. I informed potential

participants about the predetermined criteria (Hays & Singh 2012). I had prepared a formal participant information sheet (see Appendix A) outlining my study, which I handed out to provide potential participants with more clarity about their involvement in the study. At both meetings, I invited all of the nurses in attendance to participate, offering each nurse a consent form (see Appendix B) to sign and return to me. At the same time, I advised that participation was strictly voluntary and that there was no obligation on their part.

Most of the nurses attending the introductory meetings returned a signed consent form to me. Two of the nurses who were present at the meetings declined at the time, or took the consent forms but did not return them. I did not follow-up with these nurses as I assumed that they had a change of mind after considering what their possible involvement and time would entail. Confidentiality and anonymity was guaranteed at the initial meetings. Overall, informed consent was obtained from the 10 RNs who agreed to participate. One nurse withdrew the morning prior to commencement of observations for personal reasons. This reduced the final study sample size to nine participants. Pseudonyms were used to ensure the confidentiality of all participants.

4.4.3 Registered nurses as participants

Of the nine nurses recruited, two were male and seven were female. This reflects the prevalence of female versus male RNs within a wider nursing population.

Table 4.2: Years of experience—post-transition year from an undergraduate program of study to the workplace

Participants (Pseudonyms)	Years of Experience (Post-transition Year)
Steve	4 years
Julie	2 years
Theresa	2 years
Daniel	2 years
Georgia	4 years
Josephine	3 years
Sally	2 years
Jill	2 years
Hannah	2 years
Amy	3 years

In the following section, I explain how nursing work is organised as part of the everyday morning shift routine for the RN. This provides a sense of how nurses operate in the context of ward work.

4.4.4 Organisation of nursing work on a morning shift

The morning shift commences at 07.00 hours in the clinical handover room. The night shift hands over verbally to the day shift, detailing the patients that they had provided nursing care to during the night. The handover includes a retelling of the patient history and reason for admission, what happened overnight, any changes to the patient's condition and any tests or procedures that may be scheduled for that day or later during the week. Nurses receiving the handover have some of this information printed on a sheet of paper (the clinical handover sheet) that may have been updated overnight and printed in preparation for the handover. Nurses write any additional information that is included on the verbal handover on the sheet that they are looking at in front of them.

Once the handover finishes, the senior nurse (the team leader) allocates patients to nurses according to experience and skills.

After the handover finishes, most of the nurses go to the various write-up bays located around the ward to find each patient's notes. Each nurse flicks through the notes to review any additional information that may not have been passed on and then checks the individual patient's bedside charts to see what type and time their medications are due throughout the shift. The nurse then reviews and updates the nursing care plan, checks prior-documented observation recordings such as blood pressure, temperature, pulse and oxygen saturation. After reviewing the charts, the nurse walks around the bedside of each patient and greets them, introducing him/herself if they have not cared for that patient on a previous occasion.

At 08.00 hours, if medications are due, they are administered by the RN. This is followed by the RN assisting patients with breakfast, showering and sponging according to clinical need and making beds. During this time, clinical teams (doctors, pharmacists, dieticians, social workers, occupational therapists, psychologists and physiotherapists) review patients as required depending on the specific management care plan. Medications and care planning and reviews occur constantly throughout the day, depending on the time the teams arrive to the ward. At 10.00 and 14.00 hours, patient observations are taken and recorded on the specific patient bedside chart, the nurse noting any change and acting accordingly in response to such changes. Nurses in this ward have one break of an hour (this incorporates both morning tea and lunch). These are staggered over two hours starting from 11.30 hours and finishing in time for the afternoon shift handover that begins at 13.30 hours.

The afternoon handover also includes a ward round conducted between the two shifts of nurses at the bedside so as to include the patient. The bed charts are accessible to review by both teams of nurses as required during the bedside handover. At 14.30 hours, the ward holds scheduled in-

service education to nursing staff until 3 pm. During the day, nurses update their individual handover sheet about any changes in the patient's condition or changes to the plan of care in preparation for the next handover. Throughout the day, patients will receive prescribed oral, subcutaneous and intravenous (IV) medications, have x-rays or blood tests or may be transferred to other departments for tests. Nurses may be required to dress wounds, assist with patient mobility and other activities of daily living as required. One of the responsibilities of the RN is to follow-up and communicate with practitioners from other disciplines in regard to patient care management for their patients.

4.5 Data Collection Techniques

In this section, I describe the methods used for data collection in more detail. First I discuss observations, then interviews post-observations and artefacts collected during the observations.

Participants who were recruited to the study had completed the transition from an undergraduate program of study to the workplace and held between two-to-five years' post-registration clinical experience. The data collection took place on an acute care medical ward over an eighteen-month period. Each nurse was observed on three separate occasions during a morning shift as they were providing nursing care for patients delegated to them by the team leader.

Fieldwork consisted of shadowing and observing nurses as they performed everyday work, followed by interviews. Data collection took place on one ward on morning shifts from Monday through to Friday. My primary concern for commencing the data collection phase was participants' accessibility and availability for the study, given that nursing work involves the nurse rotating their workdays over a seven-day roster. The morning shift begins at 07.00 hours until 15.30 hours, afternoon staff start work at 13.30 hours until 22.00 hours and the night shift commences at 22.00 hours until 07.30 hours. To commence my fieldwork, I needed to obtain a copy of the ward roster to ascertain availability of each RN, as all

participants worked on a rotating roster that included morning, afternoon and night shift. The roster was published on a monthly basis, so I was able to take an overall approach to confirm dates with each participant for collection of data. Once the roster was available, I organised and confirmed an observation schedule with each RN who had agreed to participate. The fieldwork was carried out during the week, as this was usually when there was most activity occurring, with patients either going for specific tests or being seen and reviewed by other health professionals such as doctors, physiotherapists, social workers and dieticians.

4.5.1 Observations

My observations were carried out Monday to Friday during the peak activity period. Observations occurred throughout the ward as the participant delivered nursing care to their assigned patients on each day. I opted for a targeted approach so I was able to observe nurses on the days that they were rostered to work a morning shift. The justification for zeroing in on a specific time period such as the morning shift was due to the way work is organised in a clinical environment, as this was the most active part of patient care during the 24-hour period.

During the data-collection phase, I took on the observer-as-participant role. This method involves the researcher retaining the primary role as an observer, yet there can be some interaction with the study participants (Hays & Singh 2012). On the acute care medical ward my observations were unstructured as I shadowed each of the nine RNs for five hours at a time as they delivered patient care. Each nurse was observed on three separate occasions. During the observations, opportunities were taken for informal dialogue with each participant to enrich my understanding of what I was noticing. This allowed me to explore deeper with the RN what they were doing in situations where practitioners engaged together in practice or utilised spaces, materials and artefacts in ways that enabled or constrained learning. Hays and Singh (2012) warned that while, in the observer-as-participant role, a researcher can interact with participants,

they should not be overly intrusive in case they alter the natural circumstances surrounding the event. In this respect, I waited until the nurse had completed what he or she was doing and then asked questions. Care was taken to ensure that questions were not asked in front of patients or other practitioners.

Each nurse was followed around throughout the morning shift as they moved from one location to the next in the ward. For the most part, the nurse was constantly going back and forward from the patient's bedroom to the medication room then back via the corridors to the write-up bays or to the medical workroom to discuss patient care with doctors who happened to be available prescribing medications and ordering tests. (See Chapter 5 for a more detailed explanation about the different spaces in the ward where practice takes place.) I followed each participant around as they cared and interacted with patients; I attended ward rounds with the nurse, asking them questions along the way; I watched participants in the medication room engaging with other RNs who just happened to be in there at the same time; I joined the clinical handover, both the formal version and the more informal version to each other at the bedside; and I watched participants debrief with each other about how their day was going both in the ward and in the cafeteria. During the observations, there were numerous opportunities for informal interviews and discussion about the activities taking place. The content of what was observed was recorded and transcribed in a field note diary as the activity was being noticed. These rich, descriptive data were used as the basis for the interviews following the observations.

4.5.2 Semi-structured interviews

In-depth semi-structured interviews were included in the design of the study to supplement the observations. The purpose of the interviews was to clarify or gain more detail on something that had been observed that day. Semi-structured interviews make use of an interview protocol that acts as a starting point; questioning is flexible and open-ended. The

sequence of questions and pace can change and other questions can be asked that were not predetermined (Hays & Singh 2012). This approach permits participants to be asked initially the same questions, yet allows the flexibility to insert other questions during the interview in order to capture elaborations (Burnard 2005; Dearnley 2005). I selected this interview format so I could probe for more details if the observations and initial answers required further clarity. The trigger for questions (see Appendix D) for each interview with the RNs were based on what was noticed during the earlier observation. Participants were also free to voice their opinion about what had occurred, and describe experiences and perceptions in their own words. Each participant was interviewed for an hour directly after each day of observations. In total, every RN was interviewed for the maximum of three hours.

4.5.2.1 Interview room

After the morning observations, the participant was taken to the interview room located at the end of the ward, away from patient care areas. This space was initially intended by planners and architects as a quiet room where interviews and case conferences could be held with family relatives of patients admitted to the ward regarding their pending discharge or ongoing care requirements. Prior to the observations, I had prearranged with the NUM to use the room for my interviews with participants. As the room was located on the ward, the nurses felt able to take time out during work and agreed to be interviewed straight after the observations. I had informed each nurse on the morning of observations about the requirement of handing over the care of their patients to another nurse before leaving the ward, as previously agreed with the NUM. Each RN informed other people, such as the nurse team leader for the shift, about what was going on with their patients. The team leader also knew the whereabouts of the RN concerned, in case of an emergency.

At the beginning of the interview, participants were made to feel comfortable and a sign with 'interview in progress' was posted onto the

door to avoid any interruptions. The nurse was informed that the purpose of the interview was to supplement the observations conducted earlier, to clarify or gain more detail on something that had been observed. A series of non-directive, open-ended questions were posed to stimulate the nurse to talk about the events of the morning. Interviews were recorded via a digital recorder and transcribed verbatim. (see Appendix D for examples of trigger questions). Other questions were asked as a result from the observations and were spontaneous in nature. Data collected from both observation and interviews were in the form of field notes, transcripts from interview digital records and materials and artefacts collected during the observations.

4.5.3 Materials and artefacts collected

During the observations with the nurses, there were a number of opportunities to collect materials and artefacts, such as examples of handover sheets without any identifying information of patients or staff (see Appendix G), medication protocols (see Appendix H) that were downloaded from the computer and protocols located in the medication room.

4.6 Ethical Considerations

Ethical considerations are paramount in all research projects that are conducted in a hospital. With any research project, it is essential to consider possible ethical issues or concerns that may arise. A research protocol and application was submitted to both the Specialty Health Network and University Ethics Committee seeking approval to undertake the study at the hospital site. Approval was granted without any conditions imposed. Following this, the study was conducted in accordance with National Health and Medical Research Committee guidelines. I had a number of ethical responsibilities to guarantee because the study was conducted in a hospital. As my participants on the acute care ward were healthcare practitioners treating patients and hospital employees, ensuring confidentiality and privacy was crucial.

After I had completed my observations, I realised that it would be helpful to have photographs to illustrate the various different spaces where nurses worked on the ward. I submitted another application to the hospital ethics committee seeking approval to take the photographs of the research study site (see Chapter 5). Approval was subsequently granted for the photographs to be taken by the researcher.

4.6.1 Confidentiality

First, in relation to confidentiality and privacy of participants' information and the storage of data, the transcribed data and digital recordings of interviews and photos were stored on a password-protected computer for retrieval as required during the study. Hard copies were stored in a locked filing cabinet in an office that was not accessible to others, both at home and work. All data were de-identified using pseudonyms as names. Fieldwork notes and other data were stored in the same locked filing cabinet that was not accessible to anyone else. The governance requirements for storage of data collected must be maintained for a seven-year period. During the period of observation, I had access to patient clinical information and records such as charts, clinical notes, reports and patient handover and handover sheets, and medical and nursing procedures. Observations, materials and artefacts collected together with conversations with patients, staff and study participants remain confidential and securely stored. Where sensitive issues came to light, the researcher took extreme care to ensure empathy and confidentiality.

4.6.2 Ethical issues

Further to the issues discussed previously, there were ethical considerations about my role as a researcher on the acute care medical ward and the concerns relating to deteriorating patients and my role as a manager at the hospital where the research was conducted.

During the development phase of the study, there were a number of ethical concerns identified. As my study was conducted on an acute care

medical ward, the acuity and complexity of the illnesses affecting the patient was serious, the likelihood of an event where a patient became acutely unwell during the observation period was high. An example, of this is where a patient deteriorates unexpectedly and has a cardiac arrest. Although this did not occur, I was prepared to cease observations if the situation arose. As a RN myself, I would have been compelled to assist in the appropriate manner required as decreed in the *Code of Professional Conduct for Nurses in Australia* (Nursing & Midwifery Board of Australia 2008). Therefore, I would need to exit my role as the researcher, only recommencing once the situation was over and there was no risk of potential harm to patients or participants. Throughout the data-collection period, no such instances arose.

During the study and as part of my ethical approval, if I observed a practice that was dangerous to the patient, I was required to respond by stepping out of the research role and intervening in the role of an experienced RN, to prevent potential harm to the patient. Such issues are potentially harmful to the patient and required to be reported to the NUM so they can be followed up and managed as per hospital policy. During the data collection phase, no practice issues arose with any of my participants.

4.6.3 Role duality and role conflict

During the observations, participants were aware that I had experience as a RN and that I also held a senior management position in Nurse Education at the hospital research site. To avoid any concern or feelings of apprehension regarding my position, I developed a relationship of trust with participants during the observation period. In addition, participants were informed that as the researcher I had no professional relationship with them other than the research at the time. Further, I informed all participants at the onset of observations that their nursing practice was not going to be judged or assessed, and any data collected were according to the research proposal.

4.6.4 Consent

To obtain informed consent, RNs were invited to attend an information session about the study. Prior to the invitation, I sought permission from the NUM of the ward to conduct the study. Potential participants at the session were provided with a formal information sheet inviting them to participate and informing prospective participants about the details and methods for data collection (see Appendix A). Both a consent form (Appendix B) and a revocation of consent form (Appendix C) were given to each potential participant, and they were informed verbally about the consent process prior to obtaining consent. The cohort was advised that participation was voluntary and that they had the right to withdraw at any stage without questions asked or any consequences or prejudice for the individual withdrawing. The group was informed that confidentiality and anonymity was guaranteed and that there were no risks or any direct benefits to any individual. Although patients were not a focus of the study, they were provided with an information sheet about the study aims and the presence of the researcher on the ward (see Appendix E). All participants were given a copy of the signed consent form and an information sheet to keep for further referral at a later time if required.

4.7 Data Analysis

This section discusses the management and analysis of the data collected according to ethnography. With this approach, data are reviewed and coded to develop broad patterns, categories and themes. According to Cresswell (2013), making an ethnographic interpretation involves drawing inferences from the data and turning to theory to provide structure for the explanation. Thus, the researcher is able to make sense of findings, so as to offer justifications and draw conclusions from the data (Patton 2002).

4.7.1 Collecting data in the field

The data were collected through the shadowing and observation of nine RNs for five hours at a time as they performed routine nursing work on an

acute care ward. Each nurse was observed on three separate occasions on a morning shift (totalling 135 hours of observations). During the observations, opportunities were used for informal dialogue with each participant to enrich my understanding of what I was noticing. Stemming from the observations, descriptive data were used as the basis for the one-to-one, semi-structured interviews conducted immediately after each observation period. These were digitally audio-recorded and transcribed verbatim (27 interviews).

4.7.2 Managing the data

During my fieldwork, I collected a significant amount of field notes, which were taken from my observations and informal conversations with participants. Prior to going out into the field, I was initially concerned about how I should record and organise the data in my field notes and afterwards make sense of it all. In an endeavour to resolve the issue about recording observations at multiple sites, I divided the data collection entries into categories when recording my field notes (see Appendix F). I commenced with the participant, then place, then wrote about the event that proceeded, including citing others that became involved in the event (Zaman 2008). This allowed me see my data through the category of location and the ensuing situation that took place. Artefacts such as documents were also collected to support observational findings. MAXQDA software was used as the data management tool to enable coding and retrieval and to help with interpretive and analytical work (Gregory, Hopwood & Boud 2014).

Digitally recorded interviews were downloaded to a computer and de-identified with a pseudonymous first name. Interviews were then transcribed and filed under the allocated pseudonym. Data (field notes and transcribed digital audio recordings) were uploaded to MAXQDA.

4.7.3 Making sense of the data

My analysis was focused on the raw data, which were the richest source for answering my research questions. After initially reviewing the data—observational data and conversations, interview transcript data and field notes—I analysed them over three phases.

4.7.3.1 Phase 1

I initially read through the data very carefully to note any interesting emerging patterns or themes. I made notes about my thoughts and reflections as I sorted and sifted through the raw data. I was looking for relationships between variables and patterns (Hays & Singh 2012). I also used MAXQDA, which is a computer software program that stores data in orderly clusters under concepts or codes, which helped me manage the inordinate amount of data that I had collected (Schneider et al. 2003). Next, drawing on Srivastava and Hopwood's (2009, pp. 79-80) iterative framework, I used three specific questions to help me focus and establish broad codes. These questions asked:

1. What are the data telling me?
2. What is it I want to know?
3. What is the dialectical relationship between what the data are telling me and what I want to know?

The logic behind these questions assists the researcher to focus and clarify what is occurring in the data, connect what the researcher wants to know with the research objectives, and provoke the researcher to refine their focus and understand the data.

At the beginning of my observations I had noticed that there were specific spaces in the ward where nurses carried out work. This is where most interactions with other practitioners arose. I had used the term 'location' as one of the categories in my field notes, which later I refer to in this thesis as 'space'. These locations were patient bedrooms, the corridors, the write-up bays, the medication room, the medical workroom and the clinical

handover room. These areas (or spaces) became more obvious each time I read through the data. Therefore, space became one of the first broad categories. The outcome for this part of Phase 1 is reported in Chapter 5, which is also theoretically informed by Lefebvre's (1991) conceptual work on space.

I continued to read and re-read the data. I noticed from my description of the events that unfolded (during the observations, conversations and interviews), that data could also be further categorised into situations and then by the specific nurse who I had observed. The situation became the unit of analysis. Altogether, I had 50 situations that had taken place throughout the observations. After this, I reorganised the data (situations) so I became more sensitised to where learning was happening.

4.7.3.2 Phase 2

In this phase of the analysis, I began looking at patterns within the data. I needed to understand what were the similarities and what were the differences. What did I want to know? I knew that in the end, what I wanted to know would be informed by the theory. To isolate patterns, commonalities, differences and processes, I wrote some of the situations on a whiteboard (see Figure 4.1). I also mapped the situations clinically in terms of knowing what was going on, so I could see which events were similar and different.
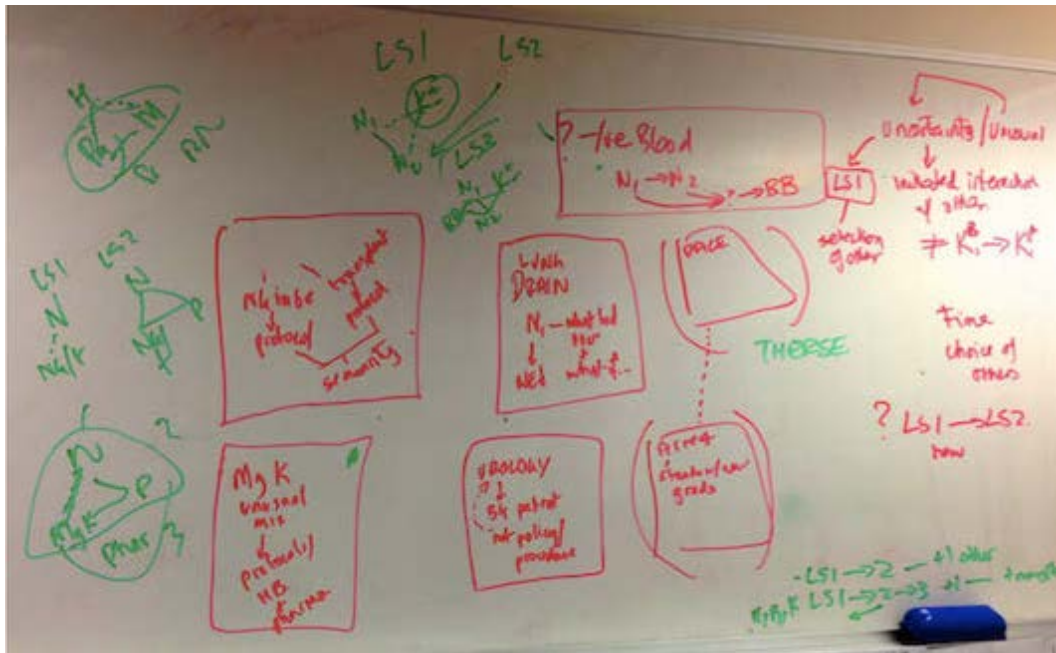
Figure 4.1: Mapping situations on the whiteboard

I began to see that situations changed in either two or three movements.
By linking the movements to Lefebvre's (1991) spatial theory, I decided
that these movements were equivalent to lived spaces. The key question
then was: what is the difference between Lived Space 1 and Lived Space
2, and in some situations, Lived Space 3, and how is it produced? From
looking at these patterns, I was seeing how nurses responded to certain
kinds of challenges at work. In each of these situations, it was the nurse
who was positioned as the learner.

When I was in the field collecting data about clinical handover practices, I
saw how important the clinical handover sheet was for the nurses in the
ward. I noticed that nurses linked their formal expertise with particular
incidences about patient care through the clinical handover sheet. As
explained in Chapter 3, I realised that this object was quite significant for
nurses to use and translate information into meaning. I also had a lot of
data that were broadly coded as 'clinical handover practices'. Using
MAXQDA, the data were further categorised into situations that occurred
in relation to clinical handover practices and the use of the clinical
handover sheet. To see a glimpse of any patterns, I returned to the

whiteboard to understand the similarities or differences and any relationships in the patterns.

4.7.3.3 Phase 3

In the final phase, I focused my attention on making sense of the patterns that had emerged. To guide my analysis in relation to my research questions, I used the theoretical concepts outlined in Chapter 3 about the conceptual framework. As a result, I attuned my interpretation of the data to concepts by Lefebvre (1991) and sociomateriality. This also meant identifying the data that were relevant to each particular question. Finally, as answers began to emerge, I looked at postmodern workplace-learning theories to explain questions of learning.

4.7.4 Presentation of the data

In chapters 6 and 7, I present my data in several ways by integrating extracts from field notes and quotations from low-inference transcripts via explicitly constructed vignettes and narratives of events (Fossey et al. 2002). Each event serves as an empirical illustration of key points that emerged numerous times during the data analysis (Gregory, Hopwood & Boud 2014). Because I had constructed and ordered my field notes where I identified the participant, the location and the situation, the data presented are described using the raw data as events unfolded on the ward. The reason for presenting the data in this explicit way was that I wanted to illustrate all events as accurate and trustworthy accounts of what had transpired.

4.8 Chapter Summary

In this chapter, I have described the research methods used to collect data for this study. I foregrounded a number of concerns I had prior to going into the field regarding deteriorating patients, complexity and the changeable observational sites. My choice for using a focused ethnographic approach was discussed and justified, since it allows the

researcher to study individuals as they interact with their environment. I explained the procedures for the purposeful selection of participants recruited to the study and the reasons why this was necessary. Next, fieldwork was described in relation to the collection of the data, ethical considerations and researcher position. In case any clinical issues arose during the observations, proposed strategies were outlined for how I would respond to any issues that could arise regarding a patient's clinical status. The process used for analysis according to ethnography is described using a three-phase approach. Finally, in order to guarantee the truthful presentation of data collected, an explanation was given about how vignettes and episodes were constructed out of the raw data.

In the following chapter, I begin to lay the foundations for the analysis and discussion of my findings in chapters 6 and 7 by explaining in more detail the key spaces used by nurses when they were observed carrying out work in the ward.

Chapter 5: Key Spaces Within the Acute Care Ward

> This descriptive chapter foregrounds the analysis and discussion of findings that follows in chapters 6 and 7. Section 5.1 provides an overview of the chapter. I explain and justify why five key spaces were selected as the focus for this chapter. Next, I describe the conceptual tools used to explore particular spaces at a micro-level, followed by the differentiation between public and private spaces on the ward. Section 5.2 examines the overall layout of the acute care ward. Section 5.3 explains nurses' movements around the ward when carrying out nursing work. Section 5.4 outlines the process for accounting for each space in Lefebvre's terms. Sections 5.5–5.6 describe and contextualise the five key spaces using Lefebvre's spatial triad, and then I distinguish these into public and private regions. Finally, section 5.7 briefly explains two other spaces that were not as significant to the data reported in chapters 6 and 7, but are nevertheless important to cover.

5.1 Introduction

In the previous chapter, I explained and justified the methodological approaches that I used to explore how and what nurses learn on the ward. The purpose of this current chapter is to lay the foundations for the analysis and discussion of my findings in chapters 6 and 7. To see how and what nurses learn in practice, it is crucial that I draw attention to the diversity and complexity of the various spaces in the ward and explain what nurses actually do in these key spaces as they carry out patient care. The analysis of space is relevant to this study because nurses learn in particular ways in certain spaces. It also provides a new way to understand how nurses learn in this environment. Further, some knowledge is more acceptable to learn in a public space than others. I use Lefebvre's (1991) spatial triad to see the purpose, the practicalities and the utilisation of each key space in order to show how the everyday routine

of doing nursing work takes place in an acute care setting. By redefining spaces into learning spaces (whether this be in public or private), I argue that nurses change the relationships between themselves, patients, tools and other people in order to make sense of patient information and to enable practices to take place to overcome uncertainty and not knowing.

In the sections below, I introduce and describe the physical layout of the acute care medical ward so as to give a sense of the site of the research and to show how nursing practices and relations (social and material) take place in particular locations.

To begin, I need to explain that in the acute care ward there are seven critical key spaces where nurses perform the majority of clinical work. While each space is vital and necessary during the course of providing nursing care to patients in the ward, I only focus on the five areas in which nurses were observed to carry out practices involving three key activities: bedside nursing, medication administration and clinical handover. The spaces that I primarily focus on in this chapter are the patient bedrooms, the medication room, the clinical handover room, the write-up bays and the corridors. To a lesser extent, I briefly explain the use of the medical workroom and the registrars' room to show how these spaces connect to the others in the delivery of patient care. I only provide a short account of these two spaces because they were less relevant to learning and the research questions asked. Also, nurses only used these two spaces (the medical workroom and the registrars' room) intermittently during the observations, and so they were not as significant to the data reported in chapters 6 and 7. There is an additional space on the ward, the sluice room (more commonly known as the pan room), which I am not going to discuss here, as nurses did not linger in this area simply because of its utility regarding the disposal of waste products.

Hospitals today are ever-increasing complex environments that can become almost overwhelming at times because of the activities that take place there. Within the architecturally purpose-designed spaces, the

physical environment determines much of what is accomplished. To help us understand what happens during practice, I now delve into explaining at a micro-level the five key spaces where nurses carried out bedside nursing practices, medication administration and clinical handover. To explore the actual practicalities of being in each space and the use of these particular spaces by nurses, I use Lefebvre's (1991) spatial triad as a conceptual tool (as explained in Chapter 3) to reveal the physical arrangements and the imbued meaning enmeshed in each site. The reason that I use a spatial approach is to direct attention later on in the thesis to the way ward space is actively constituted through nurses actions coupled with being able to see clearly the practices that nurses' use to redefine the particular space for learning.

5.1.1 Public and private spaces in the ward

In addition to using Lefebvre's (1991) spatial triad, I also found it helpful (as explained in Chapter 3) to contrast specific spaces in the ward as public and private. The purpose was to draw attention to ward spaces that are highly visible to the public and those that are not. In particular, a public space in the ward is acknowledged as the place where patients and visitors are present in the space. Private spaces are places that are concealed from view, and in my study, considered private by the nurses. As discussed in chapter 4, I am using the terms 'private' and 'public' to describe the space. On occasion in this chapter, I use the term 'backstage' (Goffman 1969) instead of 'private', because this word describes the space more succinctly by pointing to the person and their actions rather than emphasising that its location is away from the main thoroughfare of the ward. Accordingly, there were different rules of behaviour that shaped how nurses conducted themselves in both the frontstage and backstage spaces (Lewin & Reeves 2011).

In this chapter, I distinguish and illuminate the nature of the public and private performances by nurses to help us understand in later chapters how this may influence learning. Thus far, I have specified the five key

spaces that are the focus of forthcoming sections, and have justified my reasons for choosing them. In addition, I have introduced the conceptual tools that I draw on to describe and characterise the physical arrangements of each space. In the next section, I examine the overall architecture of the acute care medical ward to show links between patient bedrooms and other places that make up the clinical ward. Then, I explain how I use Lefebvre's (1991) spatial triad to illustrate the spatial dimensions of the ward and the way this influences the way nurses work.

5.2 Acute Care Medical Ward

Figure 5.2 shows a schematic map of the acute care medical ward, which is situated at the south-end of the hospital's main building. My fieldwork occurred in the multiple patient care areas and purpose-built spaces in the ward. As reported in Chapter 4, there are 34 beds in total on the ward, which accommodate patients from across the state that are admitted with a diagnosis from one of the 11 different medical specialties. The ward is open to visitors from 10.00am to 1.00pm and again later in the afternoon from 3.00pm to 8.00pm. Outside of these hours, only nurses, doctors and allied health staff go to the ward.

At the point of entry to the ward (located just to the right of the hospital main set of lifts) patients, visitors and practitioners can access the ward. Bodies move past the reception desk situated to the left of the entrance to walk through the electronic double-doors. A bottle of hand gel sits prominently at the entrance, its central position indicating that hands must be cleansed before entry. Figure 5.1 presents two photographs showing the ward entrance and registrars' office.

Figure 5.1: Entrance to the acute care ward and the registrars' office door (located just inside the entrance on the left).

As we move past the doors, the registrars' (doctors) room is located to the left of the entrance just past the double opening doors. As bodies move along the main passageway of the corridor, patients and visitors can enter patient bedrooms. Purpose-designed clinical areas are located towards the middle of the ward which are more private. Access to these spaces is restricted to health practitioners only. There are two main corridors (facing north and south) that run parallel to each other down both sides of the ward. The patient bedrooms are located on the outer aspect of the two corridors. All in all, there are 15 main bedrooms that branch off each corridor, accommodating one, two or four beds.

Figure 5.2 illustrates the layout of the multiple spaces of the acute care ward. Noticeably, patient bedrooms are positioned on the outward perimeter next to the windows, so patients and their families can look at the view outside the hospital walls. The design of the ward situates practitioner spaces purposefully through the middle of the ward, so there is easy access and less distance for practitioners to move to both sides of the ward as they carry out work or in the event of an emergency.
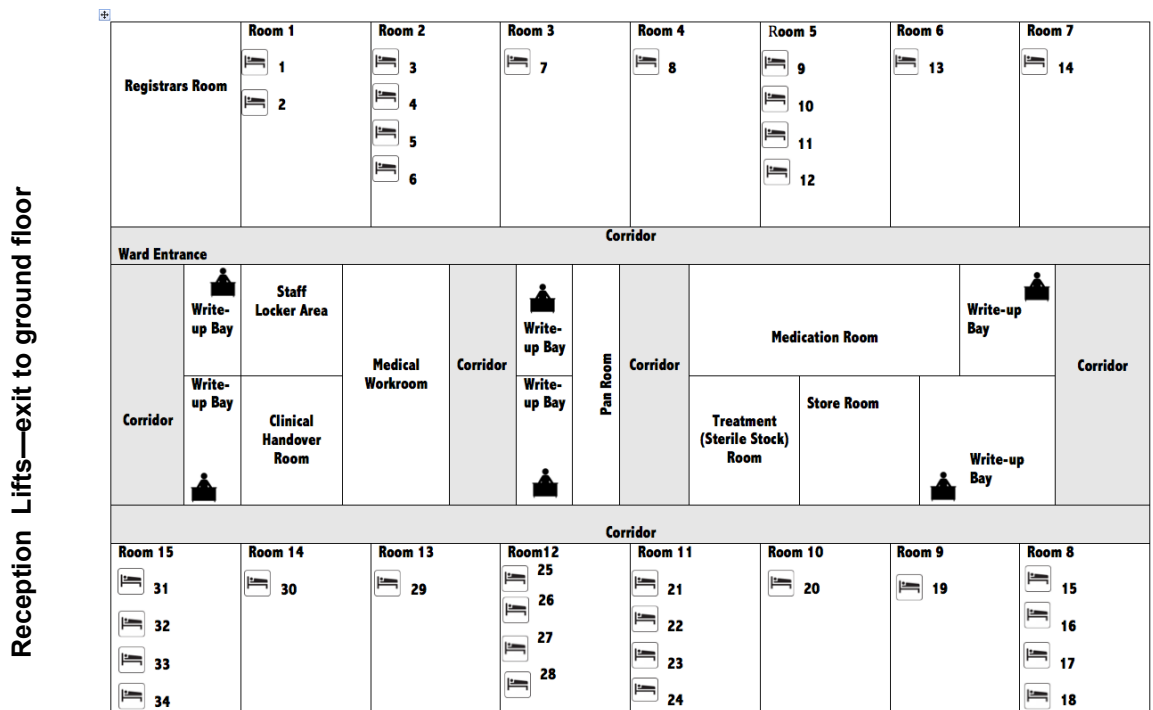
Figure 5.2: Map of the acute care medical ward (south wing)

The medical workroom, the sluice room (also known as the pan room), the treatment room and medication room are located adjacent to the corridors in the middle of the ward. These clinical spaces are positioned in between both corresponding corridors. On the opposite side to the ward entrance, connected to the corridor on the far side, is the adjoining multipurpose room. On both sides of the corridors at the midway point and at each end of the ward are write-up bay satellite stations, which are strategically located to be in view of patient bedrooms. There are six stations in total. These stations are visible to all and can be accessed easily by staff, patients and visitors alike. At each write-up bay there is a desk and two chairs. A computer sits on top of the desk for practitioners to access and use when they are seeking information about patients from the clinical progress notes or test results from the computer. Shelves are attached to the far wall of the write-up bays, which store patient records for inpatients whose bedrooms are located adjacent to each individual write-up bay.

5.3 Movements Involved in Nursing Work

In the course of caring for patients, nursing work takes place in a variety of spaces across the acute care ward. Notably, the physical layout of the ward reflects the type of work that nurses do in the actual space. Throughout the shift, nurses move back and forth between these key spaces on the ward. Bodies move through corridors to patient bedrooms to talk and provide care to patients. They go to the medication room to prepare medications or to the medical workroom where members of different professions, including nurses, come together, often incidentally or as part of separate work requirements (Gregory, Hopwood & Boud 2014). During the day, nurses sit down at write-up bays to record progress notes, go to the pan room if required, to the treatment room to obtain equipment or they may seek out doctors in the registrars' room to consult about patient care issues. At the end of the shift, nurses enter the clinical handover room to handover what has taken place with patients in their care to the next oncoming shift of nurses.

5.4 Accounting for Each Space in Lefebvre's Terms

In the following sections, I account for key ward spaces in Lefebvre's (1991) terms. I depict each element of the triad beginning with representations of space (conceived space). According to Lefebvre, designers, architects and engineers express space in plans, abstract representations, codes, images and physical manifestations of their designs. In a hospital, this is expressed through architectural plans that portray the layout of the ward. The second element of the triad, spatial practices (perceived space), refers to the sequences, habits, and patterns of movement in and through physical places. In terms of occupying a given space, it relates to what is done both within space, and in the process of producing space (Gregory, Hopwood & Boud 2014). In a hospital ward, spatial practices include everyday routines of providing patient care such as administering medications, carrying out procedures or giving clinical handover. The third element of the triad is spaces of

representation (lived space). This is the space of lived experience and the space that is the focus in this study. According to Lefebvre (1991), this is the space that is 'directly lived through its inhabitants and users' (p.39), which is 'played out in real life situations where the real and imagined spaces come to life materialized through symbols, ideologies and bodies' (Gregory, Hopwood & Boud 2014, p. 201).

I have briefly distinguished between each element of the triad. In the next section, starting with key public spaces, followed by primary private spaces, I use Lefebvre's triad to explore and illustrate the spatial dimensions of the ward. I ask the following questions:

- What is the intended purpose for the space? (conceived space)
- What are the actual practicalities of being in this space? (perceived space)
- What is the actual utilisation of the space? (lived space)

5.5 Public Spaces

In this section, I present and describe each key space using the conceptual tools explained above. The account begins with spaces that are located in public areas, that is, the patient bedrooms, corridors and write-up bays, followed by spaces that are located in the more private and less conspicuous areas of the ward, such as the medication room and the clinical handover room.

5.5.1 Patient bedrooms

Entry into the patient bedrooms is through the main doorway connected to the corridor that leads to other places in the ward. In the four-bedded rooms, there is no door to open or shut, just an open archway to go through. In most acute wards, patient bedrooms are configured as either a single-, two- or four-bedded room. Each bedroom has ensuite bathroom facilities.

5.5.1.1 What is kept in the patient bedrooms?

All single and double bedrooms contain furniture consisting of a bed for the patient to lie down on, a chair beside the bed and a bedside locker that has one of its drawers locked to keep the patient's prescribed medications secure. Oral and subcutaneous injectable medications are kept in this drawer. Only the RN looking after the patient has the key to open the drawer. A cupboard can be found in one of the corners of the room, and is where extra blankets and pillows are kept, as well as some hanging space for the patient's street clothes. An extendable meal-tray table is positioned over the top of the bed. It is held in position by an adjustable arm on one side that can be extended or lowered to the required height. This can be moved when the person is sitting in the chair. In the four-bedded rooms a similar setup is configured, except each bed is located in a corner of the bedroom. Patients can either lie in their beds or sit in a chair beside the bed. Often there are extra chairs in the rooms for visitors to occupy.

Behind the bed unit, oxygen and wall suction controls are situated on the wall. Other clinical equipment also rests on the shelf in case of an emergency (for example, suction tubes and airway maintenance materials). Also connected by a lead from the wall are the patient's call bell, light and TV remote control. The handheld device extends to the patient's bed for ease of access. A patient can press the remote device at times when they need assistance from a nurse. Additionally, there may be other medical or nursing equipment located at the bedside that is related to the type of care required for the patient's current admission. Curtains are in position around the bed unit to close off the bed space from view to the public when nursing care or procedures are carried out on the patient. Even with the curtains there for privacy, the patient's bed unit remains a public region because of its visibility and exposure to the public.

Figure 5.3 presents photographs of the entrance to patients' bedrooms and the bed unit itself in order to illustrate the arrangement of the bed unit.
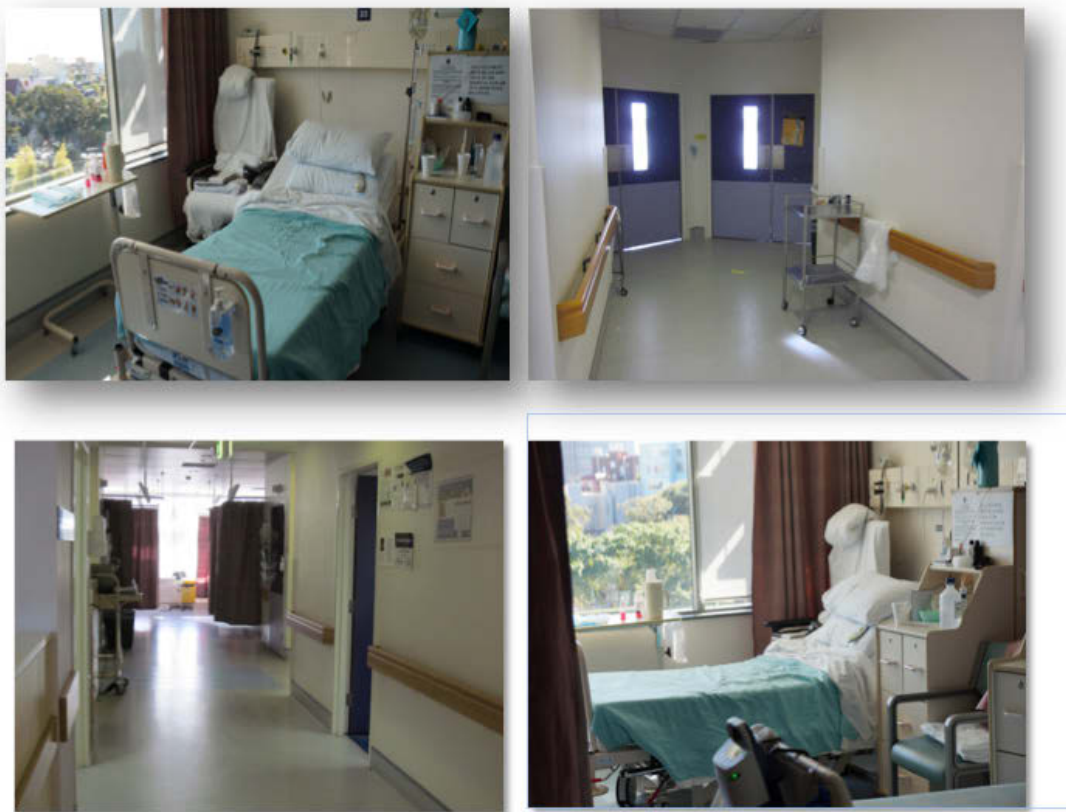
Figure 5.3: Patient bedrooms

5.5.1.2 What is the intended purpose of the (conceived) space?

Planners and hospital architects designed the patient bedrooms for the purpose of accommodating a person in a bed who has been admitted as an inpatient to the ward. Single bedrooms in a public hospital are designed to house the very sick, dying and confused or infectious patients. A patient is able to lie, sleep or sit up in the bed as they receive care or are attended to by nurses, doctors and other practitioners.

5.5.1.3 What are the actual practicalities of being in this (perceived) space?

Relatives and friends visit patients who are admitted to the ward. Nurses direct the visitors to the specific bedrooms where the patient in question can be found. Doctors see their patients in their assigned beds to physically examine, treat and review the plan of care. Nurses provide nursing care to patients in this space by following and carrying out the plan

of care as ordered by doctors. Other practitioners such as the physiotherapist, occupational therapist, dietician, pharmacist or social worker may also see and review the patient at the bedside. For practitioners, the bed space is the central delivery point where the patient receives most of their care on the ward.

However, there are limitations to the bed space, for example, the physical constraints that are inflicted on the patient such as the size of the bed. In most wards, only standard-size single beds are available. There is limited space around the bed, which often makes it difficult for nurses to move easily around the space with the patient. There is a lack of privacy in rooms containing two and four beds. This makes it difficult to maintain privacy with procedures and for practitioners having a confidential conversation with the patient. Often, the noise of some patients affects rest requirements for other patients in the room. The impracticalities of contemporary cost-saving strategies permit mixed-gender beds in bedrooms, which further hinders privacy for the patient. In addition, during my observations, patients often complained about the lack of rest because of the regimented nurses' routine of waking patients at 6 am and turning lights on.

5.5.1.4 What is the actual utilisation of the (lived) space?

The focus here is the patient, what is occurring in the patient or what care is required to be carried out next. While other disciplines also care for the patient, I am only concerned with what nurses do here. Nurses administer medications prescribed for the patient, attend to dressings, take observations and assist patients with activities of daily living and provide patient education to patients as the need arises. Nurses are frequently in and out of the patient bedrooms providing nursing care to the patient, which occurs throughout the whole 24-hour period.

When I observed nurses in patient bedrooms, sometimes they would have a nursing student with them. On one occasion, I noticed that a RN was showing a student the setup of the TPN (Total Parenteral Nutrition)

infusion that was being administered to a patient in a four-bedded room. At other times, I saw nurses talking and laughing with patients and their visitors. On ward rounds, I observed nurses talking about patients to doctors at the patient's bedside, sometimes as though the patient were not actually present (although they were). Sometimes, nurses only stood at the door watching and listening to the doctor as he talked to the medical team standing around the foot of the bed.

Sometimes, doctors talked to patients in their bedrooms without a nurse being present. This often made it difficult for the nurse to find out what had been discussed if the doctor did not record anything in the patient's progress notes. Nevertheless, the nurse would need to find out, and would have to be quite resourceful under these circumstances. In my field notes, I recorded one such situation with one of the patients in a single room. The nurse went into the room to check an infusion attached to the patient. The consultant had just left the patient, so the nurse asked what the doctor had discussed. The patient told the nurse that the doctor talked about the supply of stem cells for his transplant. He said:

> It's the first time they've used a supply from China. They chose the one from China because there were more cells available and it was a better match. He said the transportation of the cells is very important because normally when they've come from overseas, they come with a report documenting the automatic temperature control with a report readout for each hour. The Chinese core cells arrived in Sydney and they were frozen, but there was no report about the cells' temperature control to auto-track the temperature regulator, so they just had to use them because they needed to. Apparently other countries will send the automated thermometer with all these readouts of the temperature so that you've got a graph of the temperature of the cells during transportation.

The nurse commented afterwards to me that she was 'not aware about how cells were transported before'.

From this we can see that as a lived space, patient bedrooms exist as public areas. During the admission, the delivery of nursing care takes place constantly for the patient at the bedside.

5.5.2 Corridors

The corridors of hospital wards are spaces that act as paths between places, connecting ward spaces of patient bedrooms, write-up bays, the medication room and so forth. It is perceived by users that corridors are a public space where there is no privacy or restricted access. The purpose of corridors is to allow individuals to move from one place to another via the interconnecting passageways. In the acute care ward, there are two long, parallel corridors facing north to south that run from the main entrance to the end of the ward. There are two shorter corridors that connect at each end (east to west) and two corridors in the middle (see Figure 5.2). The design is similar to a long rectangle that is cut into three pieces by two partitions in the middle.

5.5.2.1 What is kept in the corridors?

Along the walls of the corridors there are pictures and signs telling people where to go, what to do and informing them of events in the ward. Scattered throughout the corridors are objects such as trolleys and wheelchairs. Laptops on trolleys are plugged into power-points on the wall. Tables also flow into the corridor, with equipment sitting on top for quick access (see Figure 5.4).

Figure 5.4: The corridors

Figure 5.4 presents photographs of the corridor, revealing numerous objects standing at various points along either side of the passageway. Pictures and posters are affixed to walls informing anyone who may walk past about various matters relevant to the ward.

5.5.2.2 What is the intended purpose of the (conceived) space?

Corridors are conceived spaces that reflect the design intentions of a public thoroughfare. As a public space, they facilitate the ease of access to patients located in bedrooms around the ward. As a path, staff, patients, visitors, goods and equipment move between spaces in the ward.

5.5.2.3 What are the actual practicalities of being in this (perceived) space?

Nurses and practitioners from other disciplines move through corridors to see patients or to access areas such as the medication room, the medical workroom and registrars' room or write-up bays. Objects such as laptops,

placed in the corridors, can be used readily at each write-up bay station. They stay there while they are being charged via a power-point connection on the wall. Hospital sinks and hand gel items are positioned on the walls at the entrance to patient bedrooms for practitioners to use prior to seeing patients. There is also a vast arrangement of other objects situated around the corridor, such as trolleys with objects on top and blood pressure machines.

5.5.2.4 What is the actual utilisation of the (lived) space?

The corridor is used by anyone wanting to access other parts of the ward. The corridor is not owned by any discipline and there is no restriction on who accesses the corridor. However, visitors can only gain access to the corridor leading to patients during visiting hours. Practitioners use the corridor on ward rounds to discuss patients, or as they pass by one another, they pause to communicate what they know or want to know about the patients. According to Iedema et al. (2005), surprisingly, it is in the corridor where professions are able to co-exist, because the rules, regulations and professional positionings are relaxed, the power structures are in abeyance and specialisation between professions is often suspended. The corridor transforms into a space where people can work, tolerate contingencies, communicate and make decisions about patient care.

Although we can see that the corridor is clearly a public region because of the unrestricted access to it, at times it transforms into a backstage region because practitioners think they are outside the public gaze (that is, away from the patient's view). During my observations, I noticed nurses checked to see if patients were not listening, then relaxing their professional persona a little, they stepped back into the corridor and lowered their voices to handover something about the patient to other nurses gathered there. Sometimes as nurses walked down the corridor, they would chat to each other (more informally) about how patients that they had cared for previously were doing. I also noticed on ward rounds, while the consultant

was talking to the patient and registrars, junior doctors and nurses purposely moved out into the corridor (rather than remaining in the room) to talk quietly about social activities that they had planned for the weekend.

As a lived space, we can see that the corridors are clearly a public space, because of their unrestricted thoroughfare. However, at times, the corridor becomes a backstage because practitioners standing in the corridor perceive that if the patient is out of hearing range, they are able to discuss things more informally.

5.5.3 Write-up bays (also known as satellite stations)

There are six write-up bays in the ward, three consecutively situated down each side of the corridor. Each write-up bay is positioned in a little alcove where there is a desk space with one or two chairs, a computer positioned on the desk, as well as a telephone nearby. A shelving system is located on the wall at the side. The shelves store patient clinical notes on one side and clinical forms on the other.

Nurses, doctors and allied health staff use the write-up bay to sit down and write-up charts, order tests, write clinical notes and talk to each other. The physical setup of the write-up bay satellite station permits only one or two practitioners to sit there at any one time, making only brief work possible. Each write-up bay is within a short walk of adjacent patient bedrooms, making it possible for a clinician to sit at the write-up bay and to see the patients in the bedrooms opposite. Figure 5.5 shows the setup of the write-up bays and the assemblage of material artefacts located at each station.

Figure 5.5: The write-up bays

5.5.3.1 What is kept in the write-up bays?

The main objects found at each write-up bay are a desk and two chairs. On the desks rests a computer and a telephone. The patients' clinical records are also close by on shelving attached to the wall, specific to bedrooms located opposite or in the near vicinity of the write-up bay. Often laptops can be found plugged in at the power-point on the wall next to the station. Blood pressure machines are frequently left at the write-up bay as a central storage point.

5.5.3.2 What is the intended purpose of the (conceived) space?

The write-up bays were designed as a shared space for all disciplines to access to write in the patients' medical records, review pathology and medications on the computer or sit and handover any relevant clinical information to other practitioners. When using the phone, practitioners are linked to others located elsewhere inside or outside the hospital.

5.5.3.3 *What are the actual practicalities of being in this (perceived) space?*

The write-up bays provide a place for nurses to sit and access information in a quiet location away from the patients. Doctors and nurses use this space to sit down at the desk and write in the patients' medical records, review test results or contact other departments or specialists about patient matters using the telephone. All disciplines come together and share this space to complete work activities related to their specific disciplinary role in the ward. The openness of the area allows other clinicians to view what occurs at the write-up bay and see any other bodies that pass by in the corridor on the way to patient bedrooms.

5.5.3.4 *What is the actual utilisation of the (lived) space?*

This space is where clinicians come together to read and write inpatient notes, to review test results and write-up charts or discuss patient management with others. Documented in my field notes, I have descriptions of nurses sitting at write-up bays reviewing patients' pathologies on the computer, talking to doctors and dieticians about the patients in their care and handing over care. At times, I saw nurses reviewing policies on the computer and later printing this information for their own personal use. Often, nurses had to share the space with other disciplines but this did not seem to be a problem. It was usual for practitioners to complete their work and then leave the write-up bay. During my observations, one of the nurses revealed that:

> Lots of handovers happen here: we do bedside handover and then anything that's not appropriate to talk about at the bedside, we move out to the satellite stations and try to keep the noise down. Sometimes I sit down with staff here, because the progress notes are docked at those stations, so we just look through the progress notes and talk about the history and why the patient is in hospital.

This suggests the utilisation of write-up bays in the lived space is more than what was imagined by the hospital architects.

Having clarified the key public spaces in the acute care medical ward, I next address which regions of the ward can be characterised as backstage private spaces as I explain what nurses actually do in these key spaces when carrying out patient care.

5.6 Private Spaces

As indicated earlier in Chapter 3, Goffman (1969) described backstage spaces as private, where workers' performances could be more relaxed, where they could step out of their public character to prepare for the next performance. The spaces that follow were places identified by nurses to be either out of sight or hearing range of the patient. They considered these two spaces (the medication room and the clinical handover room) more private and inaccessible to the public.

5.6.1 Medication room

The medication room is located at the midpoint of the ward leading off the east-facing corridor. It is positioned in the middle region of the ward, adjacent to patients' bedrooms 4, 5 and 6. Entry is via the corridor to the treatment room, turning right into the medication room (see Figure 5.2).

Figure 5.6: The medication room

This perspective looks through the window from the corridor. To access the entrance to the medication room, the nurse enters the treatment room and must use a swipe card to gain entry. The practice of administering medications to patients is a central part of nursing work in the acute care medical ward. The medication room becomes a key space, where practices and spaces of learning come together during medication preparation and, later, administration. In itself, the medication room is a pedagogically rich zone. The walls are lined with material artefacts for the nurses to look at and review. Protocols are strewn on top of the workbench, readily available to browse. Located above on the wall, computer technology overshadows the workbench, ready for nurses to source information or communicate with other practitioners about medical orders and prescriptions. While the medication room plays a central role in the assemblage of medication practices, it is not available to every practitioner or accessible as a public space for patients. Admission is restricted to the nurses working on the ward who possess a swipe card to gain entry. Day in and day out, bodies move through the medication room,

pausing for a while to prepare medications, then they move on to the patient's bedroom to give the medication.

5.6.1.1 What is kept in the medication room?

The medication room stores restricted medications; legislation demands tighter security around storage and access with Schedule (S)8 and S4D medications. Medications classified as Schedule 8 are drugs that are restricted and have specific regulations regarding storage, access, prescription and administration (these medications are also known as drugs of addiction). Schedule 4 Appendix D refers to drugs that are classified as a subset of Schedule 4 medications. However, these drugs do not possess the capability to cause addiction or abuse requiring the need to be classified and restricted in the same way as Schedule 8. Accordingly, nurses must document in a special register when removing S8 and S4D drugs from the restrictive substances cupboard before administering to patients. Also kept in the medication room are intravenous (IV) medications and fluids, together with general S4 medications ward stocks. Such objects are stored on the shelves on the far wall opposite the window. We can see the medications in Figure 5.4. They are organised alphabetically by the generic name of the drug. Objects such as syringes and needles used to prepare and administer medications are placed nearby in green storage containers for easy access. A fridge is located under the workbench to store medications that require refrigeration. A radio can be seen through the window, which is perched on top of the S8 drug cupboard. Also on the walls are posters and charts about drug administration for the nurses to check at a glance.

5.6.1.2 What is the intended purpose of the (conceived) space?

Planners and hospital architects purpose-designed the medication room primarily for the storage and preparation of medications by nurses. A window is located on the corridor side where nurses are visible to patients and the nurses can see patients and other staff as they walk past. When inside this room, you can be seen but not heard by staff and patients

outside it. There is the perception by the nurses that this window is soundproof. My field notes described a shared view among the nurses, one of whom firmly asserted:

> It's our medication room…You're out of the patient's direct sight from their bedrooms and you get a bit of privacy so you can kind of talk without looking behind you. You know they can see what's going on from the corridor but they can't hear you!

The point made here is that the medication room is a private space that belongs to the nurses. They see it as their territory. The nurses treat the medication room as a backstage space, where they do the things that they need to do to prepare the medications for administration to their patients. At the same time, the nurses can be more relaxed, stepping out of their more public professional characters for a while, turning the radio on, talking about social arrangements out of work, debriefing and so forth. The location of the room is designed to be out of sight of patients, except for the window. The window may have been conceived to add extra security so the S8 cupboard could be visible at all times.

5.6.1.3 *What are the actual practicalities of being in this (perceived) space?*

Only nurses enter the medication room. If other disciplines need access to drugs, they must approach one of the nurses to assist them. The pharmacist is the only authorised practitioner from another discipline who has access to the room. Medication preparation is the main practice carried out in the medication room.

Spatial practices involved with preparing medications before administration to the patient involve looking at the patient's electronic medication chart to determine which medications are due to be delivered. Sometimes, on the prescription, the pharmacist may have already documented some instructions for the nurses about how to prepare the medication or the appropriate way to administer the drug to the patient. An

essential component of the medication practice requires the nurse to verify the indication and dose of the medication in the *MIMS* (*Monthly Index of Medical Specialties*), which is available either online or via hard copy. In addition, the nurse should check the *Australian Injectables Handbook* to find out in what way the medication may be reconstituted and delivered to the patient. Nurses must know what the drug is for as well as when and how to give the medication, whether there are any possible drug interactions with other medications being taken by the patient or contraindications for the drug with the specific patient. Regarding administration, it is important to note that policy requirements mandate that two RNs must check intravenous (IV) medication prior to delivery to the patient. The check initially occurs in the physical space of the medication room and then again at the patient's bedside (altogether the medication is checked at least three times by two RNs).

5.6.1.4 What is the actual utilisation of the (lived) space?

Much of what happens in the medication room is accessing and preparing medications. The room as a purpose-built space can be understood in terms of the intention to facilitate and produce the preparation of medications. This by itself reflects Lefebvre's three spaces together: the conceived, perceived and the lived. However, the nurses generate other routines and practices as a consequence of being together in the medication room. The excerpt below is from a transcript of an interview with an RN that supports this. The RN alluded to the other types of practices and routines that take place in the room besides preparing medications:

> We do a lot of debriefing in the medication room. I guess that's the nurses' dedicated space as other disciplines don't need to be in there. It's got a locked door and you can't hear outside. We have the radio up in there…it's very busy …we laugh together. I do a lot of teaching in there!

The medication room was not intended to be a space for social activity or teaching. Nevertheless, one of the first things I noticed as I shadowed the nurses when they came into the medication room to prepare the drugs was the radio perched on top of the S8 drug cupboard. I also heard them talk in there about other things going on in the ward, about doctors, about patients and about each other or how good or bad their day was in terms of being demanding, hectic, eventful or challenging.

As a lived space, nurses have redefined the room to suit their immediate purposes at the time. It is a space that is perceived by the nurses to be backstage. Along with being a space where they carry out their official duties while making up drugs, it has also become a lived space for other social activities and a lived space where nurses feel that it is okay to look up a medication book in private.

5.6.2 Clinical handover room

The clinical handover room is located off the long corridor on the other side of the entrance to the ward and just next door to the write-up bay, opposite bedrooms 14 and 15 (see Figure 5.2). Access to the clinical handover room is restricted mainly to nurses, but on occasion doctors enter to talk to the nurses about patients. Here, the nurses handover about patient care to the next shift. Closing the door separates the room from the patients and whoever else is in the corridor. Figure 5.7 illustrates the setup of tables and chairs in the clinical handover room.

Figure 5.7: The clinical handover room

5.6.2.1 What is kept in the clinical handover room?

In the centre of the room are two small tables next to each other, with chairs placed around tables for nurses to sit down during the handover. The position of artefacts on walls like noticeboards and a whiteboard offer information concerning forthcoming educational programs and patient care matters. A computer lies on the desk located at the far corner of the room. Nurses sit at the computer before handover to update the clinical handover sheet and to print out a new one for the oncoming nurses in preparation for the next shift handover.

Opposite the desk is the fridge, where nurses store any food or drinks they have brought in to work. Later during the shift, the handover room converts to a tearoom at meal times, turning the handover of patient care space into a social space for the nurses. Things kept in the room like the fridge and tea- and coffee-making facilities provide an added social atmosphere, indicating that other activities other than the official ward business like clinical handover also take place in here.

5.6.2.2 What is the intended purpose of this (conceived) space?

The design intentions for this space were to provide a quiet closed-off location on the ward where practitioners could meet to discuss patients and their ongoing care. This space was planned as a private space away from patient care areas.

5.6.2.3 What are the actual practicalities of being in this (perceived) space?

During the shift, nurses access the computer in the corner of the room to prepare the clinical handover sheet for the next handover. They update any new patients that have been admitted or discharged to the ward and add any other relevant information that may be required in order to care for the patients. During the actual handover session, nurses either stand at the door or move further in to handover clinical care to the next shift. Often nurses stopped the handover to ask questions, seeking clarification or wanting to know more information. This observation differs to what other researchers had reported in the literature (see Chapter 2).

5.6.2.4 What is the actual utilisation of the (lived) space?

The space is used for a number of purposes. Its official use is for clinical handover and case meetings. However, because of its backstage features (the location being away from the patients and the privacy offered when the door is closed), the clinical nurse educator uses the room to deliver in-service education to the nurses. The room is also used as a tearoom because it is private and away from patient care areas. At meal times, nurses sit around the table to have something to eat. Here, nurses can take a break by talking to each other, debriefing about the shift and taking a quiet moment to rest before going back on the floor. At other times, the nurses use the room to hold celebrations with colleagues who may be leaving or going on maternity leave. In my field notes, I recorded during my observations that one nurse stated:

> We have a board in there where we put up thank you cards, notices about social events and photos. We do our rostering and we have a fridge in there. A lot of people will have their breaks in there when it's too busy to get off the ward. Our handover computer is in there and it's just packed with stuff. It's horrible and crowded and we all hate it but it's the only space we own as a group. Other disciplines use our fridge; they come in and eat our food. Sometimes people catch up on weekends in there and night duty hangs out in there!

What I found interesting was that this space was originally intended for clinical purposes but was redefined by the nurses as a downtime social space.

5.7 Subsidiary Spaces of the Acute Care Ward

In this section, I briefly describe the medical workroom and the registrars' room. I refer to these two places as subsidiary spaces because they were used by nurses intermittently to locate doctors or the team leader to discuss concerns that they had about a patient's health status. These backstage areas were spaces where nurses visited and paused at briefly to engage with the practitioners working there at the time, but were not places where nurses performed the bulk of their work.

5.7.1 Medical workroom

The medical workroom was intended as a workspace where all disciplines could gather and use the space to sit down and write-up charts, order tests, write clinical notes and talk to each other and those from other departments about patients in their care. The physical setup of the room, including its relative seclusion, makes quiet work possible. The material components provide access to information and ordering systems (Gregory, Hopwood & Boud 2014). Its centrality is marked by its location and the type of artefacts available for the clinicians to use, such as referral requests and clinical stationary, including patient referrals, medication charts, x-ray forms, pathology requests, clinical progress notes and observation charts. The telephones in this space are the main links to

other hospital departments and the outside world. The medical workroom has two doorways on either side that are used as both entryways and exits. Both doorways are positioned directly opposite each other, thus allowing bodies and objects to connect to the parallel corridor that links to bedrooms on opposite sides of the ward. Located on the wall at the side is a noticeboard for all clinicians to view notices about practices and clinical information. A whiteboard can be seen on one of the walls with the names of the nurses working on the shift, with the room allocation of where specific nurses can be found. Figure 5.8 presents the layout and physical arrangement of the medical workroom.
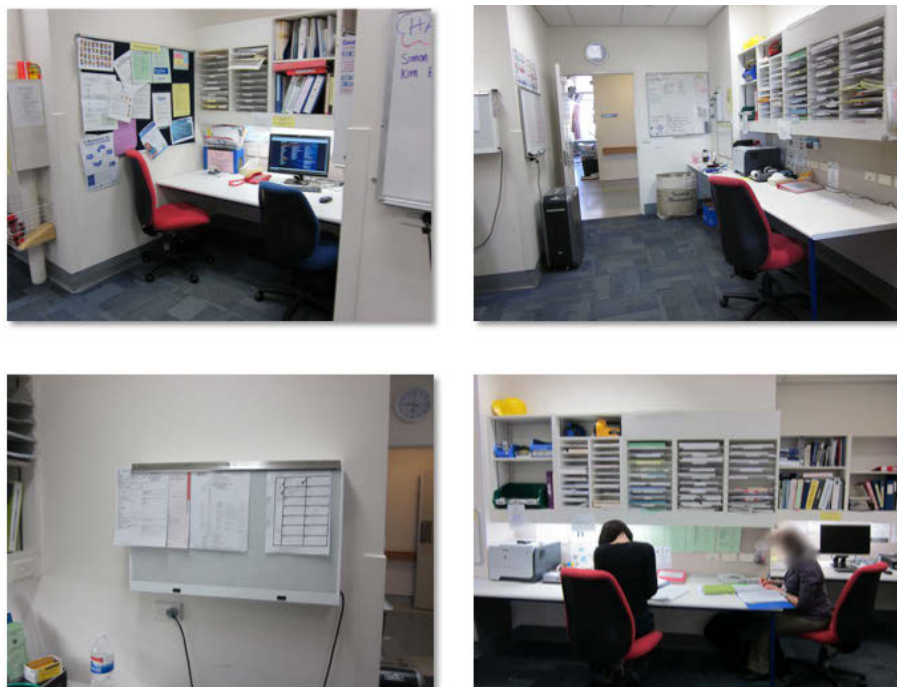
Figure 5.8: The medical workroom

Because of its centrality and its proximity to clinicians from different professions, the team leader for the shift coordinates patient care for the ward from the medical workroom. That is, the movements of beds and transfer of patients in and out of the ward. It is the team leader who is responsible for communicating information about patients to the nurses working in patient bedrooms in the ward and for liaising with medical staff and other departments around the hospital.

My field notes record one nurse describing the team leader role as:

> having many hats on, directing staff to other channels like the after-hours bed manager or teaching them how to get in touch with doctors after hours.

Another nurse described the medical workroom as:

> a sort of communication area because there are three telephones, which ring all day long. Doctors often sit in there looking up blood results or generating request forms for things. It's one of the places that you always look for a doctor if you think they are on the ward.

The medical workroom is a space where nurses know that if they enter the room they can generally find someone to help them with the challenges they are confronted with. If it is a medical concern and the doctors are not working in the medical workroom, the next place to look for them is in the registrars' room.

5.7.2 Registrars' room

The registrars' room is a space intended for doctors only. It is located at the entry of the ward and identified only with a blue door (see figures 5.1 and 5.9) modestly labelled 'Registrar'. The registrars and other doctors keep this door closed off from the main entrance to the ward. It is a private space where doctors can go to work, have lunch and socialise with other doctors. Doctors also use the room to write patient notes, look up the results of blood work, order tests and take time away from the interruptions that occur at write-up bays or in the medical workroom. Access to this room is via a pinpad entry-locking system. Only the doctors know the code for the room.

My field notes recorded nurses talking about their experiences with doctors in the registrars' room. For example, one nurse claimed that:

> You can knock on the door and, I guess depending on how important it is what you've got to say is going to depend on the type of reaction

you're going to get from the people behind the door...You wouldn't go there for something silly but it's the kind of place they go to...I don't know what they do in there really but it's definitely where they go...I have been in there a couple of times but you always feel like it's not appropriate to be in there...You feel like you go in and have a quick word and you don't linger around...I don't think that there is any specific rule...It's just a feeling that you get...I know that I wouldn't go knocking on the door for something that I could definitely wait until whenever they come out again…If I thought that it was important enough—like with the weight that the patient had put on—I would knock on the door. If it was something that could wait a little while then I wouldn't. I don't know how you make that decision. It's just based on how soon do you think something has to be done about a particular thing.

During my observations, patient's clinical records would often disappear to the registrars' room. Retrieving the notes for the nurses was a constant source of frustration. At other times, nurses would need to contact the doctors in the room to seek advice about a patient's plan of care. Figure 5.9 presents the entrance to the registrars' room.

Figure 5.9: The registrars' room

Both the medical workroom and registrars' room are essential areas for nurses to locate doctors to ask about patient care concerns. Nurses usually went to these particular spaces on their own in order to seek further clarification about the patient and to find out what action to take next.

5.8 Chapter Summary

In this chapter, I presented the different ward spaces that nurses use as they carry out acute care nursing work. As foreshadowed earlier, this is a necessary prelude to chapters 6 and 7, and adds to our understanding of where and how explicit nursing practices (such as bedside nursing, medication administration and clinical handover) take place. A schematic map was presented of the ward, showing the spaces that nurses travel through to perform patient care practices. Photographs of ward spaces depicted concrete images of the assemblage of objects, which unequivocally structure and distinguish each space. To understand how nurses redefine the space for learning, I explained and illuminated the spatial elements (conceived, perceived and lived) of the ward to mark the difference between the intended purpose, the practicalities and how nurses actually used these spaces in the ward. In addition, I began to construct a picture of the way public and private ward spaces can be significant to how and what nurses learn in practice.

Chapter 6: Creating Lived Spaces of Learning

This chapter responds to the first subsidiary research question: How do RNs overcome knowledge challenges that arise in everyday work?

Section 6.1 provides an overview of Chapter 6. I explain and justify why spatial theory was preferred as a conceptual frame to explore learning in acute care. Following this, I describe the complexity of patient care on the ward. In section 6.2, I present the first vignette, dealing with uncertainty, followed by a discussion exploring the different patterns of relations between spaces, learning and practices. This is followed by other examples that emerged across the data about how nurses coped with uncertainty as they carried out clinical work. Section 6.3 introduces and describes the context for the second vignette: managing public displays of not knowing. This is followed by a discussion about how learning is enabled in the medication room. In section 6.4, I present and discuss the last vignette: responding when you get stuck. I conclude with a discussion that addresses the first subsidiary research question (section 6.5).

6.1 Introduction

In the previous chapter, I described and contextualised a number of key spaces on the ward using Lefebvre's (1991) spatial triad. I also distinguished between areas subjected to public scrutiny in contrast to the more out-of-the-way areas of the ward where nurses could carry out work in privacy. This was a necessary prelude to answering the first subsidiary research question: how do RNs overcome knowledge challenges that arise in everyday work? Through ethnographic observation I found that nurses faced two key learning challenges: uncertainty in how to act and lack of knowledge about medication. In addition, I found that nurses responded to getting stuck by finding a solution through the team leader. Spatial analysis allowed me to show that nurses drew on several

strategies to manage these challenges. Each strategy involves creating different relationships between spaces, objects and nurses in the ward. In this chapter, I illustrate the strategies with vignettes created from observations during fieldwork and demonstrate how these strategies enabled the nurses to create the conditions in which they could learn and so overcome their uncertainty or lack of knowledge. I argue throughout this chapter that nurses overcome knowledge challenges by creating lived spaces of learning.

The chapter demonstrates this claim by exploring how nurses created learning spaces when faced with three different kinds of knowledge challenges. The first challenge examines dealing with uncertainty about practice; the next challenge focuses on nurses being asked questions about medications in a public space; the final challenge draws attention to the team leader, who is the coordinator of care on the ward. In response to the first challenge, we see how nurses change the space from one of uncertainty to one of learning by changing the relationships between people, patients, other people and objects. In the second challenge, we see a similar pattern but with the movement between a public and private space, creating a space for learning. In the final challenge, we see different instances where the one key change is the introduction of the team leader who transforms the space into a lived space of learning. The circumstances in this particular episode are conventionally understood because the main role of the team leader is the coordination of care, not pedagogy. In all of these examples, we see that the solution or way of coping with the knowledge challenge for nurses is a spatial form of coping.

Chapter 6 is the first of two discussion chapters. In this chapter, I present an analysis of three patterns of relations between spaces, learning and practices that I observed on the acute care medical ward. To explore practices and learning, I use a spatial theoretical approach as the lens to see how spaces are produced through practices and, equally, how spaces shape practices. Originally, my interest for using a spatial approach came from an earlier paper I co-authored that took Lefebvre's (1991) tripartite

theoretical framework of perceived, conceived and lived space to explore interprofessional learning at work (Gregory, Hopwood & Boud 2014). The analysis in the paper focused on practices that occurred between health professionals from different disciplines on a ward round, the medical workroom and the registrars' room. We argued that by using this framework, we illuminated elements that would not otherwise be noticeable, thus adding to our understanding of the interface between practice and learning. Accordingly, learning spaces can be better understood as being enacted, or brought into being through practices that themselves may be shaped by physical spaces, requiring professional practices to intersect in ways that bring practitioners together. In the paper, the analysis moved beyond simple notions of physical and objective space that treats space as a container for practices. Instead, it focused on a more perceptive and deeper understanding of how physical spaces and spatial practices made learning possible for health practitioners from different disciplines.

This chapter extends and enriches those arguments, showing how nurses used space in the acute care ward to create learning environments; that is, where they and their colleagues could learn. As mentioned, I present three different sets of relationships between spaces, learning and practices where learning for nurses only became obvious through the use of a spatial analysis. In Chapter 7, to develop this in more detail, I take a different approach by focusing on a specific practice, using sociomateriality to explore how learning is facilitated through practices and relationships during clinical handover.

Drawing from my conceptual framework in Chapter 3, I use Lefebvre's (1991) construction of space—specifically, spaces of representation—to examine the lived spaces of learning for nurses. While I have already explained the physical layout and spaces of the ward in Chapter 5, further exploration of lived space provides a richer, more insightful approach to illustrate and make transparent how learning unfolds during the course of practice for nurses. The spaces of representation are the spaces of lived

experience that are 'directly lived through its associated images and symbols, thus it is the space of inhabitants and users' (Lefebvre 1991, p. 39).

The act of producing the present space is understood as central to our experiences of the world (Watkins 2005). Lived space emerges through the production of appropriated space by the bodily enactments (spatial practices) of nurses and the use of objects and associated relations around them (Beyes & Michels 2011). Spatial practices are temporal, constituted through the everyday acts of interaction and movement by nurses in a given space (Zhang, Spicer & Hancock 2008). To see how learning takes place, my focus in this chapter is the lived spaces of the acute care ward as nurses carry out clinical work. This approach changes significantly our understanding of the knowledge challenges faced by nurses and their responses to them.

In the following sections, I present three vignettes from my data that were drawn from my observations, field notes and interviews to describe and illustrate the different ways of learning observed on the acute care medical ward as nurses carried out work. The aim of each vignette is to illustrate a distinct set of relationships between spaces, practice and learning that arose across the data. During the analysis, several examples of each emerged repeatedly. The vignettes are as follows:

1. First, I look at dealing with uncertainty, where we see a pattern emerging with the way certain actors and actions are introduced by nurses. This draws attention to the circumstances in which the new actors change the relationships between nurses' knowledge, the patient and the objects around them. I focus on one vignette to explore the entanglement of practices and relationships in more depth and then I highlight a number of others to show the pattern wherein the uncertainty is resolved.

2. Second, I focus on the knowledge challenges relating to medication administration and the difficulty with managing the public display of

not knowing. This display caused me to focus on the medication room, thus connecting me to the spatial practices of nurses, who move outside of the room to the bedside.

3. Third, I present the team leader, a more experienced nurse who is a crucial person for dealing with knowledge challenges on the ward. However, rather than assuming that the team leader is a person that nurses go to when they have a knowledge challenge, as characterised in the knowledge-transfer model, I examine how the role of the team leader can be understood differently as they support learning on the ward.

6.2 Dealing With Uncertainty

6.2.1 Complexity of patient care

The event in Vignette 1 is representative of six other instances that arose across the data when a nurse was dealing with uncertainty during the course of practice. Often nurses are assigned to care for a patient whose condition and treatment plan falls outside of the nurse's previous experience and knowledge base. Even the most experienced nurse on the ward will be confronted from time to time with something new. This is due to the increase in complexity of patient care in the current healthcare environment, which is constantly changing, as explained in Chapter 1. In Vignette 1, the patient acuity for the ward—that is, the measurement of the intensity of care required for a patient accomplished by a nurse (Kwan 2011)—covers 11 different medical specialties, the main specialties being haematology and medical oncology. Other clinical specialties that frequent the ward are radiation oncology, nephrology, kidney transplantation, blood stem cell transplantation, immunology, clinical pharmacology, dermatology, endocrinology and drug and alcohol issues. An example of this casemix in practice is that eight out of 10 patients may be haematology/medical oncology patients, and perhaps one or two patients may be admitted under one of the other clinical specialties that are apportioned within the ward casemix.

My reason for choosing this particular vignette is because it illustrates an event of learning at the bedside that occurred frequently throughout my data, where the nurse seemed to be dealing with some sort of uncertainty concerning a clinical situation. In this particular event, the nurse was required to negotiate a machine that had begun to ring out an alarm by providing specialty care on the spot. The nurse (Hannah) was assigned to a patient who had a disease and plan of care that Hannah rarely needed to deal with on this ward. Dialysis was not an everyday event given the usual patient casemix. The nurse handing over on the previous shift had given Hannah a protocol to use with the machine to assist with troubleshooting should any difficulties occur. At the same time as she accepted the protocol, the team leader informed Hannah 'that everything you need to know is outlined in the protocol'. What is interesting here is how the nurse deals with the situation to enable learning, given that the protocol was found not to be enough in this specific instance. Below, I give a brief commentary introducing the first scene of the vignette, Lived Space 1: Dealing with uncertainty. In the second scene, Lived Space 2, the Clinical Nurse Consultant (CNC) comes to the rescue. Later sections offer a lengthier discussion of the findings to address key questions of learning that occur during work practice.

The events reported in the vignette took place in the public space of one of the patient bedrooms. Four beds occupy the room, each bed located in a corner of the room. The patients are either lying in their beds or are sitting in a chair beside the bed. This event occurred on an afternoon shift where the RN (Hannah) was allocated to a patient (Betty) who was receiving Peritoneal Dialysis (PD). Hannah was not very familiar with the dialysis and had just taken over caring for Betty when an alarm goes off in the machine. The vignette begins at this point.

Lived Space 1: Dealing with Uncertainty

Hannah is in the middle of talking to one of her patients when she hears an alarm sounding. Hannah looks up and gazes around the room,

focusing on the PD machine in the corner, whose alarm is sounding. It is attached to another patient, Betty, located in the corner bed, who is receiving PD. Hannah walks over to the machine. Looking concerned, Hannah creases her forehead. Betty looks at Hannah.

Betty: Why is it alarming, love? Because I didn't move?

Still looking puzzled, Hannah leans over the machine to see what is wrong but struggles trying to pick up what is going on. She shakes her head hesitantly. Still fumbling, she tries a number of times to stop the alarm, pressing various buttons and becoming more frustrated as the noise continues. Finally, she finds the right button to stop the noise. The machine becomes silent just as abruptly as it began to alarm. Hannah turns and says [*to the researcher standing beside her*]:

RN Hannah: I am not that familiar with this machine, so I have to check with another nurse about what to do.

Afterwards during a follow-up interview, Hannah admits [*to the researcher*]:

RN Hannah: I haven't done the PD workshop yet. So I've got a really basic understanding to be able to set it up safely, but if it alarms or if anything goes wrong with it, I always have to go to somebody else. [*Hannah pauses.*]

Lived Space 2: The CNC Comes to the Rescue

RN Hannah: [*During the same interview.*] The other night nobody on the ward knew how to set the PD machine up, so I called the CNC from the Peritoneal Dialysis Unit, who came up to the ward. She said to me 'Well come on—I am going to show you', and she pulled out a folder [*a protocol about the specific machine and PD*] and I had to read it! Then we did it together on the patient [*Betty*]. The next night, she came back up to the ward and did the same thing. So now, I can

> set the machine up but I am certainly a very, very beginner when it comes to PD.

6.2.2 Why was this a difficult situation for the nurse in Lived Space 1?

In the vignette, the machine (HomeChoice PRO PD machine) is used for treating patients who have renal failure. As PD is an infrequent procedure that occurs only when renal patients are admitted to the ward, the nurses seldom get an opportunity to practise using the dialysis machine. In Lived Space 1, the sequence of practices involved with carrying out dialysis and the assemblage of materials creates an ongoing knowledge challenge (Jensen & Christiansen 2012) for Hannah, who has to check with another nurse about what to do before she can resolve the problem with the machine.

From a material standpoint in Lived Space 1, when the HomeChoice PRO machine alarmed, the beeping sound did not convey to Hannah what was wrong with the machine and continued to alarm until silenced or the problem was resolved. The display on the front of the machine informed Hannah that there was a problem, but she was unfamiliar with the dialysis machine and the associated procedure overall. While Hannah could read the display on the front of the machine, this did not necessarily tell her which actions or steps she needed to take to deal with the problem and recommence the dialysis. Hannah eventually succeeded to switch off the alarm, but this was by mistake as she just happened to press the right button. In this situation, Hannah was uncertain how to deal with the alarm as well as the continuing specialised care involved with this patient's treatment. She did not know how to respond knowingly and appropriately outside of luck or guesswork in the future.

————	Actor materially present
————	Visible relations between bodies and things
————	Key actors in lived space 1
----	Actor not accessed or utilized
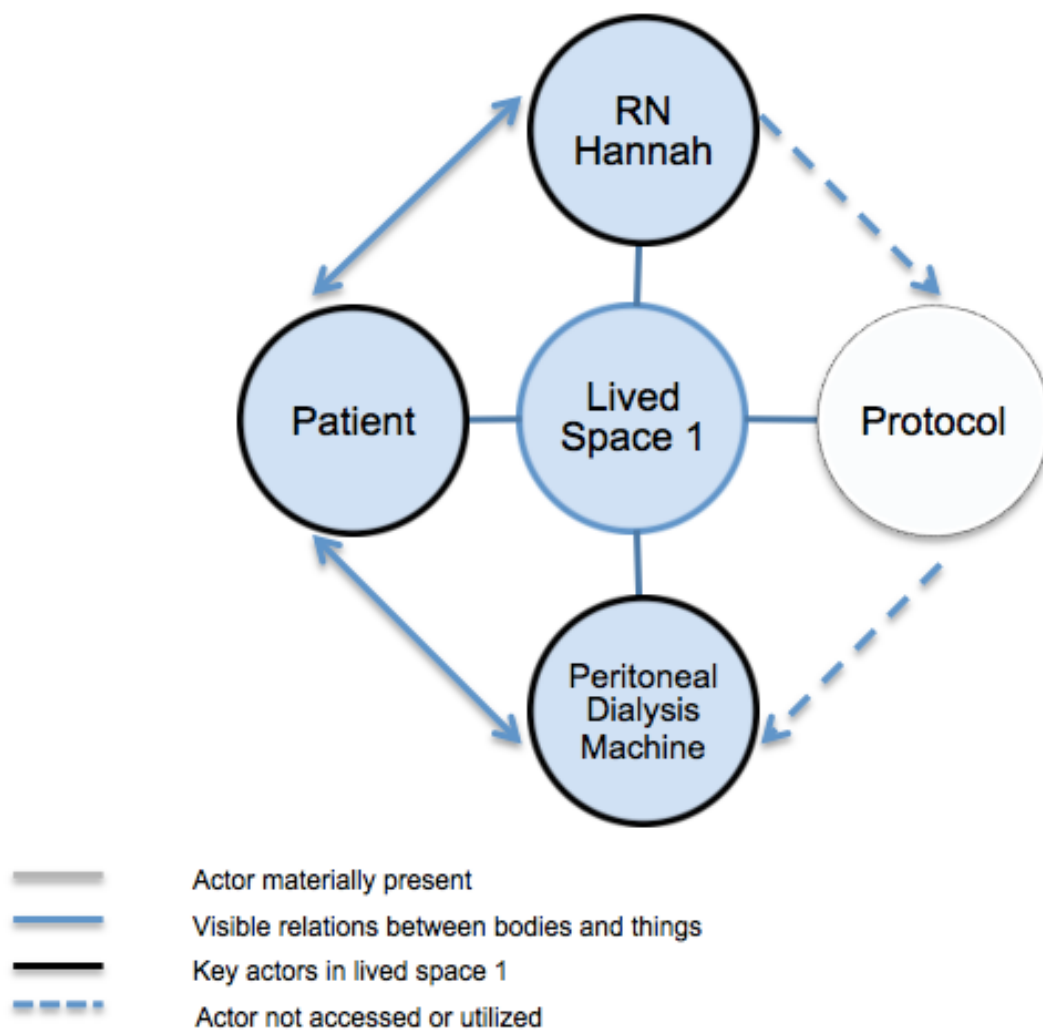
Figure 6.1: Lived Space 1—relationship between bodies and objects

The focus of interest here is the fundamental relationship between the elements as a lived space of learning. At the bedside, there are four elements that shape what is being produced in this lived space. Figure 6.1 illustrates the relationships between the nurse (Hannah) and the patient (Betty) with the present objects (the protocol and the PD machine) in Lived Space 1. Here, a bidirectional relationship is already visible and being produced with the availability and uptake in the use of the protocol by the nurse. In the scene at the bedside, the two elements that remain constant are the dialysis machine and the protocol, but the nurse and patient will change. In particular, the nurse will change every shift as new nurses come to take over caring for Betty and the PD machine. In each new Lived Space 1, a different set of circumstances is continually being produced.

Each time the alarm goes off, it is possible that the lived space may be different.

The activity described in Lived Space 1 hinges on Hannah being able to organise, perform and problem solve any issues with the PD in order to continue the treatment plan for Betty. To assist Hannah, a specific object (the protocol) was offered by the day staff as a resource. This was thought to be enough to provide Hannah with answers should any problems arise. The protocol was conceived to provide the user with pre-specified knowledge about a system. It explains how to use a piece of equipment and the correct procedure to follow in a given situation. The underlying premise of a protocol rests on trying to specify in advance what an individual needs to know in order to perform a task or to troubleshoot problems with technology such as the PD machine. But Hannah did not take up the opportunity to use the protocol, as it was not what Hannah needed at the time for this existing three-way relationship to function successfully. As argued by Hager (2011b), practices have emergent properties that cannot always be accounted for or pre-specified in a protocol. In this instance, Hannah did not access the protocol because it was not sufficient to enable a space for learning to occur. Protocols can be quite comprehensive and therefore, they don't provide quick access to the particular information needed, unless the individual is familiar with the protocol and knows exactly where to look for the information. Because the problem needed to be resolved immediately, Hannah did not think that there was enough time to search through the protocol to find out how to resolve the alarm.

In Lived Space 1, there is clearly a set of visible relations between the nurse (Hannah), the patient (Betty) receiving PD exchanges and the PD machine itself. However, the spatial practices produced by the nurse in this event resulted in the protocol not being accessed. Instead, Hannah frantically pressed a number of buttons on the machine in the hope that one of the buttons would mute the alarm and reset the machine to function normally. Later during an interview, Hannah rationalised this particular

knowledge challenge with dialysis and the machine, explaining that the part of the issue was that she had not attended the workshop yet.

6.2.3 Why was the protocol not used?

Hannah was uncertain about what she should do, yet she had the protocol. This raises the question: Why does Hannah not use the protocol here? The sense of urgency emphasised by the sound of the alarm bell signified to Hannah that something needed to be done immediately. Hannah did not use the protocol because of this urgency of time. There was no time to read the protocol because something else might have happened quickly with the machine and she did not have the confidence to deal with the situation on her own. Further, when Hannah was at the bedside with Betty, the lived space was a public space and one of patient care at that point in time.

The performance of looking at a protocol—however useful it may or may not be in that particular space—was not an option chosen at the time. Given the pace, proximity and visibility to the patient and others, the protocol is not mobilised as an actor. Also, nurses do not like reading protocols in public spaces in front of patients (as we will see Vignette 2), because this signals to the patient that the nurse does not know what she/he is doing, thus making both the patient and nurse feel uncomfortable. Consequently, it is important that nurses maintain their public professional image about knowing what to do and how to act.

A protocol is helpful in the sense that it directs the user about what to do with the machine under certain knowledge-challenge circumstances. However, a protocol cannot pre-specify in advance what the nurse needs to know or inform the user about the embodied experience for using the machine. For example, it cannot describe the dexterity or precision required by bodies when setting up and connecting the machine to the patient, or emphasise the peculiarity and detail of assessment of the situation, or provide insight to the particulars involved with decision-making as practices unfold (Mäkitalo & Reit 2014).

6.2.4 What was significant about the nurse's response and how can we understand this?

In Lived Space 1, Hannah identified that she had a knowledge challenge with the present lived space. Hannah worked around the knowledge challenge by contacting the nurse expert in PD, the CNC. In Lived Space 2, Hannah changed the dynamics by producing a new lived space by contacting the CNC to assist her with the dialysis at the time that practices emerged during the dialysis. The addition of another person changed what was being produced in Lived Space 2 (see Figure 6.2).

By introducing another body, Hannah altered the set of existing relationships between the material objects and humans to produce a new ensemble of relations, thus changing the dimensions of the lived space. By contacting a more experienced nurse (the CNC) to assist Hannah with the PD, the CNC brought other elements into the relationship that were not previously available to Hannah. In Lived Space 2, the interaction between the protocol and the spatial practices produced by the nurse were different. In this space, it became acceptable for Hannah to engage with the protocol. Therefore, these changes produced a new constellation of practices and objects that created a new space of learning for Hannah.

. . . .	Relationships between bodies and material things in lived space 2
▬▬▬	Addition of CNC
▬▬▬	Actors that remain constant
▬▬▬	Actors shaping the emergence of what is going on in the vignette
▬▬▬	Actors that constantly change
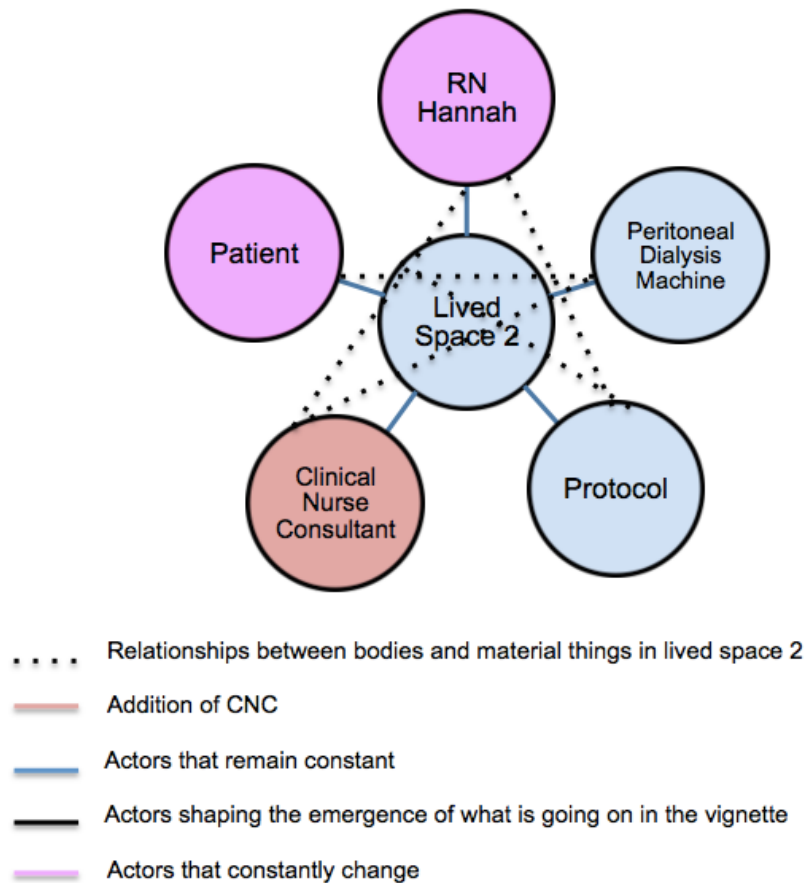
Figure 6.2: The new relationship elements in Lived Space 2

6.2.5 New relationships between bodies and objects

The CNC had a different relationship with the PD machine, the patient and the protocol guidelines, which facilitated the application of knowledge and experience with the objects to support the work practice. The addition of another person transformed the lived space and the dynamics to one of inter-relationship in action (Allen 2013). The CNC asked Hannah to read the protocol while she was there and then she physically demonstrated the dialysis and involved Hannah in the dialysis. The next night, the CNC returned to the ward and repeated the process with Hannah again. In Lived Space 2, learning was being produced through the actions of the CNC when she worked with Hannah, helping her set up the machine in combination with using the protocol. The CNC was also available to respond to any questions and her presence (Sørensen 2009) facilitated Hannah's confidence as she performed the set of practices. All of the

actors in Lived Space 2 produced and shaped learning for the nurse during the course of practice.

6.2.6 Conceptualising nurses' learning in conditions of uncertainty

Thus far, I have described and explained the complex situations in both lived spaces. These are in contrast to the conceived idea of space, where it is intended that the nurse using the PD machine would access the protocol. In Lived Space 2 the arrival of a new body changed the space and the assemblage of relationships between all elements. In Lived Space 1, there were relationships between three actors (nurse, patient and PD machine) but the protocol was redundant. In Lived Space 2, the new body changed this assemblage to include the use of the protocol, so it was now part of the complex web of elements and relationships (now five actors).

Hannah was participating less as a beginner because the expert nurse was telling her how to perform the dialysis and making her read the protocol. The CNC asked Hannah to carry out the dialysis so she would remember how to do the same thing the next time she was allocated a dialysis patient. The arrival of the CNC to Lived Space 2 was not just about the transfer of knowledge from the CNC to the nurse, but changed Hannah's relationship to the protocol (for example, Hannah knowing which section to access and how the protocol actually works), Hannah's relationship to the PD machine (Hannah knowing about its use and gaining confidence with the use of the machine) and Hannah's relationship to the patient and to the CNC.

The relationship operated now in two or more directions, taking in the assemblage of human and non-human material objects that shaped the new way of practising that produced learning for Hannah. The nurse could do the dialysis and operate the HomeChoice PRO machine for the patient on her own. The CNC afforded Hannah a sense of the pace (Johnsson 2012) of how to carry out the practice as they set up the dialysis together. The cues and signals from the CNC, other bodies and material artefacts, including the protocol, helped to shape what was negotiated by Hannah in

the unfolding dilemma. Johnsson (2012) suggested that this embodied receptive process portrays understanding as emergent; that is, dependent upon unknown cues and responses in order to create spaces for learning.

6.2.7 Theorising about learning with other practices from the data

During my observations, I noticed that knowledge challenges similar to the one encountered by Hannah occurred repeatedly. On the acute care ward, it was not uncommon for practices that were carried out by nurses on a regular basis to become routine. However, dilemmas frequently arose as a result of nurses encountering elements that were unfamiliar to them. As the ward was so diverse (encompassing 11 different medical specialties), practices that were considered non-routine emerged time after time. There were many incidents on the ward that produced uncertainty for nurses, yet they were able to be managed.

In the next sections, I focus on other examples to show the spatial pattern produced as nurses resolve the uncertainty. I look at six practices, three of which make use of three lived spaces rather than two. Using the data, I examine the patterns of how nurses responded to uncertainty. Later, I explain in more detail the events that took place that changed the set of relationships between the nurse and the problem, altering the spatial composition of elements to enable learning. Previously, Figure 6.1 illustrated three examples that arose across my data where nurses were confronted with uncertainty. These three problems produced three lived spaces before the uncertainty was resolved. In the following sections, I use red boxes to indicate the two spaces of uncertainty for the nurses concerned, then a green box to indicate the lived space of learning where the uncertainty was resolved.

6.2.7.1 Uncertainty 1: Rhesus-negative platelet transfusion

Situation: Rhesus-negative blood products (platelets) infused to a Rhesus-positive patient.

Lived Space 1 (private space)	**Lived Space 2 (private space)**	**Lived Space 3 (backstage space)**
Nurse 1 is uncertain whether the Rhesus-negative platelets can be administered to a Rhesus-positive patient. Nurse 1 asks Nurse 2, who initially says, 'Yes, it's OK'.	Nurse 1 notices Nurse 2 becoming doubtful about her answer. Nurse 1 questions if negative platelets can be administered to a patient who is positive.	Nurse 1 contacts the technician in the Blood Bank, who confirms that 'It is OK' to administer Rhesus-negative platelets, explaining by drawing on the physiology concerning rhesus factors found in blood products.

Contacting the technician brought other elements into the relationship that were not previously available in lived spaces 1 and 2. The addition of the technician to Lived Space 3 changed the nurse's relationship to the problem: knowing the rationale and understanding the physiology that underpins Rhesus-positive and Rhesus-negative blood products, finding assurance and having the confidence that the administration of the platelets will be safe for the patient.

6.2.7.2 Uncertainty 2: Dilemma of the intravenous fluid order

Situation: Two medications (magnesium and potassium) prescribed by the doctor to be loaded and administered into the same 1 L bag of normal saline.

Lived Space 1 (backstage space)	**Lived Space 2 (backstage space)**	**Lived Space 3 (backstage space)**
Nurse 1 was unsure and checks with Nurse 2, who is also unsure.	Nurse 1 checks the protocol: 'This states that these could be administered through a Y giving set which really means no they cannot go in the same bag of normal saline'. (This is more certain but is not conclusive).	Nurse 1 seeks advice from the ward pharmacist who informs her that the protocol is correct and the drugs cannot be mixed and administered together in the same flask.

In Lived Space 2, we see the addition of a protocol to address the problem. Here, confirmation was now more certain but still not conclusive. In Lived Space 3, the pharmacist was involved, offering certainty to Nurse 1 about the additives. The arrival of the pharmacist was not just the transfer and confirmation of knowledge from the pharmacist to Nurse 1, but changed the web of relationships altogether and re-established the nurse's relationship with the protocol.

6.2.7.3 Uncertainty 3: Patient with acute condition for escalation call

Situation: Patient breached the parameters of the protocol for 'Between the Flags' (escalation of patient deterioration).

Lived Space 1 (private space)	**Lived Space 2 (backstage space)**	**Lived Space 3 (public space)**
Nurse 1 was new and uncertain about what to do for a PACE call. She is not confident talking to the doctors, asking them to review the patient. Policy states that when patients breach the prescribed parameters they must be reviewed within 30 minutes by a doctor.	Nurse 1 seeks assistance from Nurse 2 to make the call (Nurse 1 stands beside her and observes Nurse 2). Nurse 2 talks to Nurse 1 about the process and provides reasons for her actions.	At the bedside with the patient, Nurse 2 stays to work beside Nurse 1, encouraging Nurse 1 to do the things required in the emergency situation. When it was not the right time to teach, Nurse 2 stepped in if the patient suddenly deteriorated.

In Lived Space 2, Nurse 2 brought other elements to the relationship, similar to those afforded to Hannah by the CNC in Vignette 1. The actions of Nurse 2 produced a third lived space by providing support and assistance for Nurse 1 at the bedside with the patient in the event of an emergency. This was not just about the transfer of knowledge from one nurse to another, but rather the arrival of a new body changed the space and the assemblage of relationships between all elements to enable learning for Nurse 1.

Earlier, Figure 6.2 illustrated another three examples that arose across my data where nurses were again confronted with an uncertainty about practice. However, these problems only produced two lived spaces before the uncertainty was resolved. In Uncertainty 4 (as in Figure 6.1), you can see in each event that the red box only indicates one space of uncertainty for the nurse concerned, then the green box signposts the lived space of learning where the uncertainty becomes resolved.

6.2.7.4 Uncertainty 4: Dealing with the underwater sealed drain

Situation: A patient is admitted to the ward with an Underwater Sealed Drain (UWSD).

Lived Space 1 (private space)	**Lived Space 2 (backstage & public space)**
Nurse 1 knows the basics but is uncertain about troubleshooting problems with the UWSD. Nurse 1 does not know how to use the emergency equipment if the drain becomes dislodged.	Nurse 1 contacts the ward educator from the respiratory ward and asks her to explain the drain. The educator explains the policy and how to look after the UWSD (using the required observations and the emergency equipment).

Nurse 1 had not had to look after a patient with an UWSD in situ before, but understands the concepts and reasons for the insertion of the UWSD in the patient's lung. She was also unfamiliar with the use of the emergency equipment sitting on the patient's bedside locker. To resolve her uncertainty, Nurse 1 contacted the respiratory ward nurse educator, who brought other elements into the relationship, thus changing Lived Space 2 into a space for learning.

6.2.7.5 Uncertainty 5: Dealing with the urology patient

Situation: A urology patient was admitted to the ward. Urology was not previously part of the ward casemix.

Lived Space 1 (private space)	**Lived Space 2 (backstage & public space)**
Nurse 1 is uncertain about how to nurse a urology patient, particularly if they have bladder irrigation in progress after prostrate surgery. The protocol is available but not accessed.	Nurse 1 contacts the urology CNC to seek advice and assistance with the care of the bladder irrigation on the acute care ward. Nurse 1 accesses the protocol with the CNC.

This example is similar to the previous case. The uncertainty for Nurse 1 developed in Lived Space 1 but was resolved in Lived Space 2 through the actions of Nurse 1, who redefined the space into a learning space by bringing other elements into the relationship that were not previously available.

6.2.7.6 Uncertainty 6: Dealing with the nasogastric tube insertion and transplant patients

Situation: Nasogastric (NG) tube insertion into a patient and looking after transplant patients was required.

Lived Space 1 (backstage space)	**Lived Space 2 (backstage & public space)**
Nurse 1 is uncertain as she has not performed the procedure (NG tube insertion) for some time. There are three different types of transplants on this ward and so it is not always the same procedure, therefore Nurse 1 is uncertain.	Nurse 1 accesses and scans through the protocol for the NG tube—she relies and gains confidence from the protocol. Nurse 1 generally knows the procedures and their differences, but prefers to have the protocol in front of her when she is preparing and setting up for the procedure concerned. Nurse 1 says this gives her the security of knowing it is there where she can reflect on it and go back to particular sections if needed.

The pattern is the same as uncertainties 4 and 5, resolving in two lived spaces, except the protocol is available and used by Nurse 1.

From all of the examples of uncertainties above, there are two patterns clearly visible. Three of the problems produced three lived spaces, and three problems produced only two lived spaces before the uncertainty was resolved. In the first three examples, we start to see a pattern emerging about how nurses respond to uncertainty. The other remaining examples have different sets of circumstances that are produced until the uncertainty is resolved in Lived Space 2. Here, the pattern is that a third lived space is not produced. Instead, similar to Vignette 1, another nurse is contacted, which changes the relationships with the assemblage of actors and objects.

In contrast, we see in Uncertainty 6 that the nurse actually gained confidence through having the protocol available, since it provided additional security when checking equipment and practices (Manias,

Aitken & Dunning 2005b). Nevertheless, protocols or bodies do not always reduce the uncertainty. What we notice in these examples is that a new set of relationships is produced, which changes the relationship between the person, objects and the problem. It is not simply about the exchange of knowledge from one person to another, but a changed set of relationships between people and other elements and how the uncertainty is managed to enable learning for the individual nurse.

Up to this point, I have described and discussed the first category of learning where nurses must deal with uncertainty during the course of work. In the next section, I continue to use a spatial lens to examine in what way specific practices and material arrangements produce the medication room as a lived space of learning for nurses. I introduce Vignette 2, then explain the practices involved for nurses when they prepare and administer medications to the patient.

6.3 Managing Public Displays of Not Knowing

Vignette 2 again draws on the data from events that I noticed during my observations. As discussed in Chapter 5, I found it helpful to contrast specific ward spaces as public and private so as to draw attention to spaces that were highly visible to the public and spaces that had restricted access and were less visible. While the main working spaces where nurses do their work are on the public or 'open floor' (Liu, Manias & Gerdtz 2013, p. 114) spaces across the ward (see Figure 5.2), I found that there were different rules of behaviour that shaped how nurses conducted themselves in these areas (Lewin & Reeves 2011) compared to when they were working in the medication room.

The purpose of this vignette is to illustrate another set of relationships between spaces, practices and learning that I noticed on the ward, concerning managing public displays of not knowing. As explained in Chapter 5, the practice of administering medications to patients is a central part of nursing work in the acute care ward. This vignette is a typical representation of the numerous times I observed nurses preparing

and administering medications. My grounds for choosing this practice were that the enactment of administering medications to patients was a recurring routine, where every nurse reproduced the same set of practices each time. More importantly, it was the way that nurses accomplished assembling the medications that afforded opportunities for learning. Because the medication room is located backstage, away from the patients, nurses are able to carry out the procedure of preparing medications in privacy. For this reason, the medication room becomes a key space where practices and spaces of learning come together during medication preparation and, later, administration.

As indicated earlier, as nurses responded to uncertainty, a spatial pattern was produced. In Vignette 2, we see a spatial pattern produced, but one that is slightly different to Vignette 1. The first lived space is one of knowledge challenges in practice (which can sometimes occur in Lived Space 2). To resolve not knowing, nurses must redefine the space as a space of learning. They do this by not only changing the relationships between people, patients, other people and objects, but also through movement. In this case, the lived space of learning is accomplished in different ways and, as a result, learning can take place in either Lived Space 2 or Lived Space 3.

6.3.1 What practices are necessary for administering medications?

Spatial practices involved with preparing medications before administration to the patient include reading the patient's electronic medication chart to determine which medications are due to be delivered. Sometimes on the prescription, the pharmacist may have already documented some instructions for the nurses about how to prepare the medication or the appropriate way to administer the drug to the patient (Liu, Manias & Gerdtz 2014). An essential component of the medication practice requires the nurse to verify the indication and dose of the medication in the *MIMS*, which is available either online or via hard copy. In addition, the nurse should check the *Australian Injectables Handbook* to

find out in what way the medication may be reconstituted and delivered to the patient. Nurses must know what the drug is for, as well as when and how to give the medication, whether there are any possible drug interactions with other medications being taken by the patient or contraindications for the drug with the specific patient. After checking the drug orders, nurses calculate and measure out drug dosages, double-checking their calculations and measurements together as they prepare the medication for delivery to the patient. It is important to note that policy requirements mandate that two RNs must check the IV medication to be delivered prior to delivery to the patient. The check initially occurs in the physical space of the medication room and then again at the patient's bedside (altogether the medication is checked at least three times by two RNs).

Medication preparation is only one of the various practices carried out in the medication room. The nurses generate other routines and practices as a consequence of being together in the medication room. The focus of interest here is primarily in this lived space of work, when medications are being prepared. In the vignette below, I show how learning is enabled and fostered as medication preparation takes place, shaping what the nurses do next.

Josephine Works with Georgia in the Medication Room

In the medication room, a first RN, Josephine, is in the process of checking the electronic medication chart HATRIX via a computer that is mounted on the wall. Josephine begins to check a medication from the S8 medication cupboard together with a second RN, Georgia, a new graduate working with Josephine. Both RNs check the medication against the prescription on HATRIX and check another IV medication that is prescribed and due a little bit later. There is some discussion between the two about how to give the medication. Both RNs refer to guidelines [*see Appendix H*] that are attached to the wall of the medication room. Still checking HATRIX, Josephine turns [*to the researcher*] and says:

Josephine*:* In the medication room, you get no distractions. So it's just like: 'How am I going to administer this? How I am going to do this the right way?' So you are checking the drugs and at the same time you are also reading either the *MIMS* online [*an online database of medicines*] or other drug books. Because once you get to the patient at the bedside, it's really hard. You can't really talk about it [*what you don't know*] because then they [*the patient and relatives*] will say she [*the RN*] does not know. And then they are going to ask questions about 'What are you going to do to me?' So it's really important that we go and check and read up on drugs in the medication room before we go to the patient. Later on, I usually print out the drug information and put it on the patient's bed notes so everybody can read it. [*Josephine rationalises the patient copy to the researcher.*] It is embarrassing if you are giving patients' medications and they ask questions that you cannot answer about the medication.

Josephine continues to check HATRIX on the computer to see if there are any medications due at this time [*08.00 hours*] for her patients, frequently referring to MIMS online. Josephine refers to the notes to see if there are any new drug orders and then rechecks the medications charted. She finds a couple of medications that are due now.

Josephine: [*Pointing to the drug information on the wall*] Using this is easier, rather than wasting time by accessing the relevant policy

Georgia, who is still standing next to Josephine, nods in agreement.

Josephine: The Nurse Educator has put these specific drug guidelines [*see Appendix H*] on the wall for staff so they can refer to them quickly, so we can administer the medication regarding chemotherapy correctly. [*Other guidelines are also on the*

wall, such as chemotherapy regimes and information regarding antiretroviral agents.]

Georgia: If I don't know, I just ask the educator or the pharmacist about the compatibility for any intravenous medications or fluids. Often the pharmacist puts instructions on HATRIX—so I just follow the pharmacy instructions when he puts it onto HATRIX, as they are always correct.

Josephine then turns back to HATRIX and continues showing Georgia how to use and look for information on the HATRIX system, clicking on various links and icons.

Afterwards, during a follow-up interview, Josephine talks about what happens in the medication room.

Josephine*:* The medication room, I guess that's the nurses' dedicated space really, because other disciplines don't need to be in there. It's got a locked door and nobody can hear you outside, so we have the radio up in there. I think it's because being small and you think you're out of the patients' view—we get a bit of privacy in there, so you can kind of talk without looking behind you. People can see what's going on but they can't hear you [*laughing*]. We complain, we debrief, we talk—it all happens in that room. There are a lot of conversations going on while you are making up drugs, you're talking about drugs, how you give them...I do a lot of teaching in there, so I work pretty closely with new staff. So, we will all be in there making up medications together, talking about what the medications are for and how we give them, any precautions that you need to take with particular drugs. Because everything is there [*computer, drugs, equipment, and medication books*] you can always ask anyone while you're searching for your medications.

6.3.2 What is taking place in the medication room?

The medication room was initially conceived to be a place on the ward where nurses go to access and prepare medications before they are given to the patient. However, in contrast, as nurses used and occupied the space, other practices were produced that shaped what happens next. Four elements (bodies, objects, social dialogue and the patient prescription) shape the spatial practices being produced in the lived space of the medication room. As we see in Vignette 2, the medication room was not just a place where nurses go to access and prepare IVs or restricted medications exclusively. As medications were being prepared, other bodies and elements came together to create a different lived space to facilitate learning. The outcome of this was the medication being appropriately and safely administered by the nurses to the patient at the bedside. Figure 6.3 depicts the elements produced that shaped Lived Space 2.
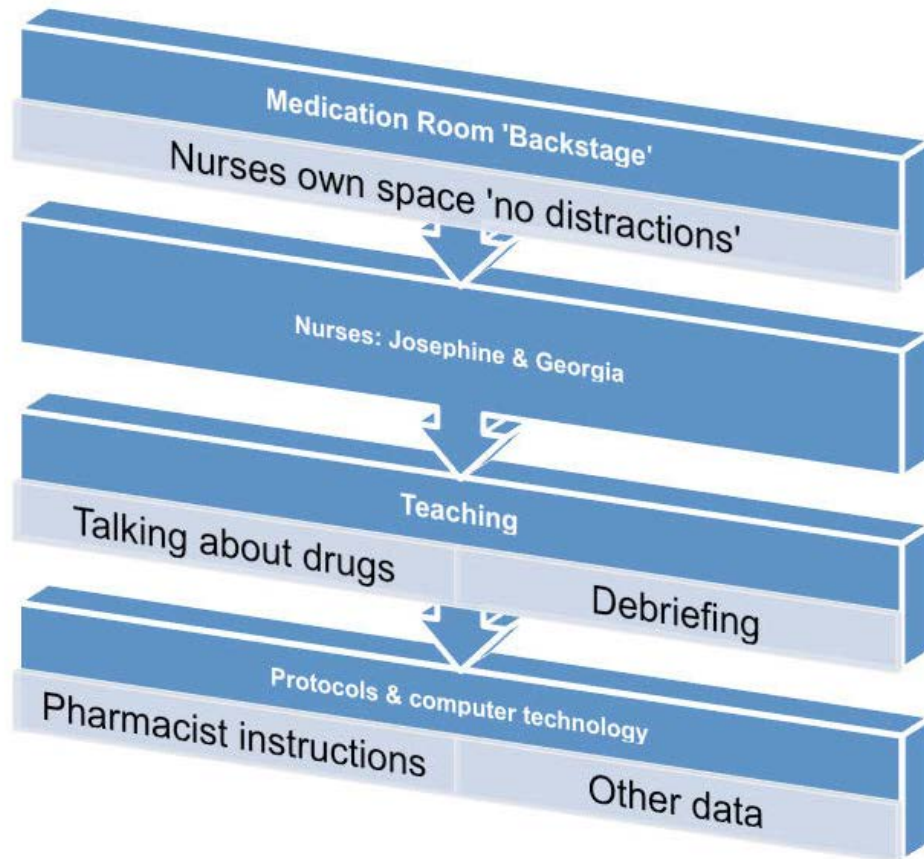
Figure 6.3: The dimensions of lived space in the medication room (Lived Space 2)

In Figure 6.3, the assemblage of objects and elements come together as Josephine and Georgia prepare and check the medications together backstage, away from patients, in the medication room (Lewin & Reeves 2011). It is also a social time for the nurses where they talk about what has happened during the shift, asking questions about practice and patient care, speaking about drugs and debriefing about what has been happening on the ward. As explained in chapters 3 and 5, because the medication room is located in a private space away from the main thoroughfare and gaze of the patient, routines become more informal and nurses can relax and step out of their public face and performance. Consequently, nurses are able to acknowledge in front of other nurses if they do not know about a particular medication. Here, it is acceptable for nurses to use the resources available on the workbench or information

that is pinned to walls, thus enabling them to know about the medication before they go back to the bedside to the patient.

From a spatial perspective, there are three lived spaces that are created from the activity described in Vignette 2. These spaces are depicted in Figure 6.4 as practices emerge. In Lived Space 1, there is no real knowledge challenge; however, in Lived Space 2, it is the spatial practices tied to medication administration that is the focus. It is in the privacy of the medication room where nurses are faced with various knowledge challenges and the possibility of not knowing about some drugs, as they review and prepare medications due to be administered to patients. Lived Space 3 occurs at the patient's bedside; however, to avoid the public display of not knowing in front of the patient and the relatives, the medication room is remobilised so the nurse can be equipped to answer any questions relating to the medications being administered. Hence, in Lived Space 3, the bedside and the medication room are actually linked.

| Lived Space 1	Lived Space 2	Lived Space 3
Nurses are in the medication room getting medications ready to prepare	Nurses use material resources and talk about drugs	Nurses administer the medication at the bedside to the patient. Nurses 1 & 2 are able to answer any questions about the medication that they are giving
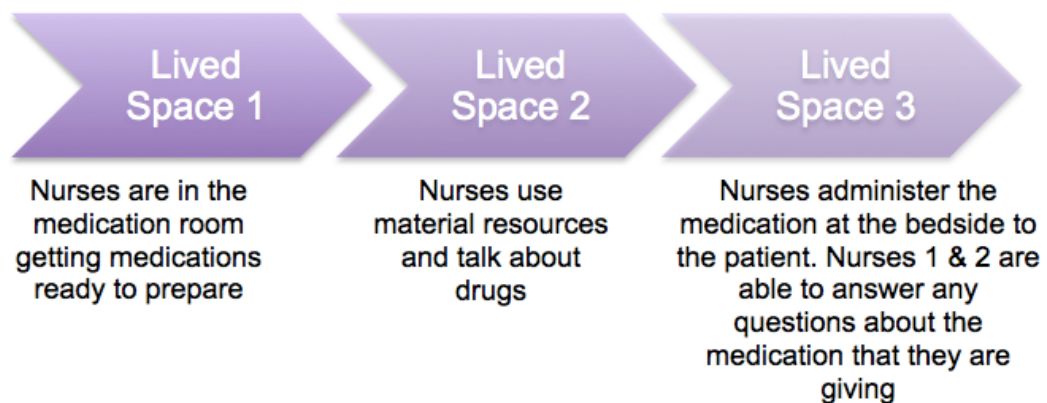
Figure 6.4: Spaces produced from the medication-preparation activity

6.3.3 How is learning required and enabled when preparing medications?

As a private space for learning about drugs, the medication room became an important bridge between the nurses and the public spaces of patient bedrooms, where the administration of the drug was carried out on the

patient (Lewin & Reeves 2011). To help understand what occurs in the medication room, I focus on the spatial practices taking place there in Lived Space 2. The network of talking, physical actions and material arrangements of bodies and elements were all part of practices involved with preparing medications. However, it was also a place where both Josephine and Georgia could use the resources made available by the nurse educator about medications that they had not given before, in private. With each patient, a variety of medications may be prescribed; some medications a nurse will know and others may be new.

Essentially, the medication room was the social nexus of the ward for the nurses, as this is the place where they continually bumped into each other and met as a part of work practice. Josephine explained that 'it all happens in there'. Because of the time of day (08.00 hours), the medication room was a flurry of activity, with other nurses coming into the room to get ready to prepare their patients' medications. With every different nurse that entered the medication room, a new set of circumstances and opportunities was created for learning (that is, other skills and elements were brought into the relationship). The process for preparing medications requires nurses to know the answer to many questions: How do I deliver the prescribed medication? What is the drug going to do to the patient? Will it interact with anything else? What are the contraindications? Is this a legal and valid drug order? Are there any possible side effects for the patient?

While preparing medications, both Josephine and Georgia had to check for any instructions from the pharmacist plus review various resources about how to prepare and deliver the medication to the patient. For safe medication administration, it is crucial that nurses look at any communication documented by the ward pharmacist, thus adding new knowledge to the assembly of elements during the preparation activity (Eisenhauer, Hurley & Dolan 2007; Liu, Manias & Gerdtz 2014; Smeulers et al. 2014). In the course of doing this, Josephine, who was more experienced, talked about drugs, showing Georgia how to find information

about the medication as well as answering any questions. It was also an opportunity for Georgia to seek clarification and validation from the more experienced nurse that she was looking up the right protocols and interpreting rules and regimes correctly. Similar to the results of Eisenhauer, Hurley and Dolan (2007, p. 85), other practices that took place in the medication room were 'anticipatory actions relating to drug side effect profiles', so as to prevent any adverse reactions. For example, both nurses used the computer to review blood work. Later, at the bedside, Georgia checked the patient's blood pressure prior to the administration of antihypertensive medication. These actions enabled Georgia to learn the importance of assessment of the patient and the evaluation of the patient's present pathophysiology. It was essential for Georgia to develop an understanding of how to anticipate potential problems before they may develop (Smeulers et al. 2014).

6.3.4 Conceptualising nurses managing public displays of not knowing

Thus far, I have focused on explaining the forces at work in Lived Space 2. The function of Lived Space 1 varied on each occasion, depending upon whether the nurses were going into the room to prepare medications, or more specifically to talk and debrief about work or personal matters. In Lived Space 2, the patient's medication prescription formed part of a complex web of elements and relationships in order for the medication to be delivered safely to the patient (in Lived Space 3).

For Georgia, learning was produced in Lived Space 2 through the actions of Josephine, who talked and showed Georgia how to look up elements on the computer with the *MIMS* online and the book on drug administration while they were preparing the drugs. The specific drug guidelines strategically placed on the wall by the nurse educator also made it easier to access information about specific medications. The use of these resources shaped the way the medication was administered to the patient. In Lived Space 3, knowing what the medication was for and the side

effects allowed Georgia and Josephine to confidently answer any questions the patient and family may have had about the drug.

In this part of my findings about spatial practices, certain kinds of knowledge challenges have emerged. Particular practices have become routinised in the ward, thus constituting the medication room in a particular way for the correct preparation and delivery of medications (Conrad et al. 2010). Such practices have enabled nurses to provide appropriate responses to questions asked about the medication being delivered. It is these specific actions that link the bedside to the medication room and to nurses' knowledge. By utilising social interaction, material resources and the knowledge of others as a form of practice-based responsive knowing, nurses learn about medications (Manias, Aitken & Dunning 2005b), the location and type of resources that are available to assist with understanding why the medication has been prescribed and how to interpret such complex information, thus delivering the drug in a safe and effective way (Smeulers et al. 2014). In addition, nurses also learn what to do if a difficulty arises with the patient during and after administration of the drug by reading the information during the preparation phase. Nevertheless, nurses cannot know everything and are constantly being faced with new knowledge challenges, so the type of spatial practices described in Vignette 2 are a way that nurses have routinised coping with the possibility of not knowing.

Similar patterns of practices to Vignette 2 were apparent repeatedly across my observations. Nurses responded via spatial practices, thus contributing to new knowledge and learning about the medication as they prepared it for their patient. The next time another patient was prescribed the same drug, the nurse would know what resources to access or what they were required to do by drawing from prior experiences that took place in the medication room.

Lived Space 1 was produced through nurses' actions with objects. This happened habitually with patients who received common medications; in

these situations, a simple performance of the task was required and no learning occurred. For instance, Lived Space 1 was in operation when nurses prepared common IV antibiotics such as Amoxicillin and Ceftriaxone or obtained IV fluids such as normal saline (0.9% NaCl) from storage in the medication room, so as to continue the patient's IV infusion as prescribed by the doctor.

The relationships between learning practices and space as characterised in Lived Space 2 arose frequently when patients were to receive more complex or less frequent medications (for example, Acyclovir and Amphotericin B or Methotrexate for a patient receiving a specific chemotherapy regime for breast cancer). Here, learning was a conceivable outcome because of the knowledge challenges that often exist with such complex drugs: not knowing about the drug because of the infrequency of use, or needing specific accreditation requirements to be able to administer the medication on this particular acute care ward. In these cases, the necessity to seek information about the drug before administration was imperative.

Spatial relations as characterised in Lived Space 3 were evident across multiple instances. I witnessed nurses being asked challenging questions by patients on various occasions about their specific chemotherapy regime or during stem cell infusions. Lived Space 2 was often remobilised in order for the nurse to cope with not knowing. However, it was in Lived Space 3 where the real-time application of professional knowledge was incorporated with the act of administration of the medication. For instance, when IV drip rates had to be calculated and set to ensure that the patient received the correct concentration of the medication, or when deciding whether special filters were also required to limit any possible reaction with the substance being administered (Eisenhauer, Hurley & Dolan 2007).

While we can see that it was useful for nurses to withdraw to a backstage region such as the medication room to manage knowledge challenges about medications in private, this action also fosters potential problems.

For example, patient input about their particular medication is no longer available, even though the patient may be an excellent source. Nonetheless, while interactions with patients and their families at the bedside were beyond the scope of this analysis, one could speculate that lived spaces of learning might be generated in such contexts. Indeed, this would be a promising avenue for further research.

Further, human resources may become more limited at certain times or perhaps not be available at all, or the nurse may be learning from peers that only know as much as the nurse who raised the concern initially. Overall, it seems that there are certain preconceptions associated with medication knowledge, insofar as nurses think that it is not acceptable to not to know about medications in a public space. Hence, the need to remobilise Lived Space 2 in the medication room in order to cope with not knowing.

Thus far, we have seen how nurses have routinised coping with the possibility of not knowing during medication preparation and administration. In the next section, I focus on the role of the team leader as they carry out work on the ward. I deliberately concentrate on the spatial practices and relationships produced by the team leader in order to see how this role can be understood differently in facilitating learning on the ward. I begin with a short overview of the team leader role, followed by Vignette 3, which is divided into two excerpts: the trouble with the IV line and doing the 'chemo'.

6.4 Responding When You Get Stuck

In Vignette 3, I draw on the data that I collected from my observations and interviews as I worked alongside and shadowed my last participant, Julie, as she was working in the role of the team leader. On the acute care ward, an experienced nurse is always allocated to work in the 'in charge' role to oversee and ensure smooth sailing in all aspects of patient care delivery. The team leader's key responsibility is to manage bed movements for the day and to communicate with and assist and direct other staff (that is,

doctors, nurses and other health practitioners) with patient care. During my observations, the team leader was the 'go to' person when nurses needed to ask any questions about their patient's plan of care. It is widely recognised that this type of clinical leadership role requires the person to be not only clinically competent and knowledgeable, but also an effective communicator, able to make decisions on the spot and possessing the ability to empower and motivate people. The team leader must also be someone who is open and approachable, perceived as a role model and visible to other practitioners on the ward (Davidson, Elliott & Daly 2006; Stanley 2014).

Vignette 3 begins as Julie is walking around the ward, initially greeting the patients. As she passes through the corridors of the ward, she bumps into several nurses working the same shift with her.

The Team Leader's Role in Learning

Julie is working in the team leader role today and has no patients of her own because she is managing all of the 34 patients in the ward. As Julie moves around the ward, she interacts with the other nurses. Her tone becomes more assertive and confident. As she stops and sees patients, they ask Julie about their care.

Julie continues to walk down the corridor where she meets the NUM. The NUM has just come from a doctor's ward round. They have a quick discussion where the NUM hands over what is happening with some of the patients on the ward. Quickly taking notes as the NUM speaks, Julie asks questions to clarify a few points, then writes down what is being discussed on her handover sheet. Julie turns to refer to her clinical handover sheet again, and then moves to see a patient in one of the bedrooms to confirm a procedure that she thinks is planned for today. She checks the patient's medication chart and begins to talk to a new graduate RN, confirming what he has done this morning for a patient.

Julie: Have you found time to order the medications for this patient?

RN: No.

The new graduate RN stops what he is doing and looks up at Julie. He asks Julie a question about the patient's drugs. Julie responds by suggesting who to contact about the ordering of the medications. In the bedroom next door, another RN, Daniel, calls to Julie for assistance.

Excerpt 1: The Trouble with an Intravenous Line

<u>**Lived Space 1: Troubleshooting an Occluded Intravenous Line**</u>

Daniel*:* Julie, could you check this intravenous line for me? I am having trouble starting the albumin for my patient [*Winifred*]. It must be blocked!

Julie enters the room, greeting Winifred as she walks around to the other side of the bed. She takes a look at the cannula site and asks Winifred:

Julie: Is it sore around the exit site?

Winifred*:* No dear, it feels fine.

Julie continues to check the line with her hands and then comes to the IV pump. The screen on the machine has an alarm light, showing 'Occlusion—no flow' on the display. Now the pump is silent. Julie continues to check the tubing up to the bottle of albumin.

Julie*:* Ah-ha. I can see what the problem is, it's just here. The way you have placed the airway in the bottle [*pointing to the long thin airway needle*]— it's stopping the flow.

Daniel*:* [*Looking closely*] Oh I see. I had some trouble putting it into the bottle.

Lived Space 2: Changing the Position of the Airway Needle

Julie adjusts the needle, demonstrating to Daniel while she is describing the way to insert the airway needle to the top of the bottle above the level of the fluid so the albumin flows. Julie informs Daniel about the physics involved so the fluid will flow freely. She asks Daniel to have a turn with moving the needle before she resets the intravenous pump machine to start. While he is doing this, Julie asks Daniel:

Julie: Why is the patient having the albumin?

Julie restarts the infusion pump, showing Daniel some special features with the pump.

Excerpt 2: Doing the 'Chemo'

Lived Space 1: Preparing for Chemotherapy

Thirty minutes later, Julie moves to the other side of the ward as she helps one of the nurses with a chemotherapy infusion. She quickly checks for IV medications due on HATRIX using the computer connected to a power-point in the corridor. Julie is the only nurse working today accredited to administer chemotherapy on the ward (she has previously attended a course). She checks the patient's blood results before preparing to start the chemotherapy. She shares this information with Hayley, the RN looking after the patient who is not endorsed to administer chemotherapy. Julie asks Hayley to look at the protocol. Julie explains to Hayley what this means in relation to the patient's current stage of the disease:

Julie: The patient's creatinine is elevated but everything else such as the haemoglobin, neutrophils and platelets are OK.

Lived Space 2: Hanging Chemotherapy

Julie and Hayley take the computer to the patient's bedroom along with the chemotherapy trolley and the medication to be administered. Using special protective equipment, Julie helps Hayley hang the chemotherapy

into the intravenous line portal, explaining the need for the additional cytotoxic precautions. While she is showing Hayley how to hang the chemotherapy, Julie explains to the patient, Mark, what they are doing and then turns to carry out the required checking procedure with Hayley.

At the bedside, Mark tells both nurses that 'they' (the doctors) were worried about his kidneys and so they had given him extra IV fluids to ensure the kidneys were not compromised and were well hydrated.

Julie*:* Yes, today we have been asked by the doctors to encourage you to take extra oral fluids, but we shall keep an eye on your fluid intake also.

During an interview afterwards, Julie talks about the team leader role:

Julie*:* At the beginning of the day, I tell everyone to come to me if they have any problems. [*Julie pauses, creasing her forehead, thinking*.] Although sometimes, new grads—they think if you're in charge that you will do everything for them, like you have to even think for them. That is really hard because, no!, it's your patient, you make your own decisions. But you can come to me if you think your patient is breathless, and we need to do something about it. But if the patient needs antibiotics or needs fluids, you know, and you want to check and you can see me running around or something, I would rather try to help them work out how they need to sort the problem out instead of doing it for them, so they've got the ability to help themselves in the future. Also, directing them to other channels like teaching them how to get in touch with doctors after hours, that's how I do it.

In Vignette 3, the team leader came into contact with other nurses while managing and overseeing patients across the ward. Knowledge challenges often arose for some of the nurses on the shift during the course of performing care work. In response to knowledge challenges, the

team leader role switched to become a rich pedagogical resource in terms of expertise so as to support the nurses. In particular, the team leaders' practices changed from caring for patients to teaching patient care. This pedagogical switch is the focus of the third set of relations, where a particular set of actions by the team leader was prompted by the nurse (the team leader responding when the nurse gets stuck). Vignette 3 illustrates that nurses' learning on the ward was mobile, flexible and emergent. Nurses who were working in the team leader role were repeatedly confronted with problems to do with clinical practice from other nurses working with them on the ward. This caused the team leader to stop what he/she was doing to attend to the problem, typically ending with an opportunity for learning and sharing knowledge with others. The events reported in Vignette 3 reveal that learning could happen anywhere and at any time on the ward. Figure 6.5 shows that only two lived spaces are created in this set of relationships, which is through the spatial practices produced by the team leader.

Lived Space 1

The team leader focuses on doing care, working across all spaces of the ward, communicating with doctors and nurses alike about issues relating back to practice and patient care.

Lived Space 2

The team leader role turns from doing care to actually producing learning about care
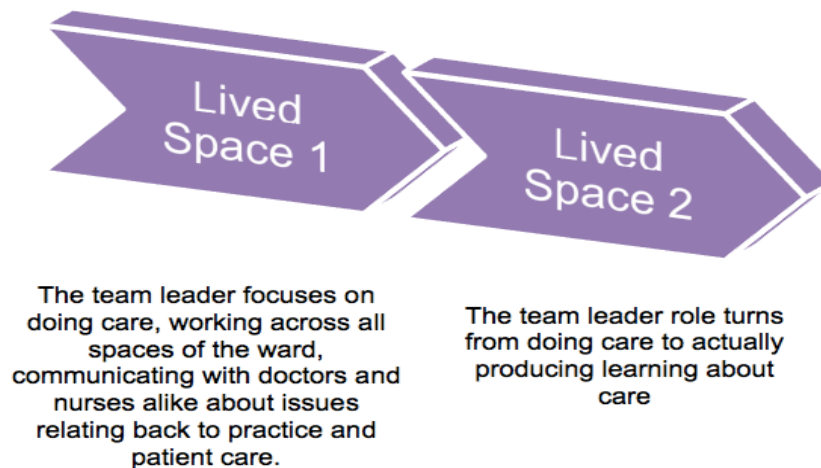
**Figure 6.5: Spaces produced by the team leader as he/she carries out the in- charge role on the acute care medical ward**

Remarkably, what was different here in Lived Space 1—in contrast to Vignette 1 (dealing with uncertainty) and Vignette 2 (managing public displays of not knowing)—was the opportunity for learning. This developed through the communication of new knowledge about patient care to

doctors and nurses by the team leader (Burford et al. 2013). On occasions, this was noticed to be bidirectional between the team leader and doctors and nurses in terms of care and practice issues, linking practices and relationships to learning. Lived Space 2 became a lived space of learning when knowledge challenges arose or simply when nurses got stuck because they did not know how to do a particular procedure or how to resolve an issue. Through the spatial practices of the team leader, RNs were coached about what to do and then later guided and mentored the next time the same situation arose.

6.4.1 Team leader, space and learning

While researchers have previously discussed the team leader role in terms of supporting care (Ekström & Idvall 2015) and the context of leadership itself (Davidson, Elliott & Daly 2006; Lett 2002; Lord et al. 2013; Stanley 2014), the role has not been described before in relation to learning. As explained in Chapter 2, many authors have focused on defining leadership and debating the type of attributes that are required to perform the role effectively. However, no research has actually examined and described the role in terms of supporting learning as clinical work is being performed by a nurse. As we can see, the team leader functioned across different dimensions in the acute care ward as they managed patient care, while at the same time supporting nurses via coaching and supervision.

In the two excerpts in Vignette 3, the one key change was the introduction of the team leader, who transformed the space into a lived space of learning. In both situations, the team leader produced a different set of relationships with objects and elements in order to resolve the practice knowledge challenges. The first excerpt concerned a practice challenge (the trouble with the IV line), so the team leader was initially mobilised as a knowledge agent to troubleshoot why the line was not working. This immediately changed the space to a space for learning as the team leader explained to the RN what was happening with the line and why. In the second excerpt, the team leader was again mobilised as a knowledge and

practice resource because this particular practice was quite risk-laden and complex. The need for the practice to be carried out correctly and in a safe way resulted in unaccredited nurses being coached by the team leader. For Hayley, this changed the space to a lived space for learning as she administered the chemo. Practices were shaped and performed correctly by having the expert team leader coaching and supervising. We can see that learning for nurses in both instances was emergent, mobile and flexible. The availability of the team leader, who was a more experienced nurse and a crucial person for dealing with knowledge challenges on the ward, meant learning could take place at any time and in any space on the ward.

6.4.2 Conceptualising the team leader as an enabler of nurses' learning

To elucidate the relationships between space, practices and learning, I draw attention to the interview regarding Julie's view and approach in response to being the 'go to' person on the ward. Julie stated that when there are problems, rather than being the person that fixes the problem for the nurse concerned, her stance as the team leader is that the nurse should think about what is occurring at the time and how the issue could be resolved. Julie firmly believed:

> No! It's your patient, you make your own decisions but you can come to me …I would rather try to help them work out how they need to sort the problem out instead of doing it for them.

From this account, we see that Julie encouraged nurses to learn to think through problems for themselves first. This is constituted through spatial practices produced by Julie while she was working alongside them in support. This is very different from the knowledge-transfer model that involves Julie telling the nurse how to resolve the knowledge challenge.

In the first excerpt, RN Daniel sought help with an occluded line (Lived Space 1). Julie changed the lived space to a lived space of learning (Lived

Space 2) through her actions, explaining to Daniel why he was having problems with getting the albumin to flow. She asked him to manoeuvre the airway needle so he could see the difference of what was occurring and experience what was happening with the airway, feeling the movement of the needle in a certain way. Julie provided Daniel with a rationale about why this problem was happening. This allowed Daniel to understand why the problem occurred. The team leader also explained other special features relating to the intravenous pump that Daniel had not noticed before. Here, learning for Daniel was shaped through his interactions with Julie. Daniel could now comprehend the situation through his own actions (by moving the airway needle) and understand why the pump was alarming and not permitting the albumin infusion to commence.

In the second excerpt, Julie prepared to hang chemotherapy on a patient. RN Hayley joined Julie in the medication room while the chemotherapy was being prepared so she could learn how to perform the chemotherapy. In Lived Space 1, Hayley did not know how to prepare or hang chemotherapy as she had not completed the chemotherapy administration course and so was not accredited to undertake this by herself. Julie stood alongside Haley while she carried out 'doing the chemo'. What is interesting here is that Julie changed the dimensions of the lived space by making the opportunity available for Hayley to carry out the procedure, thus producing a new lived space that afforded learning for the nurse.

Haley's learning was produced in this lived space through her performance of 'doing the chemo', where she could understand the difficulties of connection. She learned how to eliminate contaminating sterile lines during connection and a chemical spill (using the equipment correctly during the procedure and discarding the equipment according to cytotoxic protocols). Hayley's relationship with objects and people during chemotherapy administration thus changed. In Lived Space 2, Hayley learned the importance of wearing Personal Protective Equipment (PPE) (learning what equipment to wear and how to put it on her body), how to ensure that the patient has a patent access site (how to check that the

vascular access device is patent), how to connect the chemo to the patient safely so as not to cause a chemical spill (how and to which port does the line connect, which clamp to turn off and when to turn the clamp on again), and the appropriate disposal of the used equipment after the procedure is finished (knowing the order of removal of PPE and location and correct colour of the cytotoxic waste bin and sharps).

In this section, I described the role of the team leader and the way the role can be understood differently by supporting and making learning available to nurses during work. The focus for learning lies in the relationships and practices of the team leader rather than the transfer of knowledge alone from one nurse to another. What is significant here is that the role of the nurse turns from one of doing care to actually producing learning for another nurse about care.

The next section addresses the first subsidiary research question based on my analysis of the patterns of relations between spaces, learning and practices described.

6.5 Conceptualising the Relationships Between Spaces in the Acute Care Ward and Nurses' Learning

This chapter has addressed the first subsidiary research question: How do RNs overcome knowledge challenges that arise in everyday work? To answer this question, I used a spatial theoretical approach to explore how and what nurses learn on the acute care medical ward. The use of a spatial lens offered a richer, more in-depth analysis of my data, which I recounted via three vignettes. This enabled the illumination of objects and practices that were not otherwise visible (Gregory, Hopwood & Boud 2014). In using this approach, my attention was drawn to particular physical spaces on the acute care medical ward (such as the patient bedrooms, the medication room and the clinical handover room during handover, which frequently filtered out into the corridors and back to the

bedside). These were the key spaces where nurses performed the majority of clinical work.

Previously in Chapter 5, I described and contextualised key spaces on the acute care ward using Lefebvre's (1991) spatial triad and differentiated public and private spaces of the ward. This was necessary to see the type of practices that took place in ward spaces. In Chapter 5, I argued that nurses learn in particular ways in certain spaces and that some elements are more acceptable to learn in a public space than others. Building on this, Chapter 6 has provided a new understanding of how and what nurses learn at work. I have described several kinds of knowledge challenges (uncertainty and not knowing) and examined the role of the team leader. From these events, I have shown that nurses overcome important knowledge challenges arising in their work by creating lived spaces of learning in practice. From my findings, there were different ways that nurses accomplished learning depending on whether the issue was about being uncertain about practice or the challenge concerned a lack of knowledge.

6.5.1 Public and private spaces

All three vignettes gave an account of dealing with either an uncertainty in practice or a knowledge challenge. Vignette 1 presented an uncertainty regarding the use of the dialysis machine at the bedside. Later, other challenges similar to the first vignette were raised and discussed. There were similarities between all of the knowledge challenges. Each concerned a practice issue in a public space in front of the patient and/or others. From the data presented, it seemed that these concerns were about a practice that nurses were not always expected to know. In these events, it was socially construed as acceptable for the nurse to resolve the uncertainty in a public space at the bedside. Therefore, resources were brought to the public space in order for the nurse to learn what to do.

Although Vignette 3 differed from this by involving the team leader as part of the solution to the challenges raised by nurses, it was similar to Vignette

1 in that nurses found it acceptable to resolve the uncertainty about a practice in the public domain.

In contrast, in Vignette 2, when the challenge related to a lack of knowledge, the nurse withdrew to a backstage area so they could seek expert advice from peers and/or review other documentary resources. However, by doing this, the nurse could not consult with the patient about their medication until they returned to the bedside. In the medication room (a private space), it seemed that it was acceptable for the nurse not to know, yet in a public space, the nurse was expected to know about medications.

Through the vignettes, we can see that spatially, there is acceptable not knowing versus unacceptable not knowing. Hence, the acceptable was resolved in public spaces and the unacceptable was resolved in private spaces. Thus, ward spaces were utilised and practiced in particular ways by nurses; when these came together, a lived space of learning was produced.

6.5.2 Relations between spaces, learning and practices

I identified and described three different sets of relations between spaces, learning and practices. Three distinctive patterns were apparent in my analysis, which were linked to particular knowledge challenges. These patterns developed out of responses to challenges in practice and dealing with uncertainty. We also saw managing public displays of not knowing and the ways that the team leader was mobilised as a learning resource when practice became difficult, when nurses got stuck or as knowledge challenges arose.

Vignette 1 showed how nurses learned to manage and deal with non-routine practices by creating lived spaces in which relationships between nurses, patients, tools and other people changed to facilitate knowledge and practice taking place. Vignette 2 showed the way nurses used spaces and objects to accomplish preparing medications. However, in the course

of doing this, particular practices and relationships were routinised, not only to ensure the correct preparation and administration of medications but to also enable nurses to learn about the medications they administered to their patients. In Vignette 3, the team leader was mobilised as a learning resource that was emergent, mobile and flexible in order to support nurses doing and learning how to perform practices in the ward.

6.5.3 Redefining space

In my research, nurses learned to respond to uncertainty and not knowing by redefining the space in which they are working as a pedagogical space. Their way of coping with a knowledge challenge was a spatial way of dealing with the problem, which has not been illuminated or described before in the literature. Likewise, using a spatial approach has proved to be a rich and perceptive tool to understand how nurses overcome uncertainty and not knowing. My analysis has addressed the question of how nurses respond to knowledge challenges, indicating that they respond by creating lived spaces of learning in practice. My argument is that nurses do this by changing the relationships between nurses, patients, tools and other people so as to enable new practices to occur.

Regarding what nurses learned, Vignette 1 showed that by changing the relationships between people and objects, a new space was created where the nurse learned how to use the protocol (which section to access and how the protocol actually worked) and, more importantly, how to use the dialysis machine attached to the patient. Following this, six other examples were briefly examined (three producing three lived spaces, the other three producing two lived spaces before the uncertainty was resolved). In these examples, nurses learned about Rhesus factors when administering blood products to patients, how to correctly administer drug additives, and how to manage care for a patient with an UWSD and a patient with bladder irrigation in progress. Again, the relationships changed between people and objects so that learning emerged. In contrast to these events, we also see that when caring for NG tubes and

patients who have received a transplant, nurses learned to use the protocol as a resource and checklist so they could provide the right care in response to uncertainties.

Vignette 2 highlighted that when not knowing about medications, nurses learned to resolve this by going back to the privacy of the medication room, where they could review resources available or ask other nurses about how to administer particular drugs. In these cases, nurses learned to know that they could also find the answer to the knowledge challenge in the medication room.

Vignette 3 differed slightly to the other vignettes in that the team leader became the knowledge source for the nurses working on the ward. Subsequently, nurses learned to consult with the team leader about imminent knowledge challenges or problems about practice. Thus, the team leader was a resource that enabled nurses to learn in the public spaces of the ward.

These findings have helped me to understand the different ways that nurses respond to challenges in the context of practice. Using a spatial lens has recast the notion of the team leader in different ways and framed uncertainty and not knowing as ongoing in parts of work. However, uncertainty and not knowing are not a result of inadequate professional training. Rather, they are unavoidable due to the vast content and nature of practices involved in nursing work. Nevertheless, the findings show uniquely that what is important is not just the nurses' individual knowledge or skills, but what they are able to exploit and change in the social and material composition of their workplaces to deal with challenges, therefore producing a lived space of learning.

6.6 Chapter Summary

This chapter used a spatial theoretical approach to explore how and what nurses learn on the acute care medical ward. I proposed that there were three patterns of relations, learning and practices that took place on the

acute care medical ward. I presented findings reported through three vignettes, dealing with uncertainty, managing public displays of not knowing and responding when nurses get stuck. The justification for this chapter was that nurses learn in particular ways in certain spaces and that some elements are more acceptable to learn in a public space than others. Throughout the chapter, I argued that nurses overcome important knowledge challenges arising in their work by creating lived spaces of learning. The findings revealed that nurses coped with knowledge challenges by changing the relationships between the nurse, the patient, tools and other people to enable knowledge and practices to take place. As a result, the solution or way of coping for nurses became a spatial form of coping. The complexity of knowing and not knowing is evident in the data.

In Chapter 7, I carry forward these spatial ideas, particularly focusing on practices and relationships, to address in what way a specific artefact, such as the clinical handover sheet, enables learning for nurses during clinical handover practices.

Chapter 7: Learning to Make Practical Meaning of Patient Information

This chapter responds to the second subsidiary question: How do RNs make practical meaning of patient information?

Section 7.1 provides an overview. Section 7.2 explains why the clinical handover sheet was chosen. Section 7.3 describes and contextualises the use of the clinical handover sheet during the enactment of clinical handover routines and compares and contrasts the sheet with other forms of clinical records used in practice. Section 7.4 reframes the clinical handover sheet as an object (within a particular sociomaterial theoretical perspective) so as to examine the work that it does in practice. Section 7.5 analyses four clinical episodes about clinical handover practices to expose how nurses cope with certain kinds of knowledge, forms of knowing and knowledge challenges during work. Sections 7.6–7.8 discuss and summarise these findings, drawing on the sociomaterial conceptual framework described in Chapter 3.

7.1 Introduction

In the previous discussion chapter, I presented a spatial analysis of three different practices that I observed during my fieldwork on the acute care medical ward. This analysis showed that nurses created different relationships between patients, objects, nurses and other people in order to learn. I carry those spatial ideas forward here, with particular attention paid to practices and relationships since these highlight the situated use of material artefacts.

In Chapter 1, I highlighted the complexity involved for nurses in the contemporary acute care health environment and the recent moves towards providing practitioners with an abundance of information resources, protocols and guidelines. These were in line with the New

South Wales (NSW) Government's drive for regulating practices to decrease risk and improve patient safety in acute care hospitals. In this chapter, I address the second subsidiary question, which focuses on this abundance of patient information by asking: how do RNs make practical meaning of patient information?

Through my fieldwork, I found that nurses linked their formal expertise with particular incidences about patient care through the clinical handover sheet. As explained in Chapter 3, I noticed that this object was quite significant for nurses to use and translate information into meaning. Conceptual tools from sociomateriality (Fenwick, Nerland & Jensen 2012) allowed me to show how nurses' practices with and around the clinical handover sheet (i.e., the ways that information was recorded and the practices that encompassed using the sheet) contributed to learning. These practices allowed nurses to bring specific patient information and expertise into meaningful contact, so that they could act on knowledge challenges and continue to provide patient care. In this chapter, I illustrate this with events that were observed during fieldwork by showing the clinical handover sheet as an 'artefact of knowing' (Ewenstein & Whyte 2007, p. 82) for nurses. I argue throughout this chapter that nurses learned as practices created the clinical handover sheet as an epistemic or boundary object.

As with Chapter 6, in this chapter I make visible what nurses are learning, the activities and processes that cause learning and the situational conditions taking place at the time. It was during my observations that I became informed by sociomaterial approaches (Fenwick, Nerland & Jensen 2012), which cast a very different role for materiality in practices and learning. I then focused on an object, the clinical handover sheet, which was a critical artefact used by nurses for performing work, its main function being to be a personal record of essential details about the patient to enable care (Scovell 2010). Some of what is being learned can be traced through the sheet but not everything, because much learning is prompted by the object, but is not contained within it. The learning that

takes place for nurses can be mapped when nurses write diagrams or words on the clinical handover sheet, yet the rest remains invisible.

Understanding the clinical handover sheet as an epistemic or boundary object (Ewenstein & Whyte 2009), as I proposed in Chapter 3, revealed how nurses' practices with and around the clinical handover sheet contributed to learning by bringing specific patient information and the nurses expertise into meaningful contact, so that the nurse could act on knowledge challenges and continue to provide patient care. These practices are in some ways different to those discussed in Chapter 6. By looking at the clinical handover sheet in this way, I found that this particular lens drew attention to what was being learned, together with the conditions and processes happening while learning took place. From this, I was able to see the significance of what and how nurses are learning in their use of the sheet during practice. These findings gave me a new way of describing how nurses make meaning of clinical information on the sheet, which is linked to their actions.

By making use of sociomaterial theoretical assumptions, I present an analysis of my data that is illustrated and supported through four episodes observed on the acute care medical ward. These are the routine of formal clinical handover, bridging the hurdles when handing over to doctors; using the clinical handover sheet as a form of knowing; picking up on misleading information on the clinical handover sheet; and mapping the changes in patient progress. As explained in Chapter 4, I focused my analysis on the raw data, which were the richest for answering my research questions. In forthcoming sections, I present the data by integrating excerpts from field notes and quotations from low-inference transcripts via explicitly constructed vignettes and narratives of events.

The purpose of this second discussion chapter is to focus on meaning-making within a specific practice rather than investigating a set of practices. As I discussed in chapter 1, for knowledge to become meaningful, nurses need to take action on what they discover, and so

meaning making occurs through the processes that nurse's use to link information with practice (Daley 2001a, p.47). Therefore, it is in this way that I use the term 'meaning making'. Because I became informed by sociomaterial approaches, I decided to examine clinical handover practices, in particular the use of an explicit object critical to handover, the clinical handover sheet, so as to understand how nurses learn as they work. An important reason for choosing this particular practice is that it is a central part of nursing work that routinely happens every day. As part of the healthcare trajectory for patients, nurses must communicate and handover specifics about care to other practitioners. This connection with others during handover is a part of daily work that provides potential opportunities for learning. Often, the practices embedded in clinical handover are messy and complex in nature due to the assemblage of information sources and the way elements may be communicated by practitioners. New challenge issues may not be consistent and there may be incidents that arise from time to time that present significant knowledge challenges, but these are not regular or systematic. In the course of working through challenges, learning of particular intensity and significance unfolds. For these reasons, clinical handover practices offered a fruitful opportunity and perspective from which to explore and illuminate learning during everyday work.

The focus for this chapter does not lie in the enactment of clinical handover itself, but rather through the different ways in which a material object (the clinical handover sheet) is used and reproduced by nurses as a work-management tool, a knowledge reservoir and a learning device during work practice challenges (Frers 2009).

7.2 Why was the Clinical Handover Sheet an Object of Interest?

During the data collection phase of my study, I noticed that nurses were continually referring to a specific object throughout the day. This piece of paper seemed to be critical for managing and performing work. The

material object was known as the 'clinical handover sheet' and was used by the nurses as a tool for managing clinical practice, communicating clinical information to others and locating patients in bedrooms for visitors, doctors and other personnel. This object was kept in uniform pockets on bodies at all times and only taken out if information about patients was required or if this information needed to be updated. I focused on the clinical handover sheet in order to answer my second subsidiary question of how RNs make practical meaning of patient information. My reasons for this were that the sheet was an object used all of the time and, conceptually, it offered a rich basis for a theoretically informed analysis of materiality and learning.

During clinical practice, the handover sheet operated as a repository for handwritten notes that were taken down primarily from the formal clinical handover carried out at the beginning of the shift. In fact, the significance of the clinical handover sheet to nursing practice was that it occupied the most critical element in the assemblage of the clinical handover routine. Because patient information is quite ephemeral, unpredictable and continually fluctuating as circumstances change for the patient, the clinical handover sheet becomes a versatile tool that supports daily clinical practice and continuous access to information about the patients (Iversen, Landmark & Tjora 2015). However, what is significant here is how the clinical handover sheet was used to help nurses cope with certain kinds of knowledge and forms of knowing and knowledge.

In the following section, I briefly define and discuss what constitutes nursing clinical handover practices. The justification for this is to provide a foundation for understanding the assemblage of elements in the handover routine, and provide a context for the use of elements and the relationships involved in handing over of patient care by nurses to others in the acute care medical ward.

7.3 What Is Clinical Handover? How Is It Enacted?

Clinical handover is broadly defined as 'the effective transfer of professional responsibility and accountability from some or all aspects of care for a patient, or group of patients to another person or professional group on a temporary or permanent basis' (NSW Health 2009, p. 1). Handover is given at the beginning of each shift to the next nurses taking over the care of patients. It involves the transfer of patient information and events that have taken place for the patient or group of patients during the previous shift.

Traditionally, the nursing clinical handover has been delivered in a separate location on the ward away from patients. The intention for holding the handover in a stand-alone space away from the patient care areas is to enable it to be delivered without interruption from others (that is, from practitioners that are from other disciplines and patients who are seeking a nurse's attention to carry out tasks or to provide nursing care). If patients have not yet been informed about their condition or progress by their treating medical practitioner, then holding clinical handover away from the patient allows nurses to pass on information about care, out of the hearing range of patients. However, more recently, public enquiries (Garling 2008) and Ministry of Health initiatives have attempted to shift the clinical handover back to the bedside in order to produce a more patient-centred approach to care delivery (Johnson & Cowin 2013).

7.3.1 Clinical handover routines

Clinical handover is a routine practice that occurs every day on each shift. Handover is made possible by an allocated scheduled time. Routines such as the daily enactment of clinical handover are characterised by the repetitive recognisable patterns of interdependent actions that are conducted by the multiple nurses in attendance (Feldman & Pentland 2003). In addition, the enactment of clinical handover brings into production various practices that professionals use to 'build up intellectual

resources for defining, remembering, reporting and accounting for their everyday work' (Mäkitalo 2012, p. 64) at the handover.

The performance of clinical handover has clear patterns and structures in it that incorporate particular bodily layout, such as the assembly of bodies and elements around a table, poised waiting to hear the handover from the nurse standing at the door. It also includes a sequencing of what people say either by handing over patient-by-patient or by who speaks first in the routine (there may be key people at specific times who add additional information). The routines of handover involve not only remembering or re-enacting the past, but also adapting to contexts or situations that necessitate constant modification with later reflection about the meaning of these actions (Feldman & Pentland 2003).

7.3.2 Challenges created by casemix diversity at clinical handover: Not knowing

As described in Chapter 6, the acute care ward embraces 11 different medical specialties. As a result, the casemix diversity regularly presents new information at the clinical handover, often confronting the nurses present with new challenges. The nature of clinical practice is such that nurses are faced with elements that they might not know but have to deal with during the shift to progress clinical care for the patient. Occasionally, elements may be omitted during the handover, so the nurses coming on to the shift must also deal with the possibility of missing information once handover is finished. This raises questions about the way nurses find out and obtain missing information, which will be addressed later in the chapter. For the nurses who are present, some may have gaps in knowledge and practice, or areas where knowledge is insufficient. At other times, there are some elements they will know and be able to deal with from prior experiences and current knowledge. Even the most experienced nurse on the ward will be confronted from time to time with something new. Less-experienced or new nurses will be faced with huge gaps in

knowledge about clinical issues, so the nature of practice is such that it generates learning challenges.

Once the formal part of the clinical handover is finished, the oncoming nurses vacate the clinical handover room, relocating to the ward corridors and specific bedrooms of their assigned patients. The nurses weave in and out of bedrooms and corridors, visiting their patients, listening and taking note of any additional information that has not been disclosed during the formal transfer of care at handover. Once the bedside handover is completed, the individual nurse assigned to a set of patients formerly takes on and accepts all responsibility for the ongoing care and management of each patient for the following shift.

Although there are some clinical handover practices where the clinical handover sheet can be traced back to the bedside, it is important to mention that there are other handover practices where the patient remains the focus but is not present. For example, the patient is seldom present when nurses communicate to other disciplines about problems concerning the patient's clinical status, issues with care or test results that breach normal parameters. This type of communication may occur either in the medical workroom, at the door to the registrars' room as shown in Chapter 5, or at individual satellite write-up bays so as to acquire a review and change of medical orders quickly.

7.3.3 Clinical handover sheet

The clinical handover sheet is a piece of paper that nurses use to write down essential clinical information about the patient. The tool is composed of two-to-three pages, comprising both symbolic shorthand and text that has a shared meaning among the practitioners on the ward. The material properties of the clinical handover sheet represent the numerous clinical discussions about patient care that have been held by other practitioners throughout the shift. As nurses handover, they re-construct this narrative to others based on the contents recorded on the sheet. Other charts and files are often used in conjunction to the handover sheet to further add and

support the clinical information being conveyed. Similar to the patients' clinical records, this object is used as a tool that helps nurses talk about their patients and a variety of other issues. Using the sheet, nurses ask questions about their patients, which helps them learn about their patients and about the nature of care required.

The basic template for the clinical handover sheet consists of a table. At the top of each column there are typically the following headings: bedroom number (refers to a specific location in the ward), name of the patient, age, diagnosis, history (indicating past history), current care, blood counts and access (see Appendix H).

During the formal handover, nurses create their personal script about what has been conveyed during the verbal report on their clinical handover sheet. Other annotations and remarks made by the nurse on the handover sheet are determined by the events occurred with the patient on the shift, by any clinician who saw the patient, any planned procedures, blood work and radiology and whatever other care the patient received or were scheduled to receive. The same handover sheet may be used over a few days, particularly if the individual nurse is allocated the same group of patients to care for during that time. Throughout my observations, nurses were seen to use the clinical handover sheet to write down details such as the time that medications or procedures were due, therefore using the handover sheet as a checklist, marking off items once they were completed.

The clinical handover sheet is not a formal record that forms part of the clinical collection of records shared between nurses or other practitioners. From a legal perspective, the clinical handover sheet is also not a document that is part of a patient's formal clinical record (Iversen, Landmark & Tjora 2015). It is private and benefits the owner (the author) who has tailored the device at their own discretion to meet their own needs and requirements for managing and performing both work and social interactions with other practitioners about patient care. It is only

visible to the nurse who has created the sheet and not accessible to others.

In contrast, the patient clinical healthcare records are public artefacts, insofar as being available to all practitioners who are delivering care to patients on the ward. In the acute care setting, the patient healthcare record is 'the primary repository' of all documented information from all sources, including medical, nursing allied health and therapeutic progress and health outcomes for each intervention or interaction (NSW Health 2012). These records are social, in that they communicate conversations about the patient and plans of care to all practitioners who have access to the file. Frers (2009) referred to the patient healthcare record as a reservoir of specifically coded knowledge that serves as a link to other practitioners who have played a part in co-producing the file. However, the reader must be cognisant of medical/nursing language in order to make sense of what is happening with the patient.

In the next section, in order to make learning by nurses visible, I discuss my reframing of the clinical handover sheet as an object within a particular sociomaterial perspective and my reasons for doing so.

7.4 Re-conceptualising the Clinical Handover Sheet as an Object Within a Particular Sociomaterial Theoretical Perspective

In preceding sections, I have described the clinical handover sheet as an artefact that plays a collaborative role in the ongoing management and coordination of patient care. Nurses share what they know about patients with other practitioners using this tool. To explore nurses' learning in practice in new ways, I reconceptualise the clinical handover sheet as both an epistemic and a boundary object. In doing this, I primarily focus on the work that the clinical handover sheet does in clinical practice as nurses are using it. The clinical handover sheet can as discussed in chapter 3, be multidimensional (Ewenstein & Whyte 2009), meaning that it can possess

the properties of both a boundary object and an epistemic object at the same time, depending upon the situated use of the object shaping the activity. I am using it in both perspectives.

My reason for reframing the sheet as a particular type of sociomaterial object is to understand its function as an overlooked feature in the ward. The clinical handover sheet is frequently mentioned in the literature, but not examined in-depth (Hardey, Payne & Coleman 2000; Iversen, Landmark & Tjora 2015; Johnson & Cowin 2013; Staggers et al. 2012). As a result, I was drawn to the unexplored potential of the clinical handover sheet, which I saw as significant in different ways. The use of sociomaterial theories—in particular, concepts of epistemic and boundary objects—helped me to extract what kind of work the clinical handover sheet actually does in relation to nurses' learning. Thus, by re-conceptualising the clinical handover sheet in two ways, we can begin to understand its purpose and multiple functions on the ward.

7.4.1 Epistemic objects

In Chapter 3, I defined and explained epistemic and boundary objects and the significance of their role in other studies. Nerland and Jensen (2012, p. 109) suggested that it is the ways that an object provides access points to wider knowledge worlds and its triggers for practitioner formations around specific problems or knowledge challenges that generates learning.

Epistemic objects are described as objects of inquiry and pursuit (Ewenstein & Whyte 2009) and are characterised by their 'question generating character'. That is: What do we know? What don't we know? (Nerland & Jensen 2012, p. 104). This approach for identifying epistemic objects assembled in practices has particular utility for examining the way the object may facilitate learning. Such objects become meaningful within the course of being used in knowledge work, yet they are not stable, are always in flux and 'continually changing and acquiring new properties' (Ewenstein & Whyte 2009; Jarzabkowski, Spee & Smets 2013, p. 43; Knorr-Cetina 2001; Miettinen & Virkkunen 2005). By definition, the clinical

handover sheet has both an explorative and instrumental use as a knowledge object. As a complex artefact, it takes the role of both tool and object of enquiry (Nerland & Jensen 2012).

Similarly, the clinical handover sheet being a crucial object used in nursing work possesses this epistemic characteristic since information on the sheet is constantly being updated. Patient information is always in a state of change as the patient improves or deteriorates. Fresh information represents another point in time of the patient's hospital stay and their healthcare trajectory. In fact, today's information on the handover sheet can be different to the information included on the sheet yesterday and tomorrow's information will be different again. Revisions are not only as a result of the patient's condition changing but also due to the endless arrivals and departures on the ward as patients are being admitted, transferred or discharged. In later sections, I illustrate and explain in more detail how the clinical handover sheet is a vehicle for triggering the need for more information about what is already known about the patient. In addition, I show how the epistemic concept reveals elements about the handover sheet that would otherwise be overlooked, but which are nonetheless crucial in understanding its function in relation to nurses' learning in practice.

7.4.2 Boundary objects

As explained in Chapter 3, the term 'boundary object' is used to describe objects that are concrete in nature, affording a holding ground for ideas for communication, translation and standardisation of meaning (Star 2010). These are used in direct cross-boundary interactions between multiple participants (Ewenstein & Whyte 2009). A key feature of a boundary object is its ability to mediate knowledge across a boundary (Swan et al. 2007). This could be either a public or a private boundary. Working as common information spaces, boundary objects bridge interactions and coordination without intent or shared motives. This flexibility provides a common context, thus connecting diverse fields of expertise across practices

(Ewenstein & Whyte 2009). In situated use, the clinical handover sheet acts as a boundary object in the way it produces shared meaning through the text and dialogue between nurses and other practitioners about what is happening to the patient and plan of care. In the context of the acute care medical ward, boundaries that may be crossed could be from space to space (for example, from the clinical handover room to the patient's bedside), from professional to technician, from discipline to discipline or from an experienced nurse to a less-experienced nurse. As with epistemic objects, I show in later sections the way boundaries are crossed by nurses using the clinical handover sheet as they coordinate work and share knowledge about what they know concerning patient care. Again, this reveals elements about the handover sheet that have not been previously addressed, but are essential to its utility and the way nurses learn as they carry out work.

Up to this point, I have described the processes involved with clinical handover practices and the way these are enacted by nurses. In addition, my framework, as discussed in Chapter 3, for re-conceptualising the clinical handover sheet into either an epistemic or boundary object or both provides a vehicle for understanding the way this object may facilitate learning for nurses. In the following sections, I present from my fieldwork through four episodes (via a vignette or interview extract) that are drawn from my observations, field notes and interviews. Each episode highlights a different situation regarding clinical handover practice. Instances covered in the episodes were noticed repeatedly across my data.

7.5 Clinical Handover Episodes

To address how RNs make practical meaning of patient information, the following episodes are discussed: the routine of clinical handover, bridging the hurdles when handing over to doctors, picking up misleading information on the clinical handover sheet and mapping changes in patient progress. The purpose of each episode is to illustrate the work that the clinical handover sheet is doing in situated practice. In doing this, we see

how nurses cope with certain kinds of knowledge, forms of knowing and knowledge challenges in practice. Below, I give a brief commentary introducing each episode, followed by an explanation of the work accomplished by the object shaping clinical handover practices. In later sections, I offer lengthier interpretive discussions of the findings and the implications of these for nurses' learning.

7.5.1 Episode 1: The routine of formal clinical handover

7.5.1.1 Introduction to Episode 1

The first episode, the routine of formal clinical handover, offers a glimpse of the web of activity that transpires before, during and after the formal clinical handover. My reason for choosing this particular episode is because practices of clinical handover are a regular and central nursing activity, which afford a rich opportunity to explore learning. This episode draws attention to the enactment of handover and the way information is shared between practitioners.

Formal Clinical Handover

Steve is the team leader in charge.

Steve: Did you hear about the latest research on Alzheimer's disease and the use of alcohol?

The nurses sitting around the table begin to join in on the conversation with Steve about the latest research. One of the nurses at the table asks Steve about a patient coming to the ward, as Theresa, a RN from the morning shift, appears at the door.

Theresa walks into the handover room and stands just inside of the entryway to the door of the room. She focuses on the nurses sitting around the table in the centre of the room, and listens to the discussion that is taking place among the group. She is holding in her hand a collection of papers and some charts while she waits for a pause in the

conversation. Theresa is the first RN that is handing over patient care to the afternoon staff.

Theresa: Is everyone ready for handover to start?

There is some muffled agreement among the oncoming shift of nurses sitting in the room. All are carefully looking back and forth from their handover sheet to Theresa. They are poised to write onto their handover sheet. Handover begins. Theresa asks a question to the group before she starts. She looks at the patient's chart in front of her and her clinical handover sheet.

Theresa: Albert in Bed 5 was ordered one Atacand tablet [*medication for blood pressure*]…but did you know that there are a number of different doses?

Theresa continues to give handover and includes some of the previous history for one of the patients.

Theresa: He has had a TIA [*Trans Ischaemic Attack*].

One of the new graduate RNs sitting adjacent to the table asks:

RN 1:   What is a TIA?

Another nurse sitting at the table answers.

RN 2:   It is short for a trans ischaemic attack, which is where the vessels in the brain are partially occluded, possibly by an embolus or by some sort of atherosclerotic plaque.

The nurses at the handover continue to write down information about what is being communicated, often interrupting and asking questions and confirming aspects of patient care.

Theresa continues her handover, referring back and forth to her handover sheet.

During the handover, Steve, the nurse in charge, often completes some of the information that was provided by some of the other nurses handing over.

Steve: [*Justifying*] I have had the same patients over the last few days and so I know a bit more about their care.

As each nurse from the morning shift gives their handover, the nurses sitting down briefly discuss different issues about each patient. Clarification is sought from one nurse about specific nursing care for a patient. Once handover finishes, Steve allocates the patient assignments to the nurses sitting in the room.

7.5.1.2 How is the clinical handover sheet working here?

Here, the clinical handover sheet operated as a boundary object in the way it produced understandings and shared meaning while the nurse was handing over patient care. We can see that the clinical handover sheet was a crucial object entangled in practices for mediating knowledge across boundaries to other practitioners. The narrative, which was being conveyed from one practitioner to the collective assembly of practitioners, was reconstructed from patient information recorded on the sheet. All nurses at the handover may have had a variable knowledge of each patient, particularly those nurses who had not cared for the patient before. As nurses listened to the handover, they linked this information to actions and plans of care for the forthcoming shift.

Because the clinical handover was held in a specific place (the clinical handover room), this space converted to a private backstage space, since it was away from the patients' view and earshot. However, during clinical handover, the space became a frontstage space, because other peers were present - the nurse still showed the willingness to learn in front of them. This placed a lot of pressure on a person's performance and their knowledge of the patient. So that the particular nurse would not demonstrate not knowing in front of their peers, the clinical handover sheet

converted to a resource that crossed those boundaries of not knowing at clinical handover.

Later, during the formal part of handover, the sheet was working as an epistemic object when Theresa (the handover nurse) was suddenly prompted by something that she had written down on her handover sheet, causing her to ask the group of nurses about whether they knew about the number of doses for a particular medication. The sheet here was facilitating the discussion and refinement of the emergence of knowledge collectively, building a consensus around a particular issue. This trigger reminded Theresa that this was something she did not know before, which she then shared with the group of nurses around the table. This is an example of a private object being used to facilitate peer learning.

The clinical handover sheet, working as an epistemic object, was again a prompting vehicle when RN 1 asked, 'What is a TIA?' (This was also recorded on the clinical handover sheet as 'TIA'). RN 1 needed to know what the letters TIA stood for and what was physiologically occurring with a TIA so she could link what was recorded on the clinical handover sheet to the clinical picture of the patient being described by Theresa. As we see, there was the potential to ask questions and to learn immediately about the patient.

7.5.1.3 Conceptualising learning and making meaning of patient information

I now draw attention to the elements being learned for the nurses present in this episode. During the handover, all of the nurses were collectively learning about what had been going on with the patients admitted to the ward. Throughout the handover, things that they did not know or understand about a patient (such as not knowing about TIA), the nurses stopped and asked. The sheet acted as a catalyst for this to occur. In this particular episode, RN 1, because of not knowing what the abbreviations on the sheet stood for, could not make sense of what was being discussed. This provoked the need for questions from RN 1, following on

with a discussion and the mobilisation of knowledge about the meaning of a TIA from the other nurses present. It is crucial to point out here that in any clinical handover the same conditions may be present, conditions that prompt nurses to ask questions in order to learn more about the patient information being handed over to them.

7.5.2 Episode 2: Bridging the hurdles when handing over to doctors: Using the clinical handover sheet as a form of knowing

7.5.2.1 Introduction to Episode 2

The following episode is taken from a transcript of an interview held with Josephine, a RN, directly after my observations. Josephine described several previous events that led her to use the clinical handover sheet at the bedside. My justification for including this specific two-part episode is because it shows the nurse seeking and accessing information about patients that she needs to know via two different ways. The first event is during an emergency situation and the second event is when information about care was not passed on during the formal clinical handover. This episode emphasises the way a nurse uses the clinical handover sheet to obtain information so the medical treatment and plan of care can be continued for the patient.

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<u>The Emergency at the Bedside</u>

Josephine: In a cardiac arrest because it is an emergency, all the nurses go to where the emergency is happening to see if they can assist. When the doctors arrive they always ask:

Registrar: What's wrong with this patient? What is their history? What has been going on during their admission?

Josephine: You don't have the time to look at the clinical notes because it is an emergency. So I pull out my handover sheet from my pocket and say: 'Well this patient came in with multiple

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myeloma and metastatic bone lesions. They have a history of ischaemic heart disease' and then they say:

Registrar: [*Looking at the patient*] OK, so that's why this may be happening. [*The registrar then begins to examine the patient*].

Josephine: So that's really helpful, because all the information is there and I can understand what is happening to the patient right there and as it's happening. I suppose if there is anything you want to know about a patient at a glance, you can look at your handover sheet and it is there.

Josephine continues to talk about using the handover sheet at other times other than in an emergency.

Circumstances Around the Supra Pubic Catheter Insertion

Josephine: At the beginning of my shift, I quickly go around to see the patients and review them based on what had happened to them from my handover sheet. Generally, I would look at it at the beginning of the shift because you don't know your patients. So you look at your handover sheet and you look at your charts. For example, with the insertion of an SPC [*Supra Pubic Catheter*], you want to know what happened, when was it inserted and then what happened during and after that insertion. Were there any events? So, this gives you more information about the insertion. But if I haven't looked after this patient before, the handover sheet is not giving me any more information about this patient. When I go through the notes afterwards, I can see ah! it looks like that's happened, OK, so this is going on with him now.

7.5.2.2 How is the clinical handover sheet working here?

In the first situation, the emergency at the bedside, the clinical handover sheet was working as an epistemic object when Josephine turned to it as the registrar hurriedly asked questions about what was wrong with the sick patient. Doctors that turn up to emergency events do not necessarily know the patient and, therefore, rely on the information handed over to them by the nurse at the time. In this situation, doctors are asking questions to determine what circumstances led to the deteriorating event. While the clinical handover sheet assembles knowledge about the patient's disease or reason for admission, it does not always provide the answer about what is happening now or why, as illustrated in this event. It only offers an account about what has happened up to a current point in time, thus prompting questions about why this event is taking place and what is occurring with the patient right now. These unknown answers compelled the nurse and doctor to investigate further and so they examined the patient to find out what is happening.

At the same time, the clinical handover sheet was working as a boundary object in the way it moved knowledge about the patient away from the clinical handover room and patient clinical records to the bedside, where the nurse was handing over what she knew about the patient. Here, at the emergency at the bedside, the object was being used to cross spatial and disciplinary boundaries to bridge practices together between disciplines (nurse to doctor). The clinical handover sheet was being used to facilitate understanding of what happened with the patient prior to the event for both practitioners. Each practitioner shared specific disciplinary knowledge, interacting about the possibilities of what was occurring, so together they could treat the patient for the sudden change in clinical status.

7.5.2.3 Conceptualising learning and making meaning of patient information

In the first situation, the registrar was learning from the nurse the reason for the patient's admission and what had been happening clinically for the

patient up to this point in time. However, as practices unfolded throughout the event, knowledge was mobilised from the doctor back to the nurse. The doctor accounted for what was taking place as both professionals worked together to care for the patient. As the doctor responded and treated the patient, the nurse could see the changes in the patient's condition as he/she responded to treatment. The nurse's knowledge expanded from what she saw earlier; now she formed a new understanding of the patient's progression and treatment of the condition as it unfolded.

In the second situation involving the SPC insertion, the clinical handover sheet was working as an epistemic object by prompting questions for the nurse about what happened during the insertion. On the sheet, it was only apparent to the nurse that a SPC had been inserted. This sent Josephine off to seek this information from the patient's progress notes in order to find out when the catheter was inserted, what gauge catheter was in situ and why the patient needed a SPC rather that a urethral catheter. This contingent knowledge was required by Josephine so she could provide the patient with the appropriate care.

In this situation, knowledge discussions were not confined to what was written on the clinical handover sheet and more knowledge was sought out and mobilised from the clinical progress notes so as to build on what was previously known. The knowledge uncertainty about the catheter arose from the absence of this information on the clinical handover sheet, thus provoking Josephine to learn more about the actual insertion. Josephine learned why this type of catheter and insertion technique were used over others and why this particular size was necessary for the patient concerned in order to give appropriate care afterwards.

7.5.3 Episode 3: Detecting misleading information in the clinical handover sheet

7.5.3.1 Introduction to Episode 3

One of the interesting issues that arose from my data was how nurses dealt with misleading or inconsistent information about patient care on the clinical handover sheet. Episode 3 is taken from a transcript of an interview with Theresa, a RN, who became cross when she found misleading information on the handover sheet that was prepared for the oncoming shift of nurses. Theresa described some of the challenges that she faced with what had previously been written down about the patient's condition and care.

I chose this episode because patient information is quite ephemeral, unpredictable and continually fluctuating as circumstances change for the patient. When nurses are looking after a ward of 32 patients, it is vital that they know what occurs with each patient's admission and plan of care. Maintaining and updating the centralised clinical handover sheet on the computer creates a constant challenge for nurses working on the ward. This episode draws attention to the way Theresa engaged with other practitioners to seek confirmation about the kind of the information that should be recorded on the clinical handover sheet.

> #### Detecting Misleading Information in the Clinical Handover Sheet
>
> Theresa explains how she uses the clinical handover sheet.
>
> **Theresa:** If I'm starting a morning shift, the first thing I do is I am just intently staring at the handover sheet and listening to the verbal handover. If patients are going for something like a diagnostic test, the date and time of the test or if the results are back and handed over, I write these down on the handover sheet. Often I'll circle it in red—because you're so busy, I need to highlight what absolutely has to be done.

Quite often, I don't know why, maybe people don't pay attention, but the handover sheet doesn't always match the clinical notes [*also more formally known as the patient care record*], you know. There was a patient in the bed, for instance, and they said at handover that he was here for a reduced intensity conditioning allograft transplant, but it's been postponed because his electrolytes are just so and his renal function is just so out of whack. I'm looking at his history and all these things are going on and I am like, 'Excuse me, does anyone know why he is having this transplant? What's the transplant for, because it's not for his rheumatic fever as a child, it's not for his inguinal hernia repair, it's not for his VHP (Human Papillomavirus) for his shingles.' And I was like, 'Oh no!' So I am wondering what are they thinking? So I am looking at the handover sheet and wondering: Why are they here? What is their history, does it match? Does why they are here match with their history? Is there a tie in or is this something new, you know, a new symptom? What is their special care? You know, because when I'm busy and I need to know what is happening with 34 people now—that's what the handover sheets is for, to tie it altogether!

7.5.3.2 How is the clinical handover sheet working here?

The episode clearly illustrates the multidimensional nature of the clinical handover sheet as both a boundary object and epistemic object. The sheet possessed qualities that make social interaction necessary, in order to resolve discrepancies or gaps in knowledge. The bodies present negotiated collective meaning about possible inconsistent information. The clinical handover sheet was a distinctive object that facilitated enquiry through information that was or was not present on the sheet, which gave Theresa the need to question what she was reading. As a knowledge object, the mismatch of information on the clinical handover sheet opened

up some discrepancies about patient care that forced Theresa to seek more information and confirm what was occurring with this patient.

It is important to note that Theresa used the sheet to remind herself about events that would happen sometime during the shift or issues that would need to be attended to by circling them in red. By recording the results of tests, the sheet was working as a holding ground for this knowledge until Theresa needed to access it again to communicate to others. It was also available for her if she needed to link this knowledge to anything else that was occurring with a patient. Theresa learned that this was useful in the past, allowing her to make connections with the text on the sheet in order to mobilise knowledge to carry out patient care. Theresa used this strategy to make sense of what she needed to do for the shift. Thus for knowledge to become meaningful, nurses need to take action on what they discover. Meaning making occurs through a process that nurses use to link information with practice (Daley, 2001a, p.47) as shown here by Theresa. The use of a red ink pen also alerted her to changes or issues that she needed to know about during the shift. She did not always trust that the information was current, thus giving her good reason to question the other nurses about whether they had identified the inaccurate information on the sheet. This caused Theresa to go back afterwards to the original source (the patient healthcare record) to review and see if anything was missing.

7.5.3.3 Conceptualising learning and making meaning of patient information

Theresa's experience with previous inaccuracies on the sheet pushed her to cross boundaries with other practitioners (more experienced and inexperienced alike) in the room. She used the information already recorded on the sheet to signal her concerns. Theresa was trying to collectively co-construct the correct knowledge about what was known about the patient. She was able to draw on her own knowledge at this point to explain with confidence that the information on the clinical handover sheet did not make sense. By doing this, she created the

conditions for the other nurses to take a closer look at the sheet and question whether the information on the sheet was accurate. By seeing the inaccuracies, the nurses learned from this experience that it is critical not to assume the information that they have recorded on the sheet is always correct. They also learned about some of the conditions that Theresa spoke about in order to make sense and eliminate the conditions incorrectly recorded for the patient in question.

At this point, the sheet became a point of analytical departure. The knowledge discussions at this particular handover were not confined to the facts or information on the sheet. Instead, they were a stimulus to discussions that referred to those facts, thus mobilising other kinds of knowledge, whether codified knowledge from initial professional education, resources such as books, policies and protocols or experience with caring for other patients. In fact, the clinical handover sheet, in this instance, was the catalyst that linked to other kinds of knowledge sources.

7.5.4 Episode 4: Mapping changes in patient progress

7.5.4.1 Introduction to Episode 4

In this last episode, Jill, a RN, used the clinical handover sheet in three different ways: as a work-management tool, an information reservoir and a teaching device. I chose this event in order to draw attention to the way the nurse explicitly used the sheet. What is interesting is the way that Jill changed the conceived use of the handover sheet to suit her needs at the time so she could help other nurses cope with certain kinds of knowledge and forms of knowing during work.

<div style="background:#eee; padding:10px;">

<u>Mapping Changes in Patient Progress</u>

Jill is flicking through the progress notes, searching for any updates that may have been added during the day.

Researcher: Do you constantly refer to the clinical handover sheet throughout your shift?

</div>

Jill lifts her head up from the notes and turns to the researcher. Pointing to the handover, sheet she explains:

Jill: Yes, I write elements there [*the clinical handover sheet*] that I need to do and I tick them off as I go. Like, if they ordered [*the patient's*] blood products, I write that on the handover sheet and I look up their blood counts on the computer and record the blood counts on my handover sheet, so I can pass this on to the next shift. It is something that we do, as part of our practice. We check the bloods, so we know what stage of the disease our patients are at, especially if they are haematology and transplant patients. [*Jill pauses for a moment, creasing her forehead, considering something.*] With new graduate nurses, I teach them to write down these on the clinical handover sheet and which blood results to focus on, even if they don't have a great understanding of why they have got to focus on that. They need to know their patients neutrophil count every day, and I guess a beginner wouldn't have the depth of understanding of why they need to know the neutrophil count, so if you can get into the habit of recording it every day, then it always prompts you to think, 'Why am I doing it?'

7.5.4.2 How is the clinical handover sheet working here?

In this final episode, the clinical handover sheet was working as an epistemic object as it was being used in the enquiry and pursuit of understanding neutrophil count changes in relation to staging of the patient's disease. Here, the information recorded on the sheet raised questions for the nurse, who looked to see what the neutrophil count was the day before so she could compare it to that day's result and pass this information on to the next shift of nurses. At the same time as being used as a work-management tool, the sheet became a teaching tool for Jill as she showed new nurses how to link this information to the patient.

Working as an epistemic object, the sheet's purpose was to prompt the new nurse to review the numbers recorded. In doing this, the nurse had to think about what this might mean for the patient and their disease progression, so they could plan and implement what the next step should be for nursing care. At the same time as the object was being used as a teaching tool, it was also working as a boundary object. Here, the clinical handover sheet was being used as a bridge to mediate information across a boundary between the more experienced RN and the new graduate nurse.

7.5.4.3 Conceptualising learning and making meaning of patient information

Jill was creating the conditions for the nurses to learn how to monitor the patient's condition and make sense of the blood work. The new nurses learned as they were doing work, understanding how to use the clinical handover sheet in practice as a work-management tool. The way the nurses used the object made it a holding ground for knowledge about blood or neutrophil counts, which could be mobilised later when required or to cross boundaries with other disciplines as they communicated the need for change in the plan of care. From this, the nurses were learning to link and make meaning from the results and the signs and symptoms or changes from new treatment plans that they observed in their patients.

In the next section, I examine and discuss in what way learning has been enabled for nurses as they handed over patient care to others. I argue that learning emerges when nurses are working with the handover sheet as a boundary or epistemic object.

7.6 In What Way Is Learning Enabled?

In the past, clinical handover has received a lot of attention from researchers who have focused mainly on questions about professional practice and communication (Bjørk, Tøien & Sørensen 2013; Braaf et al. 2015; Eggins & Slade 2012; Hardey, Payne & Coleman 2000; Liu, Manias

& Gerdtz 2012; Manias & Street 2000; Matic, Davidson & Salamonson 2011; Matney, Maddox & Staggers 2014; Staggers et al. 2012; Staggers & Mowinski Jennings 2009). As I argued in Chapter 2, few studies have paid attention to learning and clinical handover. No studies have sought to explore in what ways the clinical handover sheet supports learning. This study builds on this area of research by showing how nurses' practices with and around the clinical handover sheet contributed to learning.

The clinical handover sheet is an object that is incredibly central to the assemblage of the clinical handover routine, yet its potential for learning as part of this routine has not been explored. Thus far, I have presented four different clinical handover events to draw attention to the work that the clinical handover sheet accomplishes in situated practice. In doing this, I found that this object is a crucial element to understanding how nurses learn during the course of practice. In the following section, I discuss the ways in which the clinical handover sheet facilitates learning for nurses as everyday work practice takes place.

7.6.1 Doing knowledge work by prompting and information seeking

As an epistemic object, the clinical handover sheet is central to nurses knowing what to do in clinical practice. It transforms into an 'artefact of knowing' (Ewenstein & Whyte 2007, p.82). It functions not only as a transient holding ground for knowledge but also provides a tool for nurses knowing what to do next about the patient's care. The discussions contained on the sheet become a reference point that nurses refer to across the spaces of the acute care ward as they interact with patients or other health professionals. The important role that the clinical handover sheet plays as a knowledge object is not only in its ability to hold knowledge about the patient, but also due to the lack of information on the sheet. Such discrepancies raise questions, prompting nurses to seek further information.

7.6.2 What and how are nurses learning in their use of the clinical handover sheet as an epistemic object?

Because the clinical handover sheet embodies knowledge about patient care (knowledge that is emergent, ephemeral and continually unstable), nurses learn how to cope with this ever-changing transient source of knowledge. An example of this was illustrated in Episode 2, regarding the circumstances surrounding the SPC insertion. The patient had a SPC inserted, which was a new event for that particular patient. However, there was not enough information offered on the clinical handover sheet for Josephine to understand what she needed to know to care for her patient during the shift, so she turned to the clinical progress notes to try to understand what happened with the catheter insertion. Due to the insufficient knowledge contained in the text on the clinical handover sheet, this deficit created the conditions for learning. Josephine's need for more information prompted her to locate other sources in order to be able answer questions about the catheter insertion. This event draws attention to the way that nurses work around not knowing by learning how to action discrepancies, determining where to go to find out what they need to know, what to look for and the type of resources to use to resolve the knowledge challenge. Ultimately, the clinical handover sheet shapes what nurses do and is shaped by what they do.

At other times, as an epistemic object, the sheet helps nurses question information. In Episode 3, when Theresa could not link the present information contained on the sheet with the actual patient, she did not take knowledge recorded on the clinical handover sheet for granted. She used the clinical handover sheet to raise questions about the ambiguities with the other nurses present. Other knowledge was also drawn on by Theresa to construct the problem for the other nurses present. Her questions provoked a response from the nurses about why the information did not match, urging them to review the information contained within the text displayed on the sheet. Theresa justified her reasons to the group based on her knowledge and experience. Thus, the knowledge discussions at

handover are not confined to the facts or information on the sheet but provide a stimulus for discussions that refer to facts recorded. Consequently, the clinical handover becomes the catalyst that links to other kinds of knowledge sources. Learning is made possible by knowledge not being fixed but negotiated socially and materially. The inconsistent information and the successive questions raised caused the nurses to reconsider and respond to the questions being asked.

The clinical handover sheet helps nurses link information on the sheet about the specific patient to any changes in care. As information changes, nurses are able to start to connect that information with their own expertise. As an epistemic object, the clinical handover sheet facilitates knowledge work, asking, 'What do we know about the patient? What don't we know?' For example, if blood work is not on the sheet, this opens up a discrepancy, sending the nurse to seek out more information about the blood results. This is also the result if something is not understood, as illustrated in Episode 1, where RN 1 did not understand something recorded on the handover sheet as the RN handing over discussed it. Not knowing the answer prompted RN 1 to ask what the term represented. For RN 1, learning ensued because her colleagues responded, answering her question and sharing more information about a TIA that RN1 did not have otherwise available to her. Not knowing what a TIA was meant that the nurse would have difficulty making meaning about what was going on with the patient or what actions to take next.

7.6.3 Boundary work

As a boundary object, the clinical handover sheet brings practices together, in addition to separating them. Primarily, the clinical handover sheet facilitates communication about patient care by linking practices and relationships within and across different boundaries. For example, between the doctor and nurse during the emergency, practices by the practitioners from each discipline were brought together in order to care for the patient during the emergency. In terms of relationships, any

interdisciplinary differences were disregarded at that point in time during the emergency situation. Here, the sheet plays an essential role through facilitating 'communication and interaction by practitioners who share expertise and experience and at the same time this communication is between people who may have radically different skills, experiences and responsibilities' (Ewenstein & Whyte 2009). Thus the clinical handover sheet links relationships and practices from practitioner to practitioner by the sharing of knowledge about patients at the formal handover, or from discipline to discipline (doctor to nurse), or via experienced nurse to novice nurse, or by connecting information about patients admitted between the various spaces in the ward. The clinical handover sheet produces the common ground for a shared understanding between practitioners (Bechky 2003). By providing a shared locus for practice, it allows reconciliation of knowledge in joint activities (Swan et al. 2007). This can be via connecting space to space, such as the bedside into the clinical handover room or the registrars' room, as we have seen in Chapter 5, when nurses were communicating a healthcare problem requiring action by the doctor.

Another example about bringing practices together is revealed in the way that the nurse uses red ink to highlight priorities on the clinical handover sheet to ensure that practices are undertaken at certain times. Because the sheet is being used as a work management device for the nurse during these situations, the colour prioritization also links practices that maybe required to be carried out by other disciplines such as doctors, dieticians, physiotherapists, pharmacists and social workers. Thus, the sheet is acting as a bridge to link practices via the nurse with other disciplines.

7.6.4 What and how are nurses learning in their use of the clinical handover sheet as a boundary object?

The clinical handover sheet's ability to function as a bridge between practitioners to create shared understandings is central to communicating about patient care. This arrangement opens up opportunities for learning. In the situation about the emergency at the bedside in Episode 2, the clinical handover sheet crossed spatial and disciplinary boundaries to bridge practices between the two disciplines (nurse to doctor).

In this event, knowledge contained on the handover sheet, while it was not enough to determine what happened, created the conditions for collaboration and interpretation between the nurse and doctor during the assessment of the patient. This provided the opportunity for each professional to share their specific disciplinary knowledge in order to understand and solve what was happening with the patient. More importantly, because the object only contained knowledge about the patient up to a certain point in time, the discrepancy invited new ways of thinking and problem solving in regards to the patient's clinical status across the disciplinary boundaries. Learning is made possible here because the clinical handover sheet facilitated problem solving through the co-construction and collective meaning of the patient's existing condition to the changing clinical status at that point in time. Here, the nurse was able to connect actions, linking these with emergent knowledge as the situation unfolded with the patient.

7.6.5 Learning becomes intertwined with the clinical handover sheet when nurses make meaning of patient information

Overall, the clinical handover sheet is a vehicle for individual and collective meaning-making that links to actions. From the situated use as either an epistemic or a boundary object, I have shown how the clinical handover sheet provides a mechanism for the way nurses translate information into meaning. Nurses make connections with the text on the sheet in order to mobilise knowledge to carry out patient care. In particular, they accomplish

making sense of this through linking their professional expertise and experience with what they observe in their patients, thus relating past actions to future actions in order to decide the next move for their patient's care trajectory. Moreover, it is through the clinical handover sheet that nurses link their own formal expertise with particular incidents for the patient. This happens by nurses imbuing information with meaning and opening up questions when knowledge is absent. The clinical handover sheet mediates knowledge for nurses when it is used as an epistemic or a boundary object.

Here, the clinical handover sheet represents an 'artefact of knowing' (Ewenstein & Whyte 2007, p. 82), playing a role in mediating knowledge and knowing for nurses as they use the object during practice. Meaning is articulated through the text recorded on the sheet, which helps to convey and exchange understandings of patient information. As a material object used in practice, the clinical handover sheet is something with which nurses can interact with as they generate knowledge about patients, individually or collectively. Consequently, the clinical handover sheet's communicative and interactive properties are central elements in knowledge work for nurses (Ewenstein & Whyte 2007). Therefore, we can see that learning is taking place here via the meaning-making process. To make sense of the information and to know how to act or what to do next, nurses link what they already know (in terms of their formal expertise) with information on the clinical handover sheet about the patient. Nurses do this by imbuing patient information with meaning and by raising questions when particular issues are not apparent or clear. It is the practices that take place around the sheet that enable this to happen. Therefore, I argue that what we have seen in all of the episodes described is that learning emerged for nurses when practices created the clinical handover sheet as an epistemic or boundary object.

7.7 Significance for Nurses' Learning in Clinical Practice

Thus far, I have accounted for learning for nurses in ways that have not been previously explored in the literature. This account does not use the individual as the unit of analysis in order to understand learning. Instead, it draws on the conceptualisation of the social and the material, with a specific focus on objects, to bring practices and learning into view. The reframing of the clinical handover sheet into an object (epistemic and boundary) has drawn our attention to the spaces of not knowing for nurses during practice. The clinical handover sheet becomes an 'artefact of knowing' (Ewenstein & Whyte 2007, p. 82) that enables nurses to learn about patient information. When it becomes an epistemic object, it reveals the need to learn more information. We can also see that various boundaries are crossed by nurses using the clinical handover sheet, as they coordinate work and share knowledge about what they know about patient care.

The findings described above have demonstrated that learning has occurred through the causal epistemic or boundary properties embodied in the clinical handover tool. As knowledge challenges, conflicts and problems of practice arise in nursing work, learning emerges in response to such encounters. Thus, knowledge becomes emergent, where change is constant and not specifiable in advance. It is responsive, illustrated in the way that the clinical handover sheet holds 'causal powers' (Hager 2011a, p. 21) that send the nurse to seek knowledge from other sources if the information is unavailable on the sheet. It is here that knowledge challenges and learning and knowing are produced and consumed in a third space (where practices and meanings come together through the lived experience).

What we have seen here in this new account is that learning for nurses takes place in emergent and unpredictable ways and includes events where objects are produced that shape and change the way such practices unfold in response. These findings show that for nurses, making

meaning of patient information and learning is an ongoing and everyday process at work. Based on these findings, I argue that the metaphors of participation, acquisition and knowledge transfer, which were historically used to describe and explain learning, are not applicable to the way nurses in acute care learn as they do work.

7.8 Chapter Summary

This chapter set out to explore and make visible how material artefacts such as the clinical handover sheet facilitate nurses' learning on the ward. The chapter began with a brief background on the assemblage of elements in the handover routine, providing a context for the use of different elements and the relationships involved with handing over patient care to others. To understand the interface between everyday practice and learning, a sociomaterial approach was used to reconceptualise the clinical handover sheet into an epistemic or boundary object, so as to focus on the work that the object does in practice as nurses are using it. Four episodes were presented to illustrate the work that the clinical handover sheet performs in situated practice so as to expose how nurses cope with certain kinds of knowledge, forms of knowing and knowledge challenges in practice. The findings revealed that learning emerged for nurses when practices created the clinical handover sheet as an epistemic or boundary object.

Finally, to directly address the second subsidiary question: How do RNs make practical meaning of patient information? I have shown through the analysis of the data presented that nurses make practical meaning of information by working with the clinical handover sheet as an epistemic or boundary object.

Chapter 8: Conclusions and Future Research Directions

8.1 Introduction

This thesis makes a contribution to the field of workplace learning in nursing. It does so by bringing contemporary developments in workplace-learning research to bear on issues of crucial importance to the nursing profession. When I began this study, my aim was to observe nurses as they performed everyday work in an acute care setting to identify practices that made learning visible, to reveal what nurses learned and to determine the factors that influenced their learning.

The main question for this study was:

1. How and what do RNs learn as they carry out everyday work in acute care?

To explore this in more detail, two secondary questions were asked:

a) How do RNs overcome knowledge challenges that arise in everyday work?

b) How do RNs make practical meaning of patient information?

This final chapter draws together the research findings associated with these questions. In doing this, I build answers to the main question by first reviewing each sub-question. Next, I explain the importance of my research and discuss why my findings are breaking new ground in how we might understand nurses' learning at work. Following this, I reflect on the impact of my research in relation to my own practice and the way this has reshaped my current perspective about learning at work as a nurse. I discuss the limitations of the research, and explain how my research contributes to new knowledge and the implications for the profession of

nursing. I conclude with the implications that this study has for future research.

8.2 Review of the Arguments Developed in Previous Chapters

In Chapter 1, I presented a background about the acute healthcare context where the provision of patient care was both complex and unpredictable due to the ever-increasing patient acuity and decreasing length of stay. RNs operate in a context that demands them to be responsive, efficient and competent. Despite professional training and continuing development opportunities, nurses are not prepared for the ongoing challenges that are presented daily in such an environment. I proposed that uncertainty and not knowing is a regular occurrence. It was this conundrum that prompted my research questions for this thesis.

In Chapter 2, I located my work alongside contemporary approaches to workplace learning. Empirical research relevant to my investigation showed that there has been a shift from widely accepted claims about learning to a new dimension, which is at the frontier and less certain. Postmodern theorists specified that learning at work was not always fully decidable in advance, often emerging in unanticipated and unpredictable ways (Hager 2011a).

In nursing, my research aligned with studies that highlighted the importance of the opportunities and experiences of nurses learning with each other, together with how and what they learned in an acute care hospital setting. However, this research also revealed that the field was not extensive or widely researched, and previous studies drew on different theoretical approaches to the one that is used in this thesis.

This field was further demarcated by studies on tools and resources, the team leader and clinical handover. Various studies highlighted how nurses accessed tools and resources during times of uncertainty. This was characterised by the urgency of information needed and the degree of

uncertainty for the nurse, but the literature did not link this to learning. I also found most studies only stressed the importance of leadership qualities for the team leader role. Most of the studies remarked on the team leader's support for others in some way, but failed to elaborate or link this to learning. Likewise, there was little acknowledgement in the literature about the teaching component of the role. Further, while interest about clinical handover is currently frontstage, only two studies sought to examine the clinical handover sheet. These studies were carried out 15 years ago and did not investigate or discuss learning while nurses used the sheet as they provided patient care.

I also situated this study among recent developments regarding hospital work and space. While there has been significant work by researchers in this field, few studies examined learning. Further, none of these studies used space in the way that I use it in this thesis.

Throughout the literature review, I argued that there were insufficient empirical studies that investigated how and what RNs learned as they carried out work in an acute care hospital setting. Likewise, this area had not been explored before with my particular conceptual theoretical lens (see Chapter 3).

In Chapter 3, I introduced my conceptual framework, which consisted of three theoretical perspectives. I located my study within the postmodern perspectives of workplace learning. I argued that this perspective offered a richer, more insightful lens to better understand the complexity and unpredictable emerging nature of the work that confronts nurses in an acute care environment. Next, I explained Lefebvre's (1991) spatial triad, as this was the second part of my conceptual framework. I chose this concept because during the data analysis phase I realised that questions of space and practices that I observed in the ward were of high importance. I conceptualised sources that would help me to appropriately deal with what I had noticed in the data. For the third element, I explored broader sociomaterial theories in order to find concepts that were most

suited to the ways that the clinical handover sheet functioned. To guide my conceptual analysis with particular objects used in practice, I drew on the literature concerning epistemic and boundary objects.

In Chapter 4, I argued that the methodology was well suited to my research questions and conceptual approach. A qualitative, focused ethnographic approach was used to collect data at one single study site (an acute care medical ward) in its natural setting. This framework was central as it enabled me to get close to the nurses being studied and better understand their actions and activities as they occurred in the natural everyday environment. The study sample consisted of nine RNs who possessed sufficient postgraduate clinical experience. Over 135 hours were spent observing participants as they provided clinical care to their assigned patients on the acute care ward. Throughout the observations, I took advantage of opportunities for informal discussion to enrich my understanding of what was observed. Resulting descriptive data from observations were used as the basis for one-to-one, semi-structured interviews conducted immediately after each observation period, which were digitally recorded and transcribed verbatim (27 interviews consisting of one hour each).

In Chapter 5, I introduced and explained the five key spaces in the acute care medical ward. This chapter laid the foundations for the analysis and discussion of my findings that followed in chapters 6 and 7. To understand how and what nurses learn in practice, it was crucial that I showed the diversity and complexity of ward spaces. I used Lefebvre's (1991) spatial triad as a conceptual tool to explore the actual practicalities of being in each space and the use of these spaces by nurses. I also found it was useful to contrast specific spaces in the ward as public and private in order to make a further distinction between the ward spaces that were highly visible to the public and those that were not.

Earlier in Chapter 1, I introduced the main arguments of my thesis. I claimed that in such a complex environment, in order to overcome

knowledge challenges, nurses created lived spaces of learning. Nurses achieved this by changing relationships between themselves, patients, tools and other people. This was followed by my second claim in relation to the vast quantities of information nurses are confronted with each day. In order for nurses to create meaning and to know how to act on the basis of patient specific information and nursing knowledge, learning emerged as practices render the clinical handover sheet as an epistemic or boundary object.

In chapters 6 and 7, I addressed the subsidiary research questions, providing evidence from my data to support the arguments that I had proposed in chapter 1. Now, I draw together the key findings from my research to provide answers to my initial research questions. I do this by addressing the sub-questions first before responding to the overarching thesis question.

8.3 Answers to My Research Questions

8.3.1 Overcoming knowledge challenges that arise in everyday work

In Chapter 6, I responded to the first sub-question by exploring how nurses created learning spaces when faced with three different kinds of knowledge challenges. The first challenge examined a nurse dealing with uncertainty about a practice-related issue involving a PD machine. The nurse was unsure of how to deal with an alarm that had been activated. The second challenge focused on nurses being asked questions about medications in a public space. To resolve not knowing in this situation, nurses moved from a public to a more private space, in order to create a space for finding answers to the questions asked by patients and relatives and, at the same time, learning something new. The third challenge drew attention to the team leader, who was the coordinator of care on the ward. In response to several knowledge challenges identified by other nurses, the role switched to become a rich pedagogical resource in terms of expertise, so as to support the nurses on the ward with their work.

After taking these events into account I found that nurses resolved knowledge challenges spatially. This spatial resolution had different features depending on whether it related to:

- uncertainty (the degree of difficulty, together with the number of exceptions involved in the task)
- not knowing (a knowledge challenge for the nurse)
- getting stuck (the nurse not being able to work out how to resolve the problem on their own).

In this thesis, I have shown that issues of not knowing in public and private spaces are important. The results show that there are times when nurses believe it is acceptable for nurses not to know in a public space and times when it is considered professionally unacceptable. In dealing with knowledge challenges, the location within or movement between public and private spaces is also an important factor. However, the spatial practice that provided the answer on each occasion was different, depending on the knowledge challenge that emerged.

I identified that nurses responded through spatial practices to uncertainty, not knowing and when they got stuck by redefining the space as a pedagogical space. That is, through particular efforts, a space defined by a knowledge challenge in clinical practice became a space in which nurses learned and could then address that challenge. This produced a new and/or different set of relations between spaces, learning and practices.

In response to dealing with uncertainty, a pattern emerged with how certain actors and actions (spatial practices) were introduced by nurses, consequently drawing attention to the way new actors changed the relationships between nurses' knowledge, the patient and the objects around them. When nurses were confronted with uncertainty, the solution was not about finding another body with the right knowledge or looking through a protocol to find the right answer. Rather, it involved the way these particular spatial practices changed the relationships between

patients, tools and other people so as to enable the nurse to overcome the uncertainty or knowledge challenge.

In dealing with knowledge challenges, a slightly different spatial pattern was produced by the nurses. To resolve not knowing about medications, nurses needed to redefine the space to a space for learning. They accomplished this by not only changing the relationships between people, patients, other people and objects, but also through movement. The move back into the medication room supported different rules of behaviour, which shaped how nurses conducted themselves, allowing them to redefine the space for learning. Nurses were not able to do this in public spaces at the bedside. Through spatial practices, nurses reconstructed the medication room in a particular way (using spaces and objects, together with social interaction and routinising practices) to accomplish learning, answer questions about medications and prepare the delivery of medications to patients correctly and safely.

Nurses also mobilised other resources (such as the team leader) when they got stuck. In this situation, the team leader's role switched from performing care to becoming a rich pedagogical resource that was mobile, flexible and emergent. When prompted by nurses stuck with a practice issue, the problem was resolved through the spatial practices of the team leader. RNs were coached by the team leader about what to do and later guided and mentored if the situation arose again. The team leader produced different sets of relationships with objects and elements in order to resolve practice knowledge challenges. As a result, nurses' learning was situated within the relationships and practices of the team leader rather than resulting from the transfer of knowledge from one nurse to another.

My data and analysis showed that nurses have learned to respond to uncertainty, not knowing and getting stuck by redefining the space they are working in to a pedagogical space using a range of spatial practices.

Their way of coping with uncertainty, not knowing and getting stuck was a spatially resolved way of dealing with the problem.

Using a Lefebvrian approach was important as it helped me to develop these crucial insights by making sense through theory to see the significance in what might otherwise have been overlooked. Further, I was able to see the relations among spatial practices that revealed clues about the processes by which nurses produced space and were influenced by space as they responded as part of daily work (Carp 2008).

Revealing the range of spatial practices and the type of movements used by the nurses creates a new perspective on how learning is taking place for the nurses when they resolve problems about practice. This has profound implications for how we think about knowledge challenges that arise in clinical practice. The issue is not whether nurses know enough or are well prepared for practice, but rather how they seek to resolve such challenges. As a result, I argue that nurses overcome important knowledge challenges arising in work by creating lived spaces of learning in practice. I have shown for the first time how nurses accomplish this by changing the relationships between patients, tools, objects, nurses and other people.

8.3.2 Making practical meaning of patient information

I now utilise the sociomaterial lens for my response to the second sub-question. In Chapter 1, I highlighted the complexity involved for nurses needing to understand and make meaning of the abundant sources of information concerning patient care in acute care work. This led to my second research sub-question: How do RNs make practical meaning of patient information? I chose to explore the practice of clinical handover and the use of the clinical handover sheet to answer this specific question, primarily because clinical handover was such a central practice in nursing. The use of the actual sheet was critical to the nurse during the next shift in terms of quick access to patient information when performing patient care. The object was used all the time and conceptually offered a rich basis for

a theoretically informed analysis of materiality and learning. Sociomateriality allowed me to show how nurses' practices with and around the clinical handover sheet (that is, the ways that information was recorded and the practices that encompassed using the sheet) contributed to learning.

Findings revealed that the clinical handover sheet functioned not only as a transient holding ground for knowledge but also as a tool for nurses to know what to do next about patient care. Similarly, the discussions contained on the sheet became an important reference point for nurses to refer to across the spaces of the acute care ward as they interacted with patients or other health professionals. While knowledge on the clinical handover sheet was emergent, ephemeral and continually unstable, nurses learned how to cope with this ever-changing transient source. Although the sheet contained knowledge about the patient, it also stressed a lack of information. These discrepancies raised questions for the nurses, prompting the need to source further information. Nurses worked around not knowing by learning how to action discrepancies, determining where to go to find out what they needed to know, what to look for and the type of resources required. At the time of practice the unstable nature of knowledge is momentarily reified on the clinical handover sheet – it is made practical for the purpose of patient care. At other times, the sheet became a catalyst linking other kinds of knowledge sources.

Through doing boundary work, the clinical handover sheet was instrumental in facilitating communication about care by linking practices and relationships within and across professional boundaries. At this point, practitioners could share expertise and experience about the patient (i.e., practitioners that had radically different skills, experiences and responsibilities).

Overall, my investigation revealed that nurses made practical meaning of patient information through sociomaterial ways. My analysis involved examining the epistemic and boundary object properties incorporated in

the use of the sheet during practice. Nurses used the clinical handover sheet to make connections with information recorded on the sheet and to mobilise knowledge in order to carry out patient care. They accomplished this through making sense of the information and linking this with their professional expertise and experience, and with what they observed in their patients, thus relating past actions to future actions, so they could decide the next move for their patient's care trajectory. This happened by nurses imbuing information with meaning and raising questions when knowledge was absent. Throughout Chapter 7, I argued that meaning-making was not a process that just happens in an individual's head, but something that is a social and material accomplishment, where relationships with others and physical objects are crucial. In addition, I have shown from my data how specific practices constitute everyday objects such as the clinical handover sheet as either an epistemic or boundary object. This has significant implications for understanding how nurses make meaning of patient information.

Further, I argued that the clinical handover sheet represents a visual 'artefact of knowing' (Ewenstein & Whyte 2007, p. 82) for the nurse by playing a role in mediating knowledge and knowing for nurses as they use the object during practice. Meaning is articulated through the text recorded on the sheet, which helps to convey and exchange the understanding of patient information. As I explained earlier, primary knowledge is information that the nurse already knows from reading the text on the clinical handover sheet. It is the new and emerging knowledge, which is added during shift or at the formal clinical handover. By using red or different coloured ink, the nurse is making visible that some form of action is required and at the same time notating the importance or priority. When making sense of information and knowing how to act or what to do next, nurses link what they already know with the information about the patient on the clinical handover sheet. However, it is the practices that take place around the sheet that enables this to happen. Therefore, we see that

learning occurs for nurses as they render the clinical handover sheet as an epistemic or boundary object.

8.3.3 How and what do RNs learn as they carry out everyday work in acute care?

In this section, I draw on the answers to the sub-questions to address the main overarching question. I begin by proposing that it does not do justice to what is occurring here to provide single or completely separate answers to 'how' nurses learn and 'what' nurses learn. However, in my answers to both, a lot of what is being learned is invisible, and was rendered visible using a Lefebvrian approach. This approach enabled me to see objects and practices that might otherwise have been missed or not noticed before.

In terms of 'how', a spatial approach revealed crucial insights into nurses' everyday acts that were connected to occupying a given space in the ward (Beyes & Michels 2011). This was achieved by pointing to sequences, habits and patterns of movement in and through physical spaces, which drew attention to what was done both within space and in the process of producing space (Carp 2008; Gregory, Hopwood & Boud 2014). Because the entire composition of a particular space is recognised as a combined social and material interaction, nurses enact social action through materiality, which shapes the nature of what takes place in the activity (Dale 2005). Therefore, I observed nurses' routines and practices as they worked in the acute care environment.

In order to learn, we saw that nurses redefined the space in which they were working into a pedagogical space, which enabled learning to take place. Using a spatial approach illuminated the relationships, practices, bodies, interactions and negotiations and objects, as well as movement. I was also able to focus on how these elements were used and enacted in the context of practice. This revealed that that learning ensued for nurses through the daily challenges that arose in work. In addition, we could see new ways of knowing emerging for the nurse. A spatial approach showed

that nurses learned through the ways that problems were overcome and the subsequent changes in the nurse's course of actions. Overall, there were different ways that nurses accomplished learning depending on whether the issue was about uncertainty in practice, lack of knowledge or getting stuck with a task concerning patient care.

It was also highlighted that 'what' nurses learned would be different on each occasion, depending on the context of the situation. In my research, nurses that learned how to resolve a particular uncertainty (i.e., how to use the dialysis protocol combined with managing the dialysis for the patient) also learned how to deliver particular medications and the action/effect of the drug and also how to deal with imminent patient care problems during practice.

A sociomaterial approach also revealed other significant ways about 'how' and 'what' nurses were learning. Again, these relations and practices are not instantly visible through other methods. By identifying epistemic and boundary properties as nurses were using the clinical handover sheet in practice, I was able to not only draw attention to the emergent nature of learning and the sheet when in use, but also the work it performed and how this enabled learning. Consequently, we saw evidence of how the object prompted nurses to raise questions and seek more information when knowledge was either ambiguous, vague or absent on the sheet. We also saw how communication of patient care was facilitated through the clinical handover sheet's boundary object properties, linking practices and relationships across different boundaries. Thus, practitioners from other disciplines were able to share their knowledge and expertise with nurses around and through the object. Here, nurses were able to learn other specific disciplines' knowledge, for example, the pharmacist would share knowledge about medications or doctors would provide insight about specific disease processes for certain patients. In relation to 'what' was learned, I demonstrated how nurses learned to translate patient information into meaning so they could act on it. The reframing of the clinical handover sheet into an object has drawn our attention to the

spaces of not knowing for nurses. Therefore, from this perspective, we can see how the clinical handover sheet enabled nurses to learn more about patient information.

Finally, by looking at the spatial response to knowledge challenges, we see that nurses are learning what the edge of their knowledge is, and how they work at the edge of their knowledge. They are learning the resourcefulness that they need in to overcome various different challenges. They are learning that they will never know everything, but they can learn to be a confident practitioner who can work amid uncertainty. They are learning to exploit the role of the team leader and to make practical meaning out of information, together with learning how to use the clinical handover sheet as a visual 'artefact of knowing' (Ewenstein & Whyte 2007, p. 82). And what are nurses learning in doing this? They are learning to turn separate pieces of information into practical and meaningful information. They are learning to translate, for example, a blood pressure reading into a context-bound, full-of-action form of knowing.

8.4 Reflections on My Research in Terms of My Own Practice

I started this research while working in the role of a nurse educator in a large teaching hospital. Travelling this journey over the last eight years has changed the way I look at practice issues, dealing with uncertainty and not knowing what to do.

In the messy acute care hospital environment, practice issues come up frequently. It is not unusual for the nurse not to know what to do. I was surprised by the frequency at which nurses were confronted with uncertainty and how they quickly dealt with not knowing. The amount of information nurses were expected to be cognisant of was overwhelming, yet how they managed this information in order to practice safely when delivering patient care was exceptional. Nevertheless, this information

seems to continue to grow in the endeavour to ensure a high standard of patient care.

As a result of my research, I no longer look at or think about spaces in the ward as containers where objects and people are merely accommodated. Instead, such 'representations of space' redefine public and private spaces as more sophisticated front and backstage dimensions that enable learning for nurses. The practices that occur within these newly defined spaces and the strategies that nurses employ to manage knowledge challenges have become much more apparent. In terms of the way that nurses are able to learn, my understanding of this has changed and been reshaped. I had previously considered learning to be mostly about acquiring the knowledge and skills in order to become a competent practitioner and practise safely. Like many people, I saw learning as a 'product or thing' that could be acquired or transferred from one person to another on the ward. Now, with the approach that I have described, I can see how nurses purposely redefine the spaces on the ward in order to learn.

As I worked on this research, I became more familiar with the work of Hager (2011a, p. 21), who saw learning as being emergent and that what is actually learned cannot be fully decidable in advance. Rather, learning takes place in unanticipated and unpredictable ways. After reading Hager and other works by Reich and Hager (2014), I was struck by the significance these ideas had to the current clinical acute care practice environment. The words 'emergent', 'unpredictable' and 'unanticipated' resonated with the way I understood the experience of working in such a setting. This elegant description is what I had previously termed 'messy' or chaotic. These words perfectly describe for me what it is like to work in the current acute care hospital ward environment. It can be calm and according to plan with patient care, but then something happens, for example, a patient unexpectedly deteriorates. In response to the patient's deterioration, there are bodies, machines and things everywhere as doctors and nurses attempt to resuscitate the patient. From this

perspective, I found that these new terms were helpful in making sense of what I had previously conceived as a 'messy' practice environment.

My reason for explaining this is that currently—in my role as lecturer for a Bachelor of Nursing degree and unit coordinator for two postgraduate education subjects for the Masters in Nursing program at another university—I see the way forward in the field of nurses and workplace learning differently. In the two nursing education subjects that I am responsible for, many of the essential readings do not take into account this postmodern perspective about learning in the workplace. Rather, they focus on learning as a product that can be acquired and transferred or is seen to be independent of context (Hager 2011a). The readings also provide the students with the sense that nursing education in the clinical context is a different field to workplace learning. It was the way that the students in their assignments described how important it was to accommodate the different learning styles of the nurses that they were teaching that led me to notice there was an issue. It was my understanding of the complex, messy environment in which they work that made me believe this was not practical or feasible. However, most of the students who were working in an educative capacity believed accommodating different learning styles to be appropriate. I also noticed that the students rarely referenced the workplace-learning literature in their assignments to support their arguments. Reflecting on this, I hope to provide my students with a new perspective about how nurses learn at work and the practices that they can use to better support their colleagues and nursing students learning during work.

As a result of this journey, I argue that the clinical workplace and learning about practice can be much better explained and described using postmodern theories. The insight I have gained from my research I currently use and apply as I prepare and teach new student nurses for learning in clinical practice and those students undertaking education units in the Masters of Nursing program. In particular, I use my new knowledge to describe to the students the emergent nature of nursing work in the

acute care context, and how and in what way, due to its unpredictability, this poses many new challenges for both students and educators alike in the clinical environment. Consequently, my findings help me to make sense and to explain the type of emergent properties of clinical work life that pose such challenges.

Finally, this research has provided me with greater insight into how nurses learn in practice and how they learn from not knowing. I also have a better appreciation of the role that objects play in the assemblage of work practices and the relationships these have with people.

8.5 Limitations of the Research

There are some limitations in this study. One limitation relates to sampling and the setting of the study in one ward. A bigger sample and/or the inclusion of other wards might have added variation or diversity to the data. However, I prioritised depth and richness, and given the complexity of the ward and span of my observations, this was vindicated in the relevance and quality of the data that were produced, and the new insights that they have enabled.

Another potential limitation was that during the observations, my participants were aware that I had experience as a RN and that I also held a senior management position in the Nurse Education Department at the hospital research site. I am aware that given my role, some participants may have second-guessed what I was looking for, and filtered or adjusted their responses. However, I took several measures to overcome this issue. My questions during the interviews were directed to actual events that I had observed with each participant. I asked numerous different questions about what I had observed and asked participants to provide examples. The extensive detail in my data, such as the observations in the medication room with Josephine and Georgia described in Chapter 6, suggests that these measures were effective.

A final potential limitation might relate to my capacity to gain truly novel insights, given that I am an insider in the phenomenon under investigation. The key arguments I have presented above show how I was able to mitigate this, capitalising on insider knowledge where it was helpful, but making a clear case for understanding nurses' learning in practice in distinctive ways. By adopting a distinctive contemporary workplace-learning approach, specifically Lefebvre's (1991) spatial triad and sociomateriality, I was able to get some distance and to see what was familiar in new and valuable ways.

8.6 My Contribution to Knowledge

This research makes a number of contributions to knowledge. From the research carried out, I have further developed and extended what was already known about nurses' learning in an acute care environment. Few studies have observed nurses learning as they are performing practice. This study builds on previous observational work on nurses describing what they do at work. More importantly, this research illuminates nurses' learning in new ways that have not been discussed before in the literature, using my particular combination of lenses.

The study also draws attention to the strategies that nurses put in place to enable learning. For the profession of nursing, this study is the first to show evidence about how and what RNs actually learn and how the environment in which they work shapes the nature of what it is that they learn. In Chapter 1, I highlighted concerns expressed by Boud and Hager (2012), who claimed that professional bodies focus only on a narrow range of learning activities and do not account for learning that takes place during practice. To extend the conceptualisation about the relationship between learning and working for professionals, Boud and Hager (2012) suggested that further research was required about how professionals actually learn, how the environments in which they operate influence them and the practices that they engage in when at work. This thesis provides substantial evidence showing how and what nurses learn in the practice

environment and contributes to the debate about professional learning for nursing.

Another significant contribution to knowledge that this study provides involves the role of the team leader. Previously, the focus in the literature for the team leader was on leadership and the importance of this function for managing patient care. However, I found in this thesis that in response to knowledge challenges, the role switches and becomes one of a rich pedagogical resource in terms of expertise, so as to support the nurses on the ward with their work. In particular, the team leaders' practices changed from caring for patients to teaching about patient care. My study is the first to show how the team leader was a crucial person in facilitating nurses' learning on the ward when the nurse educator was not available. The significance of this aspect of the role had been largely overlooked in the literature, and the implications for learning in the absence of the nurse educator had not been discussed. Further, my new findings on the role are important in terms of reducing the risks associated with complex care for patient safety. Thus, this study provides a rich and valuable contribution to this area by making visible this important feature of the team leader's role.

This study provides a further contribution to knowledge in relation to the use of the clinical handover sheet. A call for further research into the use of the clinical handover sheet was recommended over 15 years ago (Payne, Hardey & Coleman 2000), but this challenge had not previously been taken up. This is despite significant scrutiny in Australia regarding the clinical handover practices of all clinicians (Nursing, Medicine and Allied Health). While clinical handover practices have been under scrutiny because of patient safety and communication interests, nobody had previously examined the sheet itself. In this thesis, I have extended and enriched this field of enquiry. It is also the first study to do this in Australia.

Further, no one has linked the clinical handover sheet to its importance to nurses' learning. I have reframed the clinical handover sheet to identify the work that it does in practice and therefore uncovered its role and value in

relation to nurses' learning in practice. Previously, the only function of the clinical handover sheet that was identified was as a communication device or work-management tool resulting from clinical handover. The other functions of the sheet concerning epistemic and boundary work had never been recognised or documented before as described in this study. With the move towards nurses using electronic sources during handover, this study provides strong evidence of the rich and potential value that the traditional hard-copy clinical handover sheet has to offer towards learning.

Finally, in this thesis I have highlighted the complexities of working in the acute care hospital environment. Due to the current challenges of the diverse and complex casemix in acute care, I have shown how nurses are frequently working from the premise of uncertainty or not knowing about something. Additionally, there is little recognition in the literature that uncertainty is an everyday challenge for nurses. My study contributes to this field by providing strong evidence about how nurses actually deal with and cope with not knowing or uncertainty. I have shown that they manage this in important spatial ways. As mentioned earlier in Chapter 1, the issue is not that nurses do not know enough or are not well prepared for practice, but rather how they seek to resolve such challenges.

8.6.1 Theoretical contributions

In this thesis, I have applied a spatial theorisation in order to answer questions about nurses learning as they carry out acute care hospital work. My application of this theoretical construct within the context of workplace learning in nursing and the acute care practice environment is unique and one of the first studies to do so, thus adding a new dimension to this field in the literature. What I believe to be distinctive about my approach is that I have undertaken a spatial analysis of these three fields exclusively. The conceptual emphasis on practice draws out the situated use of materiality, bodies and the emerging nature of practice itself. By doing this, I have drawn attention to the day-to-day activities and the spatial practices involved in performing nursing work. This has revealed a

new understanding of what and how nurses learn in the acute care practice environment that was not previously made visible. Further, Lefebvre's (1991) spatial theory has not been used in this way before to expose and answer questions about learning. Therefore, I have shifted the use of this theory into a new domain.

Another significant theoretical contribution relates to my use of broader sociomaterial theories. To guide my conceptual analysis involving the clinical handover sheet, I drew on epistemic and boundary objects as a conceptual tool. I re-conceptualised the clinical handover sheet into either an epistemic or boundary object to focus on the work the sheet accomplishes when nurses are working with it. Using this approach was important as it helped me to develop crucial insights, making sense through theory about what was taking place as nurses used the sheet, allowing me to see the significance in what might otherwise have been overlooked. By reframing the sheet into a boundary object, I was able to show how practitioners from different social worlds cooperate, interacting back and forth between the object to communicate information in order to learn about patient care. In addition, by focusing on the epistemic properties of the clinical handover sheet, I was able to illuminate how learning takes place as nurses used the clinical handover sheet during practice. This has profound implications for how we understand the functions of the clinical handover sheet, not only during the handover of patient care, but also as it relates to nurses learning as they do work. Again, this theoretical perspective has not been used in this way before to expose and answer questions about nurses' learning in acute care work.

8.7 How and Why My Research Is Important to the Nursing Profession

My research is important to the nursing profession for several reasons. I have illuminated the ways in which nurses resolve uncertainty and knowledge challenges in practice and the kinds of resources that nurses need in order to overcome various different challenges. The knowledge of

what nurses do during times of uncertainty will allow the profession to provide better support and assistance, leading to superior patient outcomes.

In addition, I have shown how important the role of the team leader is when the nurse educator is unavailable. As we saw in Chapter 6, nurses frequently get stuck with not knowing what to do to continue the care for the patient. In my study, I found that the role of the team leader, mainly one of coordinating care, switched to teaching about practices and continuity of care when nurses got stuck trying to complete a task they could not resolve on their own. This research has implications for the nursing profession because the team leader is available on the ward when the nurse educator is not there. It is therefore important for the nursing profession to support the team leader given the pedagogical responsibility of the role to sustain a safe level and high standard of patient care.

In terms of nurses' learning, this study is important to the profession of nursing because it has illuminated a new way in which nurses learn with and from others in clinical practice. This knowledge has potential benefits for the nurse educator in the way that they provide educative support to all nurses working on the wards. Knowledge of the ways that nurses learn with and from each other when the nurse educator is not there means that the nurse educator can better plan for and provide the resources and tools necessary to enhance nurses' learning during practice.

Finally, this study has provided strong evidence to the profession that learning is occurring during practice and should be accounted for in some way as part of nurses' continuing professional development. I believe the measurement for this should be through the acknowledgement of the type of spatial practices that nurses use to resolve knowledge challenges, as well as the processes and the resources used. If nurses must account for the time component, then this can be recorded along with acknowledgement and reflection of what indeed it was that the nurse had learned from resolving the uncertainty or knowledge challenge. I believe

that this acknowledgement of clinical learning is extremely valuable for the nursing profession and must be captured in some way. While developing professionally in nursing is now undertaken through an academic pathway, it is timely that the benefits of clinical learning are recaptured to some extent.

8.8 Future Research Directions

This thesis has revealed several opportunities for further research. There is the opportunity to increase the number of participants across different sites and geographical locations. As the research was conducted in an acute medical ward, there is the potential to explore different specialties— such as intensive care, aged care, paediatrics and the ED—in order to provide a more representative picture of how and what nurses learn as they carry out work in acute care. While I have highlighted a new way to capture learning during work, further research is necessary to provide additional evidence of how the profession can further develop and achieve recognition for this as part of continuing professional development for nurses.

8.9 Conclusion

This thesis used postmodern theories concerning contemporary workplace learning, together with Lefebvre's (1991) tripartite theorisation of space and ideas from sociomateriality, to expose how and what nurses learn during everyday work in acute care. Findings revealed that nurses drew on several strategies to manage and learn from knowledge challenges during practice. These strategies have not been identified before. Learning during work for nurses is based on the type of situations that emerge in practice. As nurses conduct everyday work, they are thinking about what they need to do, accessing and processing information and linking this with their professional expertise and experience and with what they observe in their patients. Nurses relate past actions to future actions, make decisions

about their next move in their patient's care trajectory and learn at the same time.

In this thesis, I have presented and made visible a unique and insightful way to understand how and what nurses learn as they work. In the acute care setting, nurses' learning is produced and shaped through resolving the problems of practice (uncertainty, knowledge challenges and getting stuck) together with making practical meaning of the vast amount of patient information that nurses must deal with on a daily basis.

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Appendix A: Participant Information Sheet

Hospital and University of Technology

Hospital Logo

UNIVERSITY OF TECHNOLOGY SYDNEY

RESEARCH PROJECT
LEARNING FROM OTHERS IN CLINICAL PRACTICE
INFORMATION SHEET

Dear Colleague,

You are invited to participate in a research study about the way that registered nurses learn from others in clinical practice.

The study is being conducted by Linda Gregory, who is an employee of the Hospital and a postgraduate research student, from the University of Technology, Sydney (UTS). The study is being conducted in conjunction with the student's supervisors, Professor David Boud, who is the Professor of Adult Education, UTS and Dr. Jacqueline Baker, who is the Director of Nursing Studies from the Faculty of Nursing, Midwifery and Health, at UTS.

Before you decide whether or not you wish to participate in this study, it is important for you to understand why the research is being conducted and what it will involve. Please take time to read the following information carefully.

1. **What is the purpose of the study?**

   The purpose of the study is to investigate the way registered nurses use the knowledge and practice from others' to develop their own during the activities of everyday work and secondly, to identify opportunities and processes that will enable nurse educators to develop and implement a more structured framework to optimize and enhance learning during everyday clinical work practice.

2. **Why have I been invited to participate in this study?**

   All registered nurses who hold 2-5 years post registration nursing experience and working within this ward are invited to participate in the study.

3. **What if I don't want to take part in this study, or if I want to withdraw later?**

   You are under no obligation to participate in this study. If you decide to participate, you are free to withdraw your consent and discontinue your participation at any time without prejudice. Please be assured that all data and information collected from the study will remain **strictly confidential and anonymous.** No individual will be identifiable from the results.

4. **What does the study involve?**

   If you agree to participate in this study, you will be asked to sign the Participant Consent Form. This study will be conducted over a number of weeks. The participants of this research project will experience being observed during their everyday work practice when providing nursing care to the patients assigned to them. Observations shall occur in patient rooms, ward corridors, at the nurse's station, the doctor's office, the nurse manager's office, the medication room, the treatment room, the tutorial room, the tea room or wherever the nurse

is required to provide nursing care to allocated patients or participate with others about care provision. Observations will be carried out when the registered nurse is rostered to work a morning shift and be unstructured in the form of shadowing and noticing work practice, activity and interaction.

Interviews will be conducted up to one (1) hour in a closed room with a digital voice recorder to capture the detail from the earlier observations. Open-ended questions will be used to direct the interview. Clinical situations will be documented in a field note diary. Participants will be reassured that they will not be assessed or competence judged in terms of their work performance. All data gathered will remain confidential and be de-identified.

5. **How is the study being paid for?**

There is no funding attached to this project. Any costs involved are paid by the student as part of their research project to obtain a higher degree.

6. **Are there risks to me in taking part in this study?**

There are no risks to participants taking part in this study. The registered nurse initially may be apprehensive about being observed. Great care will be taken and assurance provided to ensure that the subjects feel at ease and feel under no obligation or pressure to continue observations during high stress periods of increased activity and acuity directly relating to workload.

The student researcher who is a Manager for Education within the organization will not be working in this role while conducting observations. The role will be as a student researcher. Performance or competence will not be assessed or judged as the focus is about **learning** from others and not about performance or competence.

Individuals who are considering a career in nurse education will not be recruited for the study.

7. **Will I benefit from the study?**

    This research will have a direct benefit to the participants who are involved with the project. This benefit will be achieved by raising awareness of the registered nurses own clinical practice and enable the participant to be conscious of their actions and learning whilst interacting with others about the care of their patients. This awareness will provide a stimulus for each participant to reflect on his or her actions and, as a direct consequence the knowledge and awareness generated will be beneficial for the recipient of nursing care provided.

8. **Will taking part in this study cost me anything and will I be paid?**

    There will be no costs involved or financial payment if you decide to take part in the study.

9. **How will my confidentiality be protected?**

    All participants taking part in this study will be de-identified using numerical identifiers at all times in order to keep their identity confidential during the dissemination of results.

10. **What happens with the results?**

    Data collected through observation and semi structured interviews of registered nurses will assist in identifying and clarifying the way that registered nurses learn in clinical practice from others during interactions, collaboration and situated activities of everyday work. Information collected will assist nurse educators to develop and implement a more structured framework to optimize learning opportunities in clinical work practice.

It is intended that results from the study will be de-identified and disseminated via publication and conference presentation and the generation of a thesis.

11. **What should I do if I want to discuss this study further before I decide?**

    If you require any further information please feel free to contact Linda Gregory on ▮▮▮▮▮▮ or mobile ▮▮▮▮▮▮▮.

12. **Who should I contact if I have concerns about the conduct of this study?**

    If you have any concerns about the conduct of this study, complaints may be directed to the Research Governance Officer, for ▮▮▮▮ Hospital, telephone, ▮▮▮ ▮▮▮ All complaints made will be treated in confidence and investigated fully.

Thank you for taking time to consider this study. If you wish to take part in it, please sign the attached consent form. This information sheet is yours to keep.

Appendix B: Consent Form

▮▮▮▮ Hospital and University of Technology

Hospital Logo

UNIVERSITY OF TECHNOLOGY SYDNEY

RESEARCH PROJECT
LEARNING FROM OTHERS IN CLINICAL PRACTICE
CONSENT FORM

1. I,_____
(Participant's Name)

   of_____

   agree to participate as a subject in the study "Learning from Others in Clinical Practice" as described in the participant information statement attached to this consent form.

2. I acknowledge that I have read the participant information statement, which explains why I have been selected, the aims of the study and the nature and the possible risks of the investigation, and the statement has been explained to me to my satisfaction.

3. Before signing this consent form, I have been given the opportunity of asking any questions relating to any possible physical and mental harm I might suffer as a result of my participation and I have received satisfactory answers.

4. I understand that I can withdraw from the study at any time without prejudice to my relationship to ▮▮▮▮ Hospital and the University of Technology, Sydney.

5. I agree that research data gathered from the results of the study may be published, provided that I cannot be identified.

6. I understand that if I have any questions relating to my participation in this research, I may contact Linda Gregory on telephone ██ ██ or mobile ████████, who will be happy to answer them.

7. I acknowledge receipt of a copy of this Consent Form and the Participant Information Statement.

Any complaints may be directed to the Research Governance Officer, for the Hospital, telephone, ███████. Complaints made will be treated in confidence and investigated fully.

Signature of participant   Please PRINT name   Date

_____ ….. /….. /….

Signature of witness   Please PRINT name   Date

_____….. /….. /….

Signature of investigator   Please PRINT name   Date

_____ ….. /….. /….

Study: Learning from Others in Clinical Practice
Participant Information Sheet V1 (February, 2009)

Appendix C: Revocation of Consent Form

█████ Hospital and University of Technology

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UNIVERSITY OF TECHNOLOGY SYDNEY

RESEARCH PROJECT
LEARNING FROM OTHERS IN CLINICAL PRACTICE
REVOCATION OF CONSENT

I hereby wish to withdraw my consent to participate in the study described above and understand that such withdrawal **WILL NOT** jeopardize my relationship with the University of Technology, █████ Hospital, or any member of staff.

Signature_____Date_____

Please   PRINT
Name_____

The section for Revocation of Consent should be forwarded to
Ms Linda Gregory
███████████

Appendix D: Interview Trigger for Questions

How long have you worked on this ward?

How long have you practiced as an RN after your transition year?

Tell me about your work routine as an RN on this ward?

Can you tell me about any particular times when you collaborate or engage with others about problems about practice?

Please tell me about the situations this morning when you have sought the assistance of others?

I noticed on the observations this morning about xx. Can you tell me more about what happened?

Tell me about the handover practices in this ward. I noticed during handover that xx occurred. Can you tell me what happened?

Did you get all the information that you need for your patients and if not can you elaborate?

How often do you refer to your handover sheet or write additional notes on the handover sheet? Can you give me some specific examples?

Can you tell me about the times when you seek doctors out and explain about the situation?

When you are in charge as the team leader what type of role do you find yourself being in and what things to you tend to do in that role?

Tell me about some situations where you have to assist others resolve situations?

From the observations this morning, tell me about what happened, and the decisions you made in order to resolve the situation or to find an answer to your problem?

Appendix E: Patient Information Sheet

██████ Hospital and University of Technology, Sydney

Hospital Logo

RESEARCH PROJECT

INFORMATION STATEMENT FOR PATIENTS ABOUT THE STUDY

LEARNING FROM OTHERS IN CLINICAL PRACTICE

This research project is being conducted by Linda Gregory, who is a research student undertaking Doctoral studies at the University of Technology, Sydney (UTS). The student is being supervised by Professor David Boud, who is a Professor of Adult Education at UTS and Dr. Jacqueline Baker, who is a senior lecturer from the Faculty of Nursing, Midwifery and Health at UTS. The research project is for the purpose of the doctoral studies being undertaken by the student.

Although you will not be directly involved with the study as a participant, you will be receiving nursing care by a registered nurse who has agreed to participate in the research. It is important for you to understand why the research is being conducted and what impact, if any, this would have on your care or treatment. Please take time to read the following information carefully.

The aim of this project is to explore the way nurses learn whilst they are providing nursing care to their patients. This study will involve observing what the nurse does as he/she is carrying out the required nursing care for you during the shift. This study is not about patients or their condition that resulted in an admission to the ward.

4. What would you be asked to do?

You will not be asked to do anything in this study. However, as an inpatient on Ward ▮▮▮▮▮ you will see the registered nurse who is caring for you being observed by the researcher as the nurse performs everyday nursing care to you.

As the patient who is receiving this nursing care, you may refuse to be involved with this study. This will not affect your treatment in any way. Should you choose to participate as a patient receiving care by a nurse who is involved in the study, you can withdraw anytime without giving a reason.

5. Are there any risks to me?

There are no potential risks to the patient if your nurse who is caring for you is taking part in this study. The focus of the study is on the nurse as they carryout everyday nursing work. You may be apprehensive about being involved as an indirect participant, however, great care will be taken and assurance provided to ensure that you feel at ease and under no obligation or pressure to continue to be the patient that is cared for by a nurse involved with the study.

6. How will my confidentiality be protected?

Any information that is collected about you as the nurse looks after you will remain strictly confidential and be de-identified to ensure anonymity. All of the nursing participants taking part in this study will remain anonymous. All data will be non identifiable and be gathered using numerical identifiers at all times in order to keep identity confidential during the dissemination of results. All data will be stored anonymously in locked filing cabinets and on a password protected computer. Pseudonyms will be used in publications derived from the research. All data will be kept in a secure password directory for seven years, after which, all information and data will be destroyed.

7. Ethics Approval

This study has been reviewed and approved by the ▇▇▇▇▇▇ Hospital Human Research Ethics Committee and the University of Technology, Sydney, Ethics Committee. The Ethics approval number for ▇▇ Hospital is 09/033 and for the University of Technology Sydney the approval number is 2009 / 073. Should you wish to discuss the matter with someone not directly involved, you can contact the Research Governance Officer, for the Hospital, telephone, ▇▇▇▇▇▇. For further information about the project, please contact Linda Gregory on ▇▇▇▇▇▇.

Thank you

Appendix F: Field Notes Template

Field Note Schedule		
Room Numbers Assigned:	Participant:	
Date:	Time of observations:	
Location /Place	Situation /Event	Content /Discussion

My Observation Details:

My Reflective Notes:

Details requiring further action:

Comments:

Appendix G: Clinical Handover Sheet

BED	MRN & Name	Age & Sex	Team Consultant	Diagnosis	History	Current Care	Blood Counts Products Due	Access/ Meds.
1		22 F	Dental	Dental Abscess	NIL	NBM from MN on 31/1 for O/T, pre-op check list √, no consent IV AB via PVC (paper chart)		
2		20 F		Newly dx AML? DIC Big ICE Chemo D+8	NIL	Ongoing temp, keep fibrinogen>2, BD blood to check coag, FBC, keep PH of urine >7, BD wt, monitor LDH		CVC IVT/IVAB
3		63 M	Urology	Left flank pain 2^0 renal calculi	HTN, AMI, IHD, ↑Chole, L) THR, parathyroidectomy	Ureteroscopy & retrograde pyelogram +/- removal of renal calculi, i/o of stent – for D/C tomorrow – meds ready		PVC IVT
4		90 M	Nephrology	Ruptured infrarenal abdominal aortic aneurism (AAA) post endovascular repair, deconditioned post-op NFR	PPM, IDDM, AMI, CABG x5, CCF, TIA 30/1 has rash to body – calamine applied Stool sample	TFx2 with rollator, incontinent faeces, food chart, daily wt, mobile Rehab√→not for active rehab at present; refused NGT Mod barium swallow ½ time TBA, Dental R/V 1/2	For stool	PVC
5								
6		65 M	Haem	Multiple myeloma with metastatic lytic bone lesions	GORD, BPH, IDDM, Partial foot amputation, Asthma, depression, glaucoma, IHD Allergic: tetracycline	Podiatry, on-going psych R/V√, Pall R/V√, pain +++, RXT No lifting, self-caring with insulin & BSL		L) PVC
7		73 M	Haem	Septic – ICU- RLL collapse Pseudomonas, oral herpes 14/1 campylobacter in stool – now clear	CLL, renal impairment, herpes, autoimmune haemolytic anaemia (transfusion dependant)	ARF-vascath- HD (also has IDC); diarrhea+++, soft diet, PR bleed, angiodysplasia, F chart. Daily U/A, Daily wt.		CVC
8				MUD Nov 09, knee & hip	Multiple Myeloma, HTN,	On-going OT & physio R/V, assist x2		Hickmans

BED	MRN & Name	Age & Sex	Team Consultant	Diagnosis	History	Current Care	Blood Counts Products Due	Access/ Meds.
		F	Haem	pain **VRE**	asthma	w/FASF, Gram (-) rods in blood culture. Monitor B		IVAB
9		75 M	Nephrology	ESRF (came from dialysis) AF SOB, LRTI	IHD, GORD, HTN, ↑CHOL, CABG, AAA, REP, CRF, PAF, CAL, Pneumonia	Telemetry heart monitoring, R) arm haematoma, R) leg BPs, gastro R/V, awaiting induced sputum sample HD Mon/Wed/Fri		L) AVF IVAB
10		50 M	Gastro	Tiredness & bloody diarrhea, prob bacterial gastro HB73, WBC 16.6, n11.6, CRP 28.8, Plats 603	ETOH, 6 litres beer/wine daily, chronic pain from football injury '87, shortening of R)leg & lumbar disc degeneration (takes Voltaren) From foster house, has been living on streets, Obese (110 kgs)	For folate, B12 and iron studies. For repeat bloods in AM, For stool culture, For 3rd stool culture√ AWS scoring0, NBM, bowel prep colonoscopy 1/2		R) PVC Oral antibiotics
11		87 M	Urology	Haematuria	Left renal mass, prostamegaly, IHD/CABGx3, HT, High CHOL, CCF, AF	IDC insitu, S/B Dr informed pt that he has incurable metastatic Ca. If renal function doesn't improve consider radiotherapy, daily wt, cardiac review TBA, For bone scan		
12		59 M	HAEM	CMV reactivation	AML, double cord BMT Dec 10, Extensive cutaneous GVHD – some improvement noted with Rx	BD Foscarnet + IVF	IV KCL	CVC
13		56 M	HAEM	D +76 Post MUD SCT for AML (Nov' 10'); GVHD GUT VRE & MRSA	TTP2^0 Cyclosporin Fluid overload	Ongoing diarrhea, nausea & vomiting; IDC, Reg PAC & mouth care; QID + 0200 BSLs – BD insulin to be given at 09.00 & 2100, monitor wt, stool spec for c.diff needed; NGT Skin tears on legs, stool chart, daily WT & U/A		L) CVC TPN 80 mls/hr
14		53	HAEM	Allo Tx day 3	Myelofibrosis, transfusion	BD WT, diarrhea -gastroscopy, 30/1 MTX☑		CVC

BED	MRN & Name	Age & Sex	Team Consultant	Diagnosis	History	Current Care	Blood Counts Products Due	Access/ Meds.
		M		Sibling for myelofibrosis/MPD	dependent, splenectomy Day 3 MTX due	NG feeds 40 mls/hr.		
15		29 F	GYNAE	Pelvic Inflammatory Disease	Laparoscopy, Appendectomy, D/O of pelvic Abscess & pus, division of multiple adhesions 27/1/11 27/01/11 JP drain was faulty & had to be removed	Regular analgesia as charted, TED's For UROLOGY R/V, daily clexane	IVAB	PVC
16		72 F	HAEM	Newly Dx ALL. LA induction therapy	Excema, HEP C (confidential), HT, compression # T12 # R) Ribs	Daily WT & U/A on GTN & Nic patches – off nocte. Fleet enema	WBC 0.4, N: 0.8	Morph. CVC
17		64 F	ONC	Mucositis 2^0 to recent chemo (6th cycle of PEM-pred/etoposide/ Mitoxantrone)	NHL, DVT L) LEG; GORD Fentanyl patch- pt declining, sol Panadol-citrus too painful	R?V IVABs if temp >38 Puree diet, Diantrition R/V		IVT
18		64 F	Nephrology	T/F from Concord A on CRF Scheduled & specialled MRSA	Intracranial Haemorrhage, AVR,CAGs, HTN, AF, ARF, SLE	OT ☑ SW☑ Refusing obs & meds, agitated & confused at times. Restless, aggressive & wanting to go home.		Hickmans IVAB
19		55 F	Gastroenterology	Chronic Anaemia	27/1 Increased Tumor Marker F1	Free fluid diet, pelvic U/S, Gynae R/V Methadone, 01/02 attended Endoscopy	30/1 HB 100	PVC

Appendix H: Medication Protocols

GUIDLINES FOR INTRAVENOUS DRUG ADMINISTRATION

DRUG NAME	RECONSTITUTION	COMPATIBILITY	DILUTION	RATE OF ADMINISTRATION
Aciclovir	10ml sterile water for injection	5% glucose 0.9% saline	250mg in 50ml 500mg in 100ml (Maximum 5mg/ml)	1 hour infusion
Amphotericin B	10ml sterile water	5% glucose	500mls	4 - 6 hours (Test dose: Infuse first 5mg over 1 hour, then infuse remainder over 6 hours) 1 litre pre-hydration - 1hr
Liposomal Amphotericin	12ml sterile water	5% glucose	250-500mls (0.2-2mg/ml)	30-60 minutes (no test dose necessary)
Ampicillin	10ml sterile water	0.9% saline	500mg -No dilution required 1g in 10-20ml	500mg - slow injection 3-5 mins 1gm - slow injection 10-15 mins (via burette)
Benzylpenicillin	10ml sterile water	5% glucose 0.9% saline	No dilution required for reconstituted solution	Slow injection 3 - 5 minutes
Cefpirome	10ml sterile water	5% glucose 0.9% saline	100ml OR 20ml dilution required if given as a push dose	30 minute infusion OR slow injection over 3-5 mins
Ceftriaxone	10ml sterile water	5% glucose 0.9% saline	No dilution required for reconstituted doses up to 1g	Slow injection 3 - 5 minutes
Cefazolin	10ml sterile water	5% glucose 0.9% saline	No dilution required for reconstituted	Slow injection 3 - 5 minutes
Ciprofloxacin	N/A	5% glucose 0.9% saline	No dilution required	Infuse over 60 minutes
Co-Trimoxazole	N/A	5% glucose	2 ampoules - 250ml 4 ampoules - 500ml	Infuse over 60-90 minutes
Cyclosporin	N/A		Dilute in 100ml in burette or glass (not PVC bag)	
Dexamethasone	N/A	5% glucose 0.9% saline	Dilute to 10ml	Slow injection over 1-3 minutes
Dicloxacillin	20ml sterile water	5% glucose 0.9% saline	Dilute in at least 100ml	Infuse over at least 60 minutes
Flucloxacillin	10ml sterile water (250-500mg) 20ml sterile water (1g)	5% glucose 0.9% saline	No dilution required for reconstituted solution	Slow injection over 3-5 minutes
Fluconazole	N/A	5% glucose 0.9% saline	No dilution required	100mg-infuse over 30 minutes 200mg-infuse over 60 minutes
Frusemide	N/A	0.9% saline	Doses <80mg-10ml Doses >80mg- 1mg/ml	Doses <80mg-slow injection over 1-2 mins Doses >80mg - infuse no faster than 4mg/min.
Gentamicin	N/A	5% glucose 0.9% saline	Dilute in 50-100ml	Infuse over 30 minutes

Updated May 2003

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Cancer Treatments Online

Non Hodgkins Lymphoma Hyper CVAD Part B (Cytarabine Methotrexate Leucovorin Methylprednisolone)

ID: 000225 *(V.1)*   Approved: 16 Mar 2006   Last Modified: 27 Oct 2010   Review Due: 31 Dec 2011

Treatment Schedule Summary

Drugs	Notes	Days	Cycles
Methylprednisolone 50 mg (IV infusion)	in 100 mL sodium chloride 0.9% over ~ 30 minutes TWICE daily (every 12 hours)	1 to 3	2, 4, 6
Methotrexate 200 mg/m2 (IV infusion)	in 500 mL sodium chloride 0.9% over 2 hours	1	2, 4, 6
Methotrexate 800 mg/m2 (IV infusion)	in 1000 mL sodium chloride 0.9% over 22 hours	1	2, 4, 6
Calcium Folinate (Leucovorin) 15 mg/m2 (IV)	every 6 hours until methotrexate level within range. Start 36 hours after commencement of methotrexate infusion	2	2, 4, 6
Cytarabine (Ara-C) 3000 mg/m2 (IV infusion)	in 500 to 1000 mL sodium chloride 0.9% over 3 hours TWICE daily (every 12 hours)	2, 3	2, 4, 6
PEGFILgrastim 6 mg (SC)	inject subcutaneously on day 4 at least 24 hours after chemotherapy	4	2, 4, 6

3 cycles of Part B (Cycles 2, 4, 6) alternating with 3 cycles of Part A (Cycles 1, 3, 5) for a total of 6 cycles. Commence next cycle on Day 21 or when WCC is greater than or equal to to 2.0 x 10^9/L and platelets are greater than 60 x 10^9/L, which ever is earlier.

Full View

Indications and Patient Population

Indications:

- mantle cell lymphoma, lymphoblastic lymphoma, non-Hodgkin's lymphoma
- this is an aggressive regimen therefore patient selection is important

https://www.eviq.org.au/Protocol/tabid/66/categoryid/54/id/225/Non+Hodgkins+Lymphoma+Hyper+CV... 4/02/2011

Drug Status:

Aprepitant, in combination with other antiemetic agents is TGA indicated for the prevention of acute and delayed nausea vomiting associated with initial and repeat courses of highly and moderately emetogenic cancer chemotherapy. It is NOT F listed for this protocol.

Pegfilgrastim: S100 schedule

All other drugs in this protocol are on the **PBS general schedule**

Cost: ~ $ 615 per cycle (excluding pegfilgrastim)

Note:

- calcium folinate (leucovorin) must be administered at the precise timings as prescribed. The first dose must be give hours after the commencement of the methotrexate infusion
- methotrexate levels should be monitored at 24 hours after the completion of the methotrexate infusion and daily ur the level is less than 0.05 micromol/L
- cease PCP prophylaxis with sulfamethoxazole/trimethoprim at least one day prior to methotrexate infusion and recommence once neutrophils have recovered to greater than 1.0×10^9/L
- cytarabine to be reduced to 1000 mg/m^2 in patients over 60 years

Links to Other Regimens:

Link to **Hyper CVAD Part A**

Commence next cycle when WCC are greater than or equal to to 2.0×10^9/L and platelets are greater than 60×10^9/L on 21, which ever is earlier

Key Prescribing Points

Venous access required	Yes	Multi-lumen central venous access device (CVAD) **Link to CVAD line selection**
Premedication	Yes	**Sodium bicarbonate 8.4% infusion:** urinary pH must be greater than 7 prior to commencing methotrexate infusion. **Corticosteroid eye drops (table)** to minimise corneal toxicity from high dose cytarabine. Commence the day prior to first dose of cytarabine and continue for at least 72 hours after completion of final cytarabine dose i.e from day 1 to day 6
Emetogenicity		The suggested antiemetic regimen in this protocol is to be used as a guide only. The acute and delayed emetic risk of multi-day chemotherapy protocols will overlap depending on the individual drugs and their sequence of administration. More or less antiemetic cover may be required.
	Day 1 High	**Aprepitant (authority)** 125 mg prior to chemotherapy **AND** **5HT$_3$ antagonist (table)** prior to chemotherapy **Steroid:** the steroid antiemetic is covered by methylprednisolone (part of protocol) Ensure that patients have sufficient antiemetics for breakthrough emesis: **Metoclopramide** 10 mg to 20 mg (*orally or intravenously*) every 4 to 6 hours when necessary **OR**

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		Prochlorperazine 10 mg (*orally or intravenously*) every 4 to 6 hours when necessary Link to **Breakthrough Emesis Management**
	Days 2 to 3	**Aprepitant** 80 mg **AND** **Steroid:** the steroid antiemetic is covered by methylprednisolone
Methotrexate		Monitoring of methotrexate levels is **essential** as delayed methotrexate excretion is potentially an emergency situation
Methotrexate and third space fluid		Methotrexate exits slowly from third space compartments (e.g. pleural effusions or ascites). This results in a prolonged terminal plasma half-life and unexpected toxicity. In patients with significant third space accumulations, it is advisable to evacuate the fluid before treatment and to monitor plasma methotrexate levels.
Neurotoxicity with high dose cytarabine		This may occur in patients treated with cytarabine greater than 2 g/m^2. Assess cerebellar function prior to each cytarabine dose. Link to **further information and assessment tool**
Ocular toxicities		Administer corticosteroid eye drops (**table**) to minimise corneal toxicity from high dose cytarabine. Commence the day prior to first dose of cytarabine and continue for at least 72 hours after completion of final cytarabine dose Link to **ocular toxicities associated with high dose cytarabine**
Tumour lysis risk		Patients receiving the first dose of Hyper CVAD (either Part 1 or 2) are at high risk of developing tumour lysis syndrome. Tumour lysis prophylaxis is recommended. Link to **prophylaxis drugs and doses**
PCP prophylaxis		Link to **prophylaxis drugs and doses**
Antiviral prophylaxis		Link to **prophylaxis drugs and doses**
Corticosteroids		Diabetic patients should monitor their blood glucose levels closely. Consider prescribing a proton pump inhibitor to prevent gastric irritation.
Blood tests		FBC at baseline and repeat prior to each treatment EUCs, LFTs and LDH at baseline and prior to each treatment BSLs at baseline and regularly throughout treatment Methotrexate levels to be monitored until level is below 0.05 micromol/L
Nutritional risk	Moderate	Dietitian to see patient during week 2 to 3 of treatment, with reviews every 2 to 3 weeks thereafter
Useful links		Link to **patient resource websites**

Clinical Information

Acute Short Term Effects from Corticosteroids - Prednisolone, dexamethasone or methylprednisolone administered continuously for longer periods of time or for short, high-dose treatment courses that are repeated regularly (e.g. dexamethasone 40 mg daily for 4 days, or prednisone 100 mg daily for 5 days) may be associated with adverse effects.

Cytarabine (Ara-C) syndrome - Treatment with cytarabine may cause a 'Cytarabine Syndrome' characterised by flu-lik symptoms, skin rash and occasionally chest pain and hypotension.

Neurotoxicity associated with High Dose Cytarabine - Therapy with high dose cytarabine (greater than or equal to 2 g/m2) has been associated with severe and potentially fatal toxicities which differ from those seen with usual low doses.

Antifungal Prophylaxis in Patients with Haematological Malignancy or Profound Neutropenia > 10 days - Summary of antifungal prophylaxis recommendations from the Royal Australasian College of Physicians 2008

Hepatitis B Screening and Prophylaxis in Cancer Patients Requiring Cytotoxic and/or Immunosuppressive Therapy - Screening is recommended in all patients who are to receive treatment with cytotoxic and/or

immunosuppressive therapy.

Effects of Antitumour Drugs on Fertility - This document contains information regarding the effects on fertility of can-treatments.

Treatment Schedule

Drug list

Cycle

Day 1

Methylprednisolone	50 mg (IV infusion)	in 100 mL sodium chloride 0.9% over ~ 30 minutes TWICE daily (every 12 hours)
Methotrexate	200 mg/m2 (IV infusion)	in 500 mL sodium chloride 0.9% over 2 hours
Methotrexate	800 mg/m2 (IV infusion)	in 1000 mL sodium chloride 0.9% over 22 hours

Day 2

Methylprednisolone	50 mg (IV infusion)	in 100 mL sodium chloride 0.9% over ~ 30 minutes TWICE daily (every 12 hours)
Calcium Folinate (Leucovorin)	15 mg/m2 (IV)	every 6 hours until methotrexate level within range. Start 36 hours after commencement of methotrexate infusion
Cytarabine (Ara-C)	3000 mg/m2 (IV infusion)	in 500 to 1000 mL sodium chloride 0.9% over 3 hours TWICE daily (every 12 hours)

Day 3

| Methylprednisolone | 50 mg (IV infusion) | in 100 mL sodium chloride 0.9% over ~ 30 minutes TWICE daily (every 12 hours) |
| Cytarabine (Ara-C) | 3000 mg/m2 (IV infusion) | in 500 to 1000 mL sodium chloride 0.9% over 3 hours TWICE daily (every 12 hours) |

Day 4

| PEGFILgrastim | 6 mg (SC) | inject subcutaneously on day 4 at least 24 hours after chemotherapy |

3 cycles of Part B (Cycles 2, 4, 6) alternating with 3 cycles of Part A (Cycles 1, 3, 5) for a total of 6 cycles. Commence next cycle on Day 21 or when WCC is greater than or equal to to 2.0 x 10^9/L and platelets are greater than 60 x 10^9/L, which ever is earlier.

Dose Modifications

Dosing Considerations & Disclaimer

Haematological toxicity

Subsequent courses are given either on day 21 or when the total WCC is greater than or equal to 2.0×10^9/L and platelets are greater than 60×10^9/L, which ever is earlier.

Renal impairment

Creatinine clearance (mL/min)

10 to 50	Reduce methotrexate by 50%
less than 10	Contraindicated

CYTARAbine to be reduced to 1000 mg/m^2 in patients over 60 years

NOTE: an increased risk of neurotoxicty has been associated with high dose cytarabine when creatinine clearance is less tl 60 mL/min

Hepatic impairment

Hepatic dysfunction

Mild	No dose modifications necessary
Moderate	No dose modifications necessary
Severe	Reduce methotrexate by 25%

Link to **classification of hepatic dysfunction** for dose modification

Peripheral Neuropathy

CTC grading

Grade 2	Reduce cytarabine to 1000 mg/m^2

Mucositis, stomatitis & diarrhoea

CTC grading

Grade 3 or Grade 4	Diarrhoea and ulcerative stomatitis require interruption of therapy otherwise, hemorrhagic enteritis and death from intestinal perforation may occur: reduce methotrexate by 25%

Interactions

References & Disclaimer

Methotrexate

	Interaction	Clinical management
NSAIDs	Concomitant administration of some NSAIDs with high dose methotrexate therapy has been reported to elevate and prolong serum methotrexate levels, resulting in deaths from severe haematologic and gastrointestinal toxicity	NSAIDs should not be administered prior to or concomitantly with high doses of methotrexate. Avoid concurrent therapy or withhold NSAIDs at least 48 hours prior to methotrexate therapy
	These drugs may displace bound	Avoid concurrent use. If this is not

Sulphonamides and penicillins (e.g. sulfamethoxazole, Bactrim®, Tazocin®)	methotrexate from plasma protein, increasing serum methotrexate levels and its toxicity	possible, monitor for increased myelosuppression
Trimethoprim	Trimethoprim and methotrexate have additive antifolate activity and may result in increased toxicity	Avoid concurrent use. If this is not possible, monitor for increased myelosuppression
Ciprofloxacin	Ciprofloxacin may inhibit renal tubular transport of methotrexate, increasing serum methotrexate levels and its toxicity	Avoid concurrent use. If this is not possible, monitor methotrexate serum levels, renal function and symptoms of methotrexate toxicity
Mercaptopurine	Methotrexate may decrease xanthine oxidase metabolism of mercaptopurine, increasing serum mercaptopurine levels and its toxicity	Avoid concurrent use. If this is not possible, monitor for increased mercaptopurine toxicity
Probenecid	Probenecid may inhibit renal excretion of methotrexate, increasing serum methotrexate levels and its toxicity	Avoid concurrent use. If this is not possible, monitor for increased myelosuppression
Proton pump inhibitors (eg omperazole, pantoprazole)	Potentially can increase methotrexate levels due to reduced renal clearance of methotrexate	Consider H_2 antagonist (eg ranitindine) or monitor for increased myelosuppression

CYTARAbine

No clinically significant interactions

Aprepitant

	Interaction	Clinical management
Drugs metabolised by CYP3A4 and CYP2C9 (eg, dexamethasone, etoposide, ifosfamide, imatinib, irinotecan, midazolam, paclitaxel, vinblastine, vincristine, vinorelbine etc.)	Aprepitant inhibits and induces CYP3A4. It also induces CYP2C9. When given with drugs which are metabolised by these enzymes, increased or decreased therapeutic effects may occur as well as increased adverse effects	Monitor for altered effects especially when aprepitant is used with drugs which have a narrow therapeutic index Note: Some combinations, eg aprepitant with pimozide, are contraindicated
CYP 3A4 inducers (eg phenytoin, phenobarbitone, rifampicin, St John's Wort etc.)	These drugs may increase the clearance of aprepitant thus decreasing its antiemetic effect	Avoid concurrent use. If this is not possible, monitor for decreased antiemetic effect or use an alternative antiemetic regimen
CYP 3A4 inhibitors (eg azole antifungals, ritonavir, erythromycin, grapefruit juice etc.)	These drugs may decrease the clearance of aprepitant thus increasing its toxicity	Avoid concurrent use. If this is not possible, monitor for increased adverse effects of aprepitant
Link to table of CYP enzymes inducers, inhibitors and substrates		

General Interactions

	Interaction	Clinical management
Warfarin	Antineoplastic agents may alter the anticoagulant effect of warfarin	Monitor INR regularly and adjust the dose of warfarin if necessary, or consider other alternatives (eg, LMWH or standard heparin)
Digoxin	Antineoplastic agents can damage the lining of the intestine thus causing a decrease in the absorption of digoxin	Monitor digoxin levels and adjust the dose of digoxin if clinically indicated
Antiepileptics	Both altered antiepileptic and antineoplastic levels may occur, possibly leading to loss of efficacy or toxicity	Avoid concurrent use of enzyme-inducing antiepileptics and antineoplastics. If this is not possible, monitor antiepileptic levels and adjust the dose if clinically indicated. The efficacy of antineoplastics should also be closely monitored
Antiplatelet agents & NSAIDs	Increased risk of bleeding due to treatment related thrombocytopenia	Avoid or minimise combination. If combination has to be used (eg low dose aspirin for ischaemic heart disease), monitor for signs of bleeding
Vaccines	Diminished response to vaccines and increased risk of infection with live vaccines	Live vaccines should be avoided

Administering

Administering Day 1

Key Administration Points Day 1

Venous access required	Yes	Multi-lumen central venous access device (CVAD) **Link to CVAD line selection**
Premedication	Yes	**Sodium bicarbonate 8.4% infusion**: urinary pH must be greater than 7 prior to commencing methotrexate infusion. If urine pH is below 7 or drops at any time over the next 3 days (or until methotrexate level is less than or equal to 0.05 micromol/L) administer stat doses of sodium bicarbonate 8.4% 100 mL over 15 minutes. **Corticosteroid eye drops (table)** to minimise corneal toxicity from high dose cytarabine. Commence the day prior to first dose of cytarabine and continue for at least 72 hours after completion of final cytarabine dose i.e from day 1 to day 6
Emetogenicity	High	**Aprepitant** 125mg **AND** **5HT₃ antagonist (table)** 60 minutes (orally) or 30 minutes (intravenously) prior to chemotherapy **AND** **Steroid**: the steroid antiemetic is covered by methylprednisolone as part of treatment protocol
Vesicant potential	Methotrexate	Non-irritant
	Methylprednisolone	miscellaneous
Blood tests		Verify recent blood results (FBC taken within ~ 24 to 48 hours) are available and are within acceptable limits for

		this treatment EUCs, LFTs and LDH are required prior to each treatment BSLs at baseline and regularly throughout treatment Methotrexate levels to be monitored until level is below 0.05 micromol/L
Nutritional risk	Moderate	Dietitian to see patient during week 2 to 3 of treatment, with reviews every 2 to 3 weeks thereafter

Assessment Day 1

General Patient Assessment:

- assess at baseline and prior to each cycle
- **Assessment Tool**

Mucositis:

- assess at baseline and prior to each cycle
- if patient experiences > grade 2 **mucositis**, review by medical officer before commencing treatment
- **Assessment Tool**

Tumour Lysis Syndrome (TLS):

Patients receiving the first dose of Hyper-CVAD are at high risk of developing tumour lysis syndrome. The risk is reduced subsequent cycles.

- High risk for developing TLS include:
  - high grade lymphomas
  - high tumour burden (may be manifested by high pre-treatment WBC and/or raised LDH)
  - more common with the first cycle of chemotherapy
- symptoms include: nausea and vomiting, lethargy, joint discomfort, fluid overload, muscle cramps, tetany, seizures dyspnoea and cardiac arrhythmias
- monitor patients closely during and up to 48 hours post therapy including regular weights and fluid balance
- report abnormalities to medical officer

Hyperglycemia:

- methylprednisolone may increase blood glucose levels in both diabetic and non-diabetic patients
- monitor blood glucose levels closely at baseline and throughout treatment

Fluid Balance:

A large volume of intravenous fluid is given with this protocol

- perform baseline weight and weigh daily
- strict fluid balance
- if weight increases by more than 1 kg from baseline or fluid balance becomes positive by more than 1 litre, or any o signs of fluid overload present review by medical officer (diuretics may be required)

Drug Specific Administration Details

Methotrexate:

High dose methotrexate (greater than 1 g/m^2) can cause renal failure from the time of administration until the methotr blood level has returned to normal.

Urine pH monitoring

- measure base line pH
- monitor all urine output prior and during infusion, and until the methotrexate level is less than 0.05 micromol/L (at 3 days post methotrexate infusion)
- maintain urine pH greater than 7
- administer sodium bicarbonate 8.4% to maintain a urine pH greater than 7

Pulmonary Toxicity

- monitor patients for symptoms of pulmonary toxicity
- inform medical officer of any symptoms that may occur during therapy

Calcium Folinate Rescue

- must be administered at the precise timings as prescribed
- first dose to be given 36 hours after the commencement of the methotrexate infusion
- plasma methotrexate concentration monitoring
- must be preformed until the methotrexate level is less than 0.05 micromol/L
- do not take sample from the same CVAD lumen as the methotrexate was administered through.

Monitor methotrexate levels at 24 hours after the completion of the methotrexate infusion and daily until the level is less t 0.05 micromol/L

Methylprednisolone:

Caution

There are reports of cardiac arrhythmias and/or circulatory collapse and/or cardiac arrest following rapid administration of large IV doses (over less than 10 minutes)

Hyperglycaemia

- may increase blood glucose levels in both diabetic and non-diabetic patients
- diabetic patients may require dose adjustments to their medication

Mood disturbances

- may cause mood disturbances and personality change

Gastrointestinal side effects

- may increase appetite and cause weight gain
- may cause dyspepsia and gastric ulcers - proton pump inhibitors may be required

Administration details day 1

Prime 3 IV lines with sodium chloride 0.9%

Access 3 lines of the CVAD **CVC** or **Hickman**

Attach each IV line to a seperate CVAD lumen

- make sure corticosteroid eye drops are given 24 hours prior to high dose cytarabine
- continue to monitor pH on all urine output
- administer antiemetics as required
- do not interrupt the infusion of sodium bicarbonate or methotrexate

- the starting time of the methotrexate infusion **must** be documented

Chemotherapy

Hour	LINE 1 Hydration	LINE 2 Methotrexate	LINE 3 Other
-4	1000 mL sodium chloride 0.9% with 100 mL sodium bicarbonate 8.4% over 4 hours		
-3	*if urine pH is greater than 7 commence methotrexate*		Administer antiemetics Administer methylprednisolone over at least 30 minutes **(every 12 hours)**
+0	1000 mL sodium chloride 0.9% with 100 mL sodium bicarbonate 8.4% every 8 hours *Continue this hydration regimen until methotrexate level is less than 0.05 micromol/L*	Administer methotrexate infusion over 2 hours (dose 1)	
+2		Administer methotrexate infusion over 22 hours (dose 2)	
+11			Administer methylprednisolone over at least 30 minutes
+24		Stop methotrexate infusion, even if it is not completed	

Document appropriately

Excretion time: 7 days after the last dose of chemotherapy for each cycle

Administering

Administering Day 2

Key Administration Points Day 2

Venous access required	Yes	Multi-lumen central venous access device (CVAD) **Link to CVAD line selection**
Premedication	Yes	**Corticosteroid eye drops (table)** to minimise corneal toxicity from high dose cytarabine. Commence the day pr to first dose of cytarabine and continue for at least 72 ho after completion of final cytarabine dose i.e from day 1 to day 6
Emetogenicity	High	**Aprepitant** 80mg **AND** **Steroid:** the steroid antiemetic is covered by methylprednisolone as part of treatment protocol
Vesicant potential	CYTARAbine	Non-irritant
	Methotrexate	Non-irritant
Blood tests		Verify recent blood results (FBC taken within ~ 24 to 48 hours) are available and are within acceptable limits for t treatment EUCs, LFTs and LDH are required prior to each treatment BSLs at baseline and regularly throughout treatment Methotrexate levels to be monitored until level is below 0 micromol/L
Nutritional risk	Moderate	Dietitian to see patient during week 2 to 3 of treatment, reviews every 2 to 3 weeks thereafter

Assessments Day 2

General Patient Assessment:

- assess prior to treatment
- **Assessment Tool**

Mucositis:

- assess prior to treatment
- if patient experiences > grade 2 **mucositis**, review by medical officer before commencing treatment
- **Assessment Tool**

Neurotoxicity:

- neurological assessment **prior** to high dose CYTARAbine infusion **Assessment tool**
- **link to further clinical information**

Tumour Lysis Syndrome (TLS):

Patients receiving the first dose of the Hyper-CVAD are at high risk of developing tumour lysis syndrome. The risk is with subsequent cycles.

- High risk for developing TLS include:
  - high grade lymphomas
  - high tumour burden (may be manifested by high pre-treatment WBC and/or raised LDH)
  - more common with the first cycle of chemotherapy
- symptoms include: nausea and vomiting, lethargy, joint discomfort, fluid overload, muscle cramps, tetany, seizures dyspnoea and cardiac arrhythmias
- monitor patients closely during and up to 48 hours post therapy including regular weights and fluid balance
- report abnormalities to medical officer

Hyperglycemia:

- methylprednisolone may increase blood glucose levels in both diabetic and non-diabetic patients
- monitor blood glucose levels at baseline, and a minimum of daily throughout treatment or as clinically indicated

Drug Specific Administration Details Day 2

CYTARAbine:

High dose CYTARAbine is associated with severe gastrointestinal, central nervous system and pulmonary toxicity

- monitor closely for toxicities during and post each CYTARAbine infusion
- **Neurotoxicity Assessment tool**

Rapid infusion

- may increase neurotoxic adverse effects
- nausea and vomiting become more severe

CYTARAbine syndrome

- characterised by fever, myalgia, bone pain, and / or occasionally rash, chest pain, or conjunctivitis
- can occur 6 to 12 hours following drug administration. Symptoms usually resolve within 24 hours after cytarabine is discontinued
- corticosteroids may be used for treatment and prophylaxis

Ocular Toxicity

- corticosteroid eye drops 4 times a day are commenced the day prior to CYTARAbine therapy and continues for 72 h post last infusion

Methotrexate:

Urine pH monitoring

- monitor all urine output pH prior and during infusion, and until the methotrexate level has returned to normal (abou days post methotrexate infusion)
- maintain urine pH greater than 7
- administer sodium bicarbonate 8.4% to maintain urine pH greater than 7

Pulmonary Toxicity

- monitor patients for symptoms of pulmonary toxicity
- inform medical officer of any symptoms that may occur during therapy

Calcium Folinate Rescue

- must be administered at the precise timings as prescribed
- first dose to be given 36 hours after the commencement of the methotrexate infusion

Plasma methotrexate concentration monitoring

- must be performed until the level is less than 0.05 micromol/L
- do not take sample from the same CVAD lumen as the methotrexate was administered through

Calcium Folinate:

First dose is to be given 36 hours after the commencement of the methotrexate infusion and subsequent doses must be g

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on time

Methylprednisolone:

Caution

There are reports of cardiac arrhythmias and/or circulatory collapse and/or cardiac arrest following rapid administration of large IV doses (over less than 10 minutes)

Hyperglycaemia

- may increase blood glucose levels in both diabetic and non-diabetic patients
- diabetic patients may require dose adjustments to their medication

Mood disturbances

- may cause mood disturbances and personality change

Gastrointestinal side effects

- may increase appetite and cause weight gain
- may cause dyspepsia and gastric ulcers - proton pump inhibitors may be required

Administration Details Day 2

On completion of methotrexate infusion

- flush line with ~ 150 mL sodium chloride 0.9%

Deaccess methotrexate line **CVC** or **Hickman**

- administer calcium folinate as an IV bolus ~ 5 to 10 minutes every 6 hours
- first dose must be given 36 hours after the commencment of methotrexate (the timing of this must be exact)
- administer subsequent doses as prescribed
- continue to administer intravenous sodium bicarbonate 8.4% as a continuous infusion until the methotrexate level i less than 0.05 micromol/L

Continue to monitor pH for all urine output

Monitor methotrexate concentration every 24 hours until the level is less than 0.05 micromol/L

Prior to commencing CYTARAbine infusion

Ensure corticosteroid eye drops have been administered

Prime IV line with sodium chloride 0.9%

Access central venous access device **CVC** or **Hickman**

Perform baseline neurological assessment **Assessment tool**

Pre treatment medications

Administer antiemetics as prescribed

Administer methylprednisolone IV infusion ~ 30 to 60 minutes

CYTARAbine

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Verify that CYTARAbine neurological assessment has been performed prior to administration of CYTARAbine

- if the patient scores 0 then administer CYTARAbine as charted
- if the patient scores 1 or above, do not administer the CYTARAbine and immediately notify medical officer

Administer CYTARAbine by controlled IV infusion over ~ 3 hours

- flush with ~ 50 mL of sodium chloride 0.9%

Deaccess **CVC** or **Hickman**

Terminate procedure and document appropriately

Commence second dose of CYTARAbine **12 hours after the commencement** of first dose

Continue infusion of sodium bicarbonate 8.4%

Excretion time: 7 days

Administering

Administering Day 3

Key Administration Points Day 3

Venous access required	Yes	Multi-lumen central venous access device (CVAD) **Link to CVAD line selection**
Premedication	Yes	Corticosteroid eye drops (**table**) to minimise corneal toxicity from high dose cytarabine. Commence the day prior to first dose of cytarabine and continue for at least 72 hours after completion of final cytarabine dose i.e from day 1 to day 6
Emetogenicity	High	**Aprepitant** 80mg **AND** **Steroid:** the steroid antiemetic is covered by methylprednisolone as part of treatment protocol
Vesicant potential	CYTARAbine	Non irritant
Blood tests		Verify recent blood results (FBC taken within ~ 24 to 48 hours) are available and are within acceptable limits for this treatment EUCs, LFTs and LDH are required prior to each treatment BSLs at baseline and regularly throughout treatment Methotrexate levels to be monitored until level is below 0.05 micromol/L
Nutritional risk	Moderate	Dietitian to see patient during week 2 to 3 of treatment, with reviews every 2 to 3 weeks thereafter

Assessments

General Patient Assessment:

- assess prior to treatment
- **Assessment Tool**

https://www.eviq.org.au/Protocol/tabid/66/categoryid/54/id/225/Non+Hodgkins+Lymphoma+Hyper+CV...   4/02/2011

Mucositis:

- assess prior to treatment
- if patient experiences > grade 2 **mucositis**, review by medical officer before commencing treatment
- **Assessment Tool**

Neurotoxicity:

- neurological assessment **prior** to high dose CYTARAbine infusion   **Assessment tool**
- **link to further clinical information**

Hyperglycaemia:

- methylprednisolone may increase blood glucose levels in both diabetic and non-diabetic patients
- monitor blood glucose levels at baseline, and a minimum of daily throughout treatment or as clinically indicated

Drug Specific Administration Details

CYTARAbine:

High dose CYTARAbine is associated with severe gastrointestinal, central nervous system and pulmonary toxicity.

- monitor closely for toxicities during and post each CYTARAbine infusion
- **Neurotoxicity Assessment tool**

Rapid infusion

- may increase neurotoxic adverse effects
- nausea and vomiting become more severe

CYTARAbine syndrome

- characterised by fever, myalgia, bone pain, and / or occasionally rash, chest pain, or conjunctivitis
- can occur 6 to 12 hours following drug administration. Symptoms usually resolve within 24 hours after CYTARAbine discontinued
- corticosteroids may be used for treatment and prophylaxis

Ocular Toxicity

- corticosteroid eye drops 4 times a day are commenced the day prior to CYTARAbine therapy and continues for 72 h post last infusion

Methotrexate:

Urine pH monitoring

- monitor all urine output pH until the methotrexate level has returned to normal (about 3 days post methotrexate infusion).
- maintain urine pH greater than 7
- administer sodium bicarbonate 8.4% to maintain urine pH greater than 7

Pulmonary Toxicity

- monitor patients for symptoms of pulmonary toxicity
- inform medical officer of any symptoms that may occur during therapy

https://www.eviq.org.au/Protocol/tabid/66/categoryid/54/id/225/Non+Hodgkins+Lymphoma+Hyper+CV... 4/02/2011

Calcium Folinate Rescue

- must be administered at the precise timings as prescribed
- plasma methotrexate concentration monitoring must be preformed until the level is less than 0.05 micromol/L
- do not take sample from the same CVAD lumen as the methotrexate was administered through

Methylprednisolone:

Caution

There are reports of cardiac arrhythmias and/or circulatory collapse and/or cardiac arrest following rapid administration of large IV doses (over less than 10 minutes)

Hyperglycaemia

- may increase blood glucose levels in both diabetic and non-diabetic patients
- diabetic patients may require dose adjustments to their medication

Mood disturbances

- may cause mood disturbances and personality change

Gastrointestinal side effects

- may increase appetite and cause weight gain
- may cause dyspepsia and gastric ulcers -proton pump inhibitors may be required

Administration Details Day 3

Prior to commencing CYTARAbine infusion

Continue to administer intravenous sodium bicarbonate 8.4% as a continuous infusion until the methotrexate level is less 0.05 micromol/L

Monitor methotrexate concentration levels every 24 hours

Continue to administer calcium folinate as an IV bolus ~ 5 to 10 minutes every 6 hours (as prescribed)

Ensure corticosteroid eye drops have been administered

Continue to monitor urine pH

Prime IV line with sodium chloride 0.9%

Access central venous access device **CVC** or **Hickman**

Pre treatment medications

Administer antiemetics as prescribed

Administer methylprednisolone IV infusion ~ 30 to 60 minutes

CYTARAbine

Verify that CYTARAbine neurological assessment has been performed   **neurotoxicity assessment tool**

- if the patient scores 0 then administer CYTARAbine as charted
- if the patient scores 1 or above, do not administer the CYTARAbine and immediately notify medical officer

https://www.eviq.org.au/Protocol/tabid/66/categoryid/54/id/225/Non+Hodgkins+Lymphoma+Hyper+CV... 4/02/2011

Administer CYTARAbine by controlled IV infusion over ~ 3 hours

- flush with ~ 50 mL of sodium chloride 0.9%

Deaccess CVAD **CVC** or **Hickman**

Terminate procedure and document appropriately

Commence second dose of CYTARAbine administration **12 hours after the commencement of the first dose**

Continue infusion of sodium bicarbonate 8.4%

Monitor all urine pH

Aminister PEGFILgrastim 24 hours after the completion of CYTARAbine

Continue corticosteroid eye drops for 72 hours post last infusion of CYTARAbine

Excretion time: 7 days

Discharge checklist

☐ **Discharge medications as required:** (all medications must be prescribed by a medical officer)

- antiemetics
- supportive therapy (i.e. antifungals, antivirals, antibacterials)
- filgrastim or pegfilgrastim
  - arrangements for administration 24 hours post treatment

☐ **Patient/Carer information and education (written and verbal) to include:**

- **Patient Information specific to this regimen** containing a list of common adverse effects and how to manag them
- awareness of the important or high risk adverse events associated with this treatment and how to manage them including:
  - the potential for febrile neutropenia
  - nausea and vomiting
  - neutropenic self care
  - mucositis management
  - bowel management
- CVAD care (if in situ)
- **safe handling information for patients**

☐ **Further appointments**

- blood tests
- health professional visits
- next treatment

☐ **Contact details of health professionals and treating clinic as appropriate**

Monitoring

The following are routine measurements and assessments that should be scheduled with this treatment
Refer to the side effects for more information on assessing and managing the adverse events and toxicities associated wit this regimen

	Frequency	Additional comments and assessment tools

Full blood count (FBC)	Baseline and repeat prior to each treatment	
EUCs, LFTs, LDH	Baseline and repeat prior to each treatment	
Mucositis	Prior to and regularly between each treatment	**Assessment Tool**
Blood sugar levels (BSL)	Baseline and repeat prior to and regularly between each treatment	Methylprednisolone may destabilise blood glucose levels especially in diabetic patients
Neurological assessment	Baseline and repeat prior to and regularly between each treatment	Cytarabine may cause acute cerebellar toxicity **Assessment tool**

Side Effects

The side effects listed below are not a complete list of all possible side effects for this treatment. Side effects are categoris into the approximate onset of presentation and should only be used as a guide.

Immediate (onset hours to days)

Nausea and Vomiting   Antineoplastic treatment induced nausea and vomiting.

Taste and Smell Alteration   Changes in taste and smell can affect appetite and are a common side effect in patients receiving chemotherapy.

Ocular toxicities associated with high dose cytarabine   High dose cytarabine has been associated with ocular toxici in up to 80% of patients.

Neurotoxicity associated with High Dose Cytarabine   High dose cytarabine (doses greater than or equal to 2 to 3 g/m2) has been associated with acute cerebellar syndrome and diffuse cerebral dysfunction.

Early (onset days to weeks)

Anaemia   Antineoplastic drugs can interfere with the reproduction of haematopoietic cells which results in a decreased production of red blood cell (RBC) precursors and mature RBCs.

Neutropenia   Low numbers of circulating neutrophils reduce the body's ability to fight infection. Any fever or suspicion infection should be investigated immediately and managed aggressively.

Thrombocytopenia   A reduction in the number of circulating platelets increasing the risk of bruising and bleeding.

Diarrhoea   An increase in the frequency, or fluid content of stool that is different from the usual pattern.

Side Effects of Corticosteroids   Steroid use is associated with numerous side effects including insomnia, gastric irritat increased blood sugar levels, mood changes, increased appetite, osteoporosis (long term use).

Mucositis   Painful inflammation and ulceration of the mucous membranes lining the mouth, oropharynx and the digestiv tract. It may also affect any mucous membranes in the body.

Fatigue   Fatigue is a feeling of excessive tiredness or exhaustion for most or all of the time, typically not relieved by res sleep.

Skin Rash - Macular and Papular   A disorder characterised by the presence of macules (flat) and papules (elevated lesions) and can be associated with pruritus

Cytarabine (Ara-C) Syndrome   Treatment with cytarabine may cause a 'Cytarabine Syndrome' characterised by flu-lik

symptoms and occasionally hypotension.

Side Effects of Corticosteroids Steroid use is associated with numerous side effects including insomnia, gastric irritat increased blood sugar levels, mood changes, increased appetite, osteoporosis (long term use).

Late (onset weeks to months)

Alopecia This treatment will cause hair loss. In some cases this may include hair loss from all parts of the body.

Evidence

R-HyperCVAD and R-MTX/ARA-C have been used in aggressive CD20+ B cell malignancies where response rates to R-CHO are deemed unsatisfactory. The same regimen without rituximab has been used in poor prognosis peripheral T cell lympho

The use of the dose-intensive phase of the R-Hyper-CVAD regimen, consisting of six-eight cycles of alternating rituximab Hyper-CVAD and rituximab plus high dose methotrexate/Ara-C has been used in the management of Mantle cell lymphom reported by Romaguera et al. from the MD Anderson Cancer Centre in abstract form at ASH 2004 104:Abstract 128. Patie complete remission after 6 courses of a planned 6 to 8 cycles, were not offered consolidation with a stem cell transplant. C patients evaluable for analysis there was an 87% CR/CRu rate. With a median follow-up of 40 months, the 3 year FFS and were 67 and 81% respectively.

Alternatively Capote et al, also report in abstract form: Blood 2004, 104(11), abs#1390, use of HyperCVAD/MTX/Ara-C x followed by: Rituximab x4 and stem cell harvest ASCT then Rituximab x 4. 15/34 patients were transplanted; median follc was 30 months. 13 in CR1 4 yr Kaplan-Meier estimates overall survival 93% and event free survival 86%

Efficacy

All patients with Mantle Cell Lymphoma	
Event free survival at 3 years	42 %
Probability of overall survival	56 %
Patients with prior treatment	
Overall survival	25 %
Event free survival	17 %
Patients with no prior treatment	
Overall survival	92 %
Event free survival	72 %

Toxicity

Toxicity with hyper-CVAD or modified hyper-CVAD for Lymphoblastic Lymphoma (n = 33)[1]

Parameter	Number	Grades 1-2	Grades 3-4
Infections during induction (71 courses)*			
FUO	13	0	13
Sepsis	8	0	8
Pneumonia	2	0	2
Fungal	1	0	1
Infections during consolidation (131 courses)			
FUO	32	0	32
Sepsis	9	0	9
Pneumonia	8	0	8
Fungal	2	0	2
Other	5	0	5
Stomatitis	15	33	12
Nausea/vomiting	6	15	3
Ileus	1	0	3
Increase in creatinine	1	3	0
Peripheral neuropathy	5	9	3
Pericarditis	1	0	3
Increase in bilirubin	3	6	3
Increase in transaminases	6	6	12
Pancreatitis	1	0	3
Rash	1	0	3

* Number of episodes per course until CR

Mantle Cell Lymphoma

All patients developed reversible grade 4 neutropenia
85% developed grade 4 thrombocytopenia with MTX AraC
46% with Hyper-CVAD cycles [2]

References

1. Thomas, D. A., S. O'Brien, et al. (2004). "Outcome with the hyper-CVAD regimens in lymphoblastic lymphoma." Blood 104(6): 1624-1630. - Link to external article
2. Khouri, I. F., J. Romaguera, et al. (1998). "Hyper-CVAD and high-dose methotrexate/cytarabine followed by stem-cell transplantation: an active regimen for aggressive mantle-cell lymphoma." J.Clin Oncol. 16 (12): 3803-3809

Support & Information Services

For telephone support:

- Cancer Council Helpline Phone 131120

For online support:

- Talk Blood Cancer www.talkbloodcancer.com
- Revive: Leukaemia Foundation's Netwirk for Young Adults www.teamrevive.org

For further information:

- eviQ Cancer Treatments online www.eviQ.org.au
- Cancer Council NSW www.cancercouncil.com.au
- The Cancer Council Australia www.cancer.org.au
- The Leukaemia Foundation www.leukaemia.org.au
- Food Standards Australia - diet information including downloadable brochure 'Listeria and Food: Advice for people a risk' http://www.foodstandards.gov.au/foodmatters/listeria/
- Australasian Menopause Society www.menopause.org.au

For patient advocacy:

- Cancer Voices NSW www.cancervoices.org.au

For assistance with accommodation, transport, counselling :

- The Leukaemia Foundation www.leukaemia.org.au   Phone 1800 620 420 (Mon to Fri 9am-5pm)

For support for young people living with cancer (12-24 years):

- Canteen www.canteen.org.au

For free workshops on caring for your hair and skin while on treatment:

- Look Good Feel Better www.lgfb.org.au

The currency of this information is guaranteed only up until the date of printing, for any updates please check www.eviq.org.au

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Appendix I: Papers and Presentations from this Research

Peer – Reviewed Papers

Gregory, L., Hopwood, N. & Boud, D. 2014, 'Interprofessional learning at work: What spatial theory can tell us about workplace learning in an acute care ward', Journal of Interprofessional Care, vol.28, no. 3, pp. 200-5.

View/Download from: Publisher's site

Conference Presentations (based on peer-reviewed abstracts)

Gregory, L., Hopwood, N. & Boud, D. 2014, 'Exploring the sociomaterial interchanges of nursing clinical handover practices: Implications for professional learning', paper presented to the *Second International ProPEL Conference,* Stirling, Scotland 25-27 June 2014.