Anticipatory Vigilance: A Classic Grounded Theory of Risk Reduction and Management in the Perioperative Setting.

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Author's Declaration

I, the undersigned declare that this PhD Thesis which I am submitting is all my own work and research which has not been submitted for another degree, either at University College Cork or elsewhere.

Signature: _____ **Date 11 /12 /2013**

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Abstract

This research aimed to investigate the concern facing nurses in minimising risk within the perioperative setting and to generate an explanatory substantive theory of how they resolve this through anticipatory vigilance.

In the context of the perioperative setting, nurses encounter challenges in minimising risks for their patients on a continuous basis. Current explanations of minimising risk in the perioperative setting offers insights into how perioperative nurses undertake their work. Currently research in minimising risk is broadly related to dealing with errors as opposed to preventing them. To date, little is known about how perioperative nurses practice and maintain safety in such a high risk setting. An understanding of the main concern creates an awareness on how to minimise risk.

This study was guided by the principles of classic grounded theory as described by Glaser (1978, 1998, 2001). Data was collected through individual unstructured interviews with thirty seven perioperative nurses (with varying lengths of experiences of working in the area) and thirty three hours of non participant observation within eight different perioperative settings in the Republic of Ireland. Data was simultaneously collected and analysed adhering to established classic grounded theory research procedures of open and selective coding, constant comparison, memo-writing, theoretical sampling and theoretical coding.

The theory of anticipatory vigilance emerged as the pattern of behaviour through which nurse's deal with their main concern of minimising risk in a high risk setting. Anticipatory vigilance is enacted through orchestrating, routinising and momentary adapting within a spirit of trusting relations within the substantive area of the perioperative setting. The theory of anticipatory vigilance offers an explanation on how nurses resolve the challenges of minising risk within the perioperative setting.

The theory of anticipatory vigilance will be useful to nurses in providing a comprehensive framework of explanation and understanding on how nurses deal with minimising risk in the perioperative setting. The theory links perioperative nursing, risk and vigilance together. Clinical improvements through understanding and awareness of the theory of anticipatory vigilance, will result in an improved quality environment, leading to safe patient outcomes. Futhermore, it adds to the wider context of minimising risk within other care settings

1 Chapter One: Introduction

A journey of a thousand miles begins with a single step
Chinese philosopher Lao Tzu (c 604 bc - c 531 bc)

1.1 Introduction

This study is concerned with the challenges experienced by qualified nurses working in the perioperative setting within an Irish Hospital context and seeks to discover how they resolve their main concern. The aim of the study was to develop a classic grounded theory explanatory theory on the core concern of perioperative nurses working in the perioperative setting. Theory is required to provide understanding, management and guidance service delivery for the surgical patient.

The literature was reviewed and searched, for this study using a variety of resources (Appendix 1). Even though this subject area was reviewed broadly, a particular interest was taken with regards to nursing in the perioperative setting. Conceptualised patterns of behaviour rooted in the culture of the perioperative setting are explained.

1.2 Background Literature in Relation to the Study

With the advancement in medical and surgical technologies, improvements of anaesthesia technique, education and socio economic factors, perioperative nursing has undergone many changes since its conception (McGee & Castledine 2003). Care and safety of patients during their time in the perioperative setting is of paramount importance. Maintaining a safe environment is dependent on the perioperative nurse maintaining an optimal level of practice, encompassing moral, legal standards, education, autonomy, accountability, decision making, ethical standards, management and leadership. Safety is a complex multifaceted phenomenon, yet it is essential that all perioperative nurses understand and possess the skills to ensure that patients are not exposed to error. A rich source of information regarding safety within the perioperative setting can be obtained

from the nurses who work there on a daily basis. They need to be more aware of their role in minimising risk in the perioperative setting. Awareness is required by nurses of different risks, the need for perioperative safety and compliance with the fundamental preventative measures such as policy and procedures, guidelines, rules and regulations.

Patient care in the perioperative setting involves both the art and science of nursing. The core nursing skills of perioperative patient care involve: critical thinking, aseptic technique (procedure performed under sterile conditions), working with diverse patients and evidence based practice to ensure that quality care is delivered (AORN 2010). It also involves maintaining safety, educating patients, adhering to legal guidelines, policies and procedures' ensuring that care is administered in an ethical way (O' Brien 2011a). The current culture of safety influences nurses to develop appropriate perioperative knowledge and skills in order to maintain safety. Furthermore adequate resources for nurses for interventions such as, equipment and funding for further education and training are essential components of working in the perioperative setting.

1.3 Safety and Risk

Patient safety is now both an international and global priority (Battles & Lilford 2003) where the goal is to lessen the possibility of injury or risk to patients within the structure and processes of care given. This goal is achieved by either, eliminating or minimising risk and hazards within the context and structures of care. Within developing countries, death occurs in five to ten per cent of patients during major surgery with death during general anaesthesia, from infections and other postoperative morbidities resulting in a minimum of one million deaths during or following surgical procedures annually (World Health Organisation 2009a). Human error in the operating room may result in patient injury, disability or death (Helmreich & Schaefer 1994, World Health Organisation 2009a).

All healthcare workers intend to deliver high quality safe care. Patient safety incidents can be unintended, unexpected and undesired. Hospitals are large multifaceted systems dependent on human performance (Nunn Warburton 2005) so risk management and maintaining safety are complex. A safety culture of high performance is required (Hudson 2003) which supports staff to be more aware of potential problems, errors, risks and risk

analysis (Boakes 2009). Error is defined as the result of choosing the wrong plan to achieve an aim, or not initiating or completing the right plan as intended (National Health Service Education for Scotland 2011a). They can either be evident through doing the wrong thing (commission) or by not doing the right thing (omission) at any stage of an event or situation (Reason 1990).

Patient safety remains a constant challenge in the perioperative setting. Surgical care is a fundamental element within health care worldwide. The impact of surgical intervention on health care systems continues to rise with the increases of traumatic injuries, cancers, cardiovascular disease and new surgical technologies. Surgical care delivery affects the lives of millions of people. Within the complexity of modern surgery many hazards and risks are present from equipment, electrical products, laser, to the storage of surgical requisits and instruments (Association of periOperative Registered Nurses 2010).

Perioperative nurses meet significant challenges in maintaining patient safety in the perioperative environment (Fairchild 1996). The World Health Organization approved the implementation of a surgical checklist in 2009, which sought to improve the safety in the operating room (Hurlbert & Garrett 2009). World Health Organisation (2008a, 2009a) suggests that two hundred and thirty four million major surgical operations are performed annually. Furthermore they suggest that sixty three million of those operations were to treat traumatic injuries, ten million surgical operations for pregnancy-related complications and thirty one million more for cancer care. Major surgical complications, disabilities and increased hospital inpatient stay occur with three to sixteen per cent of patients, depending on the complexity of surgery and the hospital setting. Vigilance is required as a component in risk management (Ramanujam 2003, Ramanujam & Goodman 2003, Wellbrink *et al.* 2004). It is required for the identification and reduction of risk and the maintenance of safety.

Even though safety in healthcare within the context of the nursing literature has gained momentum, the concept of risk still remains somewhat under theorised (O'Byrne 2008). A

risk aware culture requires good leadership, involvement of all stakeholders, training and learning on the job, staff accountability and good communication (Flin & Yule 2003). Developing a safety culture decreases major accidents and disasters associated with normal routine tasks (Clarke 1999, Cooper 2000). A safety culture in healthcare applies to both patients and employees and ultimately leads to improving positive patient outcomes (Clarke 2006, Feng *et al.* 2008, Sammer *et al.* 2010). The safety culture of the organisation contributes to giving the finest quality patient safety (Thompson 2011). Thus anticipation and awareness of risks are essential in promoting such a culture.

1.4 Concerns of Nurses Working in the Perioperative Setting

This current study questioned what nurses in the perioperative setting found to be their main concern. This is a question worthy of researching and explaining as it will identify the current concern experienced by nurses within the perioperative setting. It will add to the body of knowledge through generating a substantive explanative multivariate theory on how nurses can resolve their current challenge of minimising risk in the perioperative setting. It is hoped that the theory generated will make meaningful and lasting contributions to nursing within the perioperative setting.

1.5 Presentation of the Thesis

The thesis will be presented as follows:

Chapter two provides an introduction to the perioperative setting and considers the historical background to nursing in general and nursing in the perioperative setting. Furthermore it explores the characteristics and roles of nurses working in the perioperative setting and considers key aspects of the role such as team working, communication, safety and risk management.

Chapter three considers grounded theory methodology. It examines the philosophical beliefs underpinning the methodological approaches and offers a rationale for choosing

classic grounded theory research in guiding the current research. A discussion of the different versions of grounded theory is presented. The issue of how credibility is achieved in classic grounded theory is also discussed.

Chapter four looks at the application of classic grounded theory research methods and decisions undertaken for the research study. It begins with an overview of the researcher early jouney in undertaking the PhD and continues with the aims and objectives of the study and addresses the methods involved in the emergence of the substantive theory. It provides evidence of the choices and the decisions made with regard to access, recruitment, sampling, data collection, theoretical sensitivity, memos, data analysis and ethical consideration throughout the study. It looks at the ethical application approval process and how the ethical principles were upheld throughout the research.

Chapter five presents the theory of anticipatory vigilance. This provides the presentation of the substantive explanatory theory which emerged from the data through the categories of orchestrating, routinising and momentary adapting. The concept of trusting relations which underpins the effectiveness of orchestrating, routinising and momentary adapting is explained. The subcategories of orchestrating which include macro orchestrating, locational orchestrating, situational orchestrating and being in the know is explained. Then the subcategories of routinising which include habitual checking, rule following, mutual watching and mutual dependency are explained. Finally the subcategories of momentary adapting which include heightened awareness, rapid responsible responding, temporary structuring, and advanced knowing are explained.

Chapter six considers the theory of anticipatory vigilance and contextualises it within the existing literature. Vigilance is explored from an industrial, healthcare and human performance perspective. The relationship between managing risk and theories of risk is then explored. Trusting relations which is an essential thread linking the categories within the theory is presented. Literature is then framed around the categories of orchestrating, routinising and momentary adapting within the theory of anticipatory vigilance which are

critical to minimising risk. The importance of training in anticipatory vigilance is also considered.

Chapter seven presents the implications of the substantive theory of anticipatory vigilance from a practice, education and research perspective. It considers the strengths and limitations of the study. Generally it is concluded that the theory of anticipatory vigilance offers a range of valuable possibilities for the understanding of situations and actions of nurses working in the perioperative setting and beyond by informing practice.

The nurse is a valuable resource within the perioperative setting and has accountability and responsibility for identification of and the reduction of risk in the promotion and maintenance of patient safety. While the presence of human error is well recognised within the perioperative setting, it is widely acknowledged that adverse events in the department involve human factors competence as opposed to technical incompetence. The involvement of and challenges faced by the nurse in the perioperative setting will be considered in this study. The next chapter will consider the background to this study.

2 Chapter Two: Background to the Study

Nursing in the perioperative setting will now be considered. The roles will now be discussed in terms of a historical overview, structure and function of the perioperative environment, errors and safety within the perioperative environment.

For over a century, surgery has been identified as a key component of healthcare. As longevity increases worldwide, surgery is increasing rapidly (World Health Organisation 2008a). Perioperative nursing is directed towards patients undergoing surgical and other invasive procedures. With the advancement in medical and surgical technologies, improvement in anaesthetic techniques, education and socio economic factors, the profession of perioperative nursing has changed rapidly since the beginning of the 20th century (Mc Gee & Castledine 2003). Developments and innovations pose challenges for the perioperative nurse (Radford *et al.* 2004). To understand developments in the speciality of perioperative nursing, then it is necessary to discuss it historical developments.

2.1 Historical Overview of Perioperative Nursing

Surgery has been carried out for thousands of years, however, the rates of infection and mortality were initially very high (Wicker 1991). Most of the surgery was carried out by barbers, men who were skilled in the craft of surgery but without formal training. Those who survived their surgery were frequently badly maimed by crudely executed procedures carried out by unskilled operators. Surgery although selective had no guarantee of success. The surgery at this time was dependent on the nerve of the surgeon rather than his ability to carry out the job (Mc Garvey *et al.* 2000). Before the beginning of the civil war in the USA 1861-1865 the majority of women took care of individuals in the home following surgery. During the war women became volunteers to care for the sick and injured soldiers near the battlefields. Women were expected to work alongside surgeons where amputations were commonplace. Amputations carried a high mortality rate and some shots of whiskey and a leather thong to bite on was the anaesthetic of the day. The civil war became the testing ground for anaesthetic agents such as chloroform and ether (Holder 2003a). Pope

& Maxwell (1911) describe how the surgical environment was prepared by washing down a kitchen table and covering it with an oil cloth and providing good lighting for the surgical procedure to take place.

A name associated with the early years of forming and shaping awareness within nursing was Florence Nightingale 1820-1910, (Nightingale 1992, Government of Ireland: Report of the Commission of Nursing 1998, Holder 2003a) who went to Scutari between 1854-1855 during the Crimean War (Fairchild 1996, Holder 2003a). Her major success was the introduction of sanitary measures which reduced the mortality rate amongst the wounded from forty two per cent to two point two per cent. This demonstrates the value of antiseptic techniques in surgery and laid down the groundwork for aseptic practices in operating room nursing (Donahue 1985). Other names connected with the area of surgical nursing in America were Dorthea Dix and Clara Barton (army nurses corps during the civil war who were allowed onto the battlefield) (Holder 2003b). In 1870, Linda Richards, Lillian Wald and Lavina Dock became early pioneers for providing a better education for nursing as a profession (Holder 2004a). Edith Carvell, a British born nurse working in Belgium (Holder 2004b) became well known in surgical nursing during World War 1 (1914) where nine million men died (Holder 2004b). Major advancements occurred in medicine especially in understanding how diseases were contacted and spread. A knowledge of bacteria and the importance of hand washing ensured that many soldiers were treated by informed nurses thus reducing the number of deaths (Holder 2004c). Alice Fitzgerald became involved in the war conflict as the Edith Carvell memorial nurse (Holder 2004b). Alice was proficient in the operating room where she assisted surgeons at surgery. She believed that the operating room could work efficiently so long as nurses and surgeons worked together and were both satisfied with the outcome. Nurses were no longer considered handmaidens to surgeons, but considered as valuable team members who were able to partake in the surgical situation (Holder 2004c).

John Hopkins University identified operating room nursing as an area of specialisation in their training school in 1889. Operating room education began at the Boston Training School in 1889 (later the Massachusetts General Hospital Training School for Nurses).

Students at that time were given responsibility for, cleaning and sterilizing instruments for surgery and assisting with Saturday operations as there was no class on that day. By the turn of the 20th century, the scope of surgery had increased due to application of ether gas, making surgery painless for the patient and allowing the surgeon to perform longer and more complex procedures (Rothrock 2003). By the beginning of the 20th Century major changes had occurred; anaesthesia with ether gas was discovered in 1846, antisepsis discovered in 1867, asepsis in 1886 and antibiotics were discovered in 1929 (Williams 1989). Operations were performed with more regularity and new surgical equipment was developed. By the end of 1800 special rooms were allocated for surgery and the role of assisting surgeon was fulfilled by nurses (McGarvey et al. 2000).

Many changes occurred during World War 11. While nurses performed many different and expanding surgical roles such as administrating anaesthesia and acting as first assistants during the surgical procedures, corpsmen (USA Navy medical assistants that accompany troops into battle) assisted at surgery (Holder 2004d). However following the war corpsmen became technicians and nurses became the director of activities within the surgical setting giving and performing complex nursing care (Groah 1996).

Operating room technique was included in the standard curriculum published by the National League for Nursing in 1919. The curriculum recommended that the requirement should include: ten hours of theory, twenty hours of bacteriology and 2 - 3 months rotation to the operating room (Fairchild 1996). The first certification examination for operating room nurses was held in 1979. Certification for first assistants was established in 1992 (Rothrock 2003). Perioperative higher diplomas and perioperative graduate diplomas commenced in 2000 in Ireland. Over the past twenty years the development of specialised training in the perioperative environment has been identified as a focus of nursing education internationally. In 1992, the European Operating Room Nurses Association (EORNA) was established and commenced its preliminary work on developing a universal core curriculum for theatre nurses throughout Europe. The publication of the European Common Core Curriculum for Operating Department Nursing (European Operating Room Nurses Organisation 1997) provided the framework for the development of quality

standards in operating room practice as well as enabling and encouraging easier movement of perioperative nurses across Europe. The Association of Operating Room Nurses' provides quality standards, recommended practices and guidelines for the perioperative setting globally (Association of periOperative Registered Nurses 2010).

Worldwide perioperative nursing groups such as the Associations of Operating Room Nurses (AORN), International Federation of Perioperative Nurses (IFPN) and the National Association of Theatre Nurses (NATN) have impacted positively on nurses working in the perioperative setting (Association of periOperative Registered Nurses 2010). The association of operating room nurses were the first organisation to try and define the role of the nurse in the operating department (Mc Garvey *et al.* 2000).

An Bord Altranais Requirements and Standards ensures that all undergraduate nursing students undertake part of the specialist clinical placement in the operating department ensuring that students become aware of the care that the surgical patient requires (An Bord Altranais 2007a). Postgraduate perioperative nursing programme curricula to-day are designed to provide nurses with the theoretical underpinnings and clinical experience for the development of contemporary nursing skills in the assessment and management of patients within perioperative environments.

2.2 Structure and Functioning of the Perioperative Environment

The perioperative setting is a complex work environment in which the patients often have multiple conditions that must be treated. In addition, there is a large amount of technology in use at any given moment of time (Catalano 2008). Working in the perioperative environment involves being multiskilled and working in a high risk setting. Shields & Werder (2002) suggest that the operating room is a rather unique place. They suggest that it consists of many complex systems that amalgamate personnel, technology, surgical patients and pharmacodynamics in one area combined to yield positive surgical patient

outcomes. Shift work covering a twenty four hour service in acute hospital settings enables emergency surgical procedures to be carried out (Cooper & Smith 1985). Maintaining a culture of safety is the primary goal of all staff working in the perioperative setting.

There are many rituals and routine tasks required within the perioperative setting. Routine tasks include checking on patients, checking counts of swabs and instruments, documentation of patient care, safety checklists for instrumentation and equipment. The Association of periOperative Registered Nurses (2010) gives detailed and comprehensive recommended practices for nurses. Policies and guidelines must be adhered to for safe practice to occur. There are also many routine responsibilities depending on the job being undertaken. As there are many different routines that need to be performed, flexibility and adaptability is required. Flexibility is one of the many characteristics of a perioperative nurse (Gruendemann 1995, Rothrock 2011). This characteristic is required for the many different roles that the nurse undertakes within the perioperative setting. Other skills required include being knowledgeable, competent and adaptable regarding all work practices (O'Brien 2011b).

2.3 Perioperative Nursing

Perioperative nursing is a specialised area of nursing practice. The perioperative nurse is responsible and accountable for management of the surgical patient within the perioperative setting (Rothrock 2011). Perioperative nursing can be defined as the provision of nursing care by a Registered Nurse preoperatively (before), intra-operatively (during), and postoperatively (after) to a patient undergoing an operative or invasive procedure (Association of Operating Room Nurses 2006). Perioperative nursing is practiced to-day in many different areas such as hospital operating rooms, interventional radiology suites, cardiac catheterisation laboratory, surgeon offices, endoscopy suites, ambulatory surgery centres and emergency trauma units. It is a complex and exciting specialty (Rothrock 2011). Teamwork is fundamental in the operating room and occurs from the moment one steps inside the unit. Participation in a multidisciplinary team is

essential when working in the perioperative setting where all staff take responsibility in reducing errors of all types in the perioperative setting (Rothrock 2011, Association of periOperative Registered Nurses 2012). Human performance is an essential element within teamwork in maintaining safety within perioperative settings (Yule *et al.* 2008). When teams work well together errors can be recognised, prioritised and managed before an expected unfavourable outcome becomes a reality (Association of periOperative Registered Nurses 2012). Catchpole *et al.* (2008) in their observational study on teamwork and error in the operating room (during laparoscopic cholecystectomies and carotid endarterectomise) suggested that any interventions intended to improve communication and teamwork may have a valuable impact on technical performance and patient outcomes.

The perioperative nurse must implement nursing action such as guidelines, policies and proceedures to ensure and maintain a safe environment for the patient. The role of perioperative nurse is multifaceted and complex and requires many skills (Pidduck 2003). Rothrock (2003) suggest some of the characteristics of a perioperative nurse include the ability to be a skilled, knowledgeable, flexible and adaptable practitioner who are required to pay a great deal of attention to detail and be good communicators with the ability to work collaboratively in a fast paced environment within a multidisciplinary team. Spry (2005) suggests that the role of the perioperative nurse be expanded to include patient advocate, protector, teacher, change agent, manager, clinical practitioner, educator and researcher. The role also involves assessment, decision making, maintaining safety, adhering to legal guidelines, policies and educating patients, while ensuring that care is administered in an ethical and quality care way (Association of periOperative Registered Nurses 2010). The fundamental nursing values, knowledge, skills and judgment are ever present when working in the perioperative setting (Tanner 2006, Association of periOperative Registered Nurses 2010) and are the foundations for quality care in the perioperative setting (O' Brien 2011a). Perioperative nursing is not just the technical work that nurses do. A significant part of it is the delivery of scientifically based care (Rothrock, 2003). Knowledge of surgical interventions, instruments and equipment is required. Without this the perioperative nurse is unable to prepare for or anticipate the steps in any surgical procedure. Perioperative nursing is a systematically planned process (Association of periOperative Registered Nurses 2010).

Normally the perioperative period consists of the preoperative, intraoperative and postoperative phase (Rothrock 2003). Surgery is normally classified under three separate headings, degree of urgency (which implies elective or emergency), degree of risk (which implies minor or major) and purpose (which implies diagnostic, removal of, palliative, reconstructive, transplantation and constructive) (Rothrock 2011). However a surgical case could incorporate all of these headings. The Association of periOperative Registered Nurses (2007, 2010), which are an international group defines perioperative nursing as the practice of nursing care directed toward patients or clients undergoing operative and other invasive procedures. Furthermore they identify the perioperative nurse working in the preoperative, intraoperative, and postoperative phases of the patient's surgical experience as someone who has a wide range of skills that provide, manages, teaches, and/or studies the care of patients/clients undergoing operative or any other invasive procedures. The management of multifaceted procedures, equipment, drugs, difficulties and challenges encountered is complex.

Surgical patients require elective or emergency surgery. Perioperative nurses' principal focus is the surgical patient and they need to be constantly alert to patients' needs and actively participate in the planning and implementation, delivery of safe patient care (Association of periOperative Registered Nurses 2010). This corresponds with the Irish Nurses Organisation (INO) Operating Department Nurses Section 2007, European Operating Room Nurses Association Guidelines (European Operating Room Nurses Association 2012) and the American Nurses Association (American Nurses Association 2001) who believe that health, safety, comfort and security of the surgical patient is the primary responsibility of the perioperative nurse. Communication and advocacy are essential in securing positive outcomes for the surgical patient. Patients are dependent on nurses' knowledge and skills within their role in the multidisciplinary surgical team (Hughes & Mardell 2009). Alfredsdottir & Bjornsdottir (2008) found in their action research study on nursing and patient safety in the operating room that theatre nurses view securing patient safety as their main nursing intervention and providing a culture of prevention as their second. The nurse as a patient advocate must be vigilant and responsive in both expected and unexpected situations.

The primary role of perioperative nurses is to provide safe care (Rothrock 2011). In doing so they co-ordinate and deliver care to surgical patients who are physically and emotionally compromised during surgery. Rapid and multiple decision making is a critical component of the role of the nurse. The daily activities of perioperative nurses differ from other areas of nursing, because nurses assist with surgical procedures and assist in the giving and recovery from an anaesthetic. The perioperative setting is a highly technical environment which enables surgery to be performed (McGarvey *et al.* 2004). Patient safety and advocacy rely on nurses' ability to integrate awareness, knowledge and skill as patients in perioperative environment are exposed to many risks (McGarvey *et al.* 2004, Smith 2009).

Perioperative nurses must be responsible and accountable for maintaining high-quality nursing care for patients who undergo surgery and other invasive procedures within the perioperative environment (Association of Operating Room Nurses 2007). The Association of periOperative Registered Nurses (2012) recognises the importance of education as a continuous process and offer perioperative nurses opportunities to pursue life-long learning through their yearly publication of their book on standards and recommended practices, thus ensuring their continued competency in practice McGarvey *et al.* (2000) suggests that perioperative nurses need to articulate and validate their roles in terms of quality.

Within the perioperative setting one main manager is responsible for the management of the entire unit, with other speciality managers responsible for each operating room such as vascular theatre, ophthalmic theatre, orthopaedic theatre and recovery room. Perioperative management of people and workloads involves planning, organising, delegating, directing, co-ordinating and controlling as the nurse is responsible and accountable for management of the surgical patient (Rothrock 2011). The requirement for a standardised approach to effective and efficient management encompassing leadership, teamwork and communication, in order to optimise patient outcomes has become paramount for nurses (Rothrock 2011, Association of periOperative Registered Nurses 2012).

With the development of technology within the operating room, the role of nurse changed. As the use of technology in health care continues to advance, new roles and practices have developed for operating room department nurses such as anaesthetic nurse and clinical nurse specialist nurse (with a focus on pain) (Mc Garvey *et al.* 2000, Association of periOperative Registered Nurses 2012). Mc Garvey *et al.* (2000) suggests that the term operating room nurse also changed to perioperative nurse within the literature. The role of the perioperative nurse is more technical in nature than other nurses working on the wards (Shields & Werder 2002) due to the use of highly technical equipment and instruments.

2.4 Communication in the Perioperative Setting

Communication is essential when undertaking surgical procedures within the perioperative setting (Association of periOperative Registered Nurses 2010). Communication underpins numerous safety issues (Rothrock 2010) which is undertaken through verbal exchange and non-verbal activities such as eye contact, listening and documenting. Verbal messages must be given in a clear and concise way as one of the main barriers to effective communion is the wearing of the face mask during surgery (Non-verbal messages such as eye contact take a vital role).

Communication that is timely, correct, complete, unmistakeable and which is understood by others helps to reduce error (Amato-Vealey *et al.* 2008). Current literature supports the idea that inadequate communication is a primary cause of medical errors, and communication among professionals in the operating department is essential for patient safety (Sutcliffe *et al.* 2004, Joint Commission on Accreditation of Healthcare Organizations 2008, Gardezi *et al.* 2009). Brennan *et al.* (2004) suggests that ineffective communication is the most recurrent root cause of sentinel events (which is an unexpected event) in healthcare resulting in death, psychological or physical injury which is not related to original diagnosis. According to Makary *et al.* (2006) communication error is the most common cause of incorrect surgical procedure being carried out. Gawande *et al.* (2003b) found that a failure in communication in adverse events was associated with forty three per cent of surgeon.

Safe patient care depends on the ways in which team members communicate with each other. Emergency or unplanned surgery challenges the surgical team (Rothrock 2010) as there is a change in the planned order of work where staff needs to respond to unfolding events. Fundamentally poor communication in the perioperative setting can result in unacceptable consequences (Rothrock 2010) such as medical or surgical errors or where patient allergies, blood type, or correct surgical site are undocumented (Pfiedler Enterprises 2011). It exposes both the surgical patient and the multidisciplinary team to potential risk (Smith & Jones 2009). An understanding of the communication process within a department supports staff in avoiding misunderstanding and improving communication (Pfiedler Enterprises 2011). Carthey & Clarke (2011) suggest that briefing and debriefing staff provides support for teams in developing a shared view of a planned procedure or a patient's clinical status and also to consider both individual and team performances. This enables staff to know and understand the skills of their colleagues and to forward plan for unexpected events. Some hospitals have introduced routine briefing and debriefing sessions at the beginning and end of the work day, which has been useful in identifying risks and raising awareness (Rothrock 2011).

The complexity of the surgical environment coupled with restriction of human performance, make communication critically important within the team (Leonard *et al.* 2004). Communication enables perioperative practice to be efficient as all staff are kept informed on what is occurring and what has occurred. Being informed is vital to enable the smooth running of the perioperative setting. The operating list represents a structured means of communication as it indicates priority and sequence of procedures (Riley & Manias 2006). Leonard *et al.* (2004) found that effective communication and teamwork help to prevent error. Their research on the effectiveness of communication briefings found that wrong site surgery had not occurred since communication briefing was commenced. Futhermore, nursing turnover reduced by sixteen per cent with an increase of nineteen per cent in employee satisfaction and safety climate went from good to outstanding. Overall improvements were identified within teamwork, communication and where perioperative personnel take accountability for patient safety, and medical errors (Leonard *et al.* 2004).

2.5 Errors

Battles & Lilford (2003) suggest that errors are actions or inactions that may result in digression from intentions or expectations which present as risks that may result in harm. The majority of errors are linked with complex processes, medical devices, fragmented care, communication challenges and the lack of standardisation (National Initiative for Children Health Care Quality Project Advisory Committee 2001). Error detection is identified in the industrial literature as a spontaneous process as either action or outcome based. Action based error detection occurs while the action is being performed whereas outcome based detection occurs after feedback has been received on the error (Kontogiannis & Malakis 2009).

Errors within the medical domain can be classified as active errors or latent errors (Greenberg *et al.* 2006). Reason (1990, 1997) highlights the important distinction between active and latent types of errors since the former produces effects that are felt almost immediately by the person who performs the task and the latter lie dormant within the system before combining with other factors to produce measurable effects. Latent errors are normally system based mistakes such as decisions that lead to inadequate staffing, extreme workloads or defective equipment due to lack of maintenance. Greenberg *et al.* (2006) expands on this to include active errors that produce an immediate and measurable change in a patient's clinical status, while latent errors are features of the patient care environment, decisions or plans that do not immediately become manifested but establish the conditions for a further change in patients status.

Matthews *et al.* (2000) discusses errors under the heading of skill, rule and knowledge based errors based on work by Rasmussen's (1983) and Reason's (1990) taxonomies. They acknowledge that the most common errors are skill based errors (slips and lapses) but also acknowledging that within highly skilled occupations such as anaesthesiology knowledge based errors are more prevalent. Deficiencies in non-technical skills such as communication, teamwork, leadership, co-operation, decision making and situational awareness (Yule *et al*. 2006, Flin *et al.* 2008, Yule *et al*. 2008) are also identified as a

cause of adverse events in the perioperative setting (Yule *et al*. 2006, Engle 2008, Youngson & Flin 2010). Yule *et al*. (2006, p. 144) lists some behavioural errors as:

- Surgeons failure to inform anaesthetists of what information pertain to the surgery
- Failure to anticipate events during complex procedure
- Failure to monitor other team member's activities
- Consultant distracted from making a decision by problems being reported from another operating theatre
- Failure to brief own team
- Failure to discuss an alternative procedure
- Hostility and frustrations as a result of poor team coordination
- Failure to debrief after a surgical operation and failure to learn from the situation
- Failure to establish leadership for operating room team
- Unresolved conflicts between staff.

These behavioural errors appear to place emphasis on medical staff as they identify the surgeon's role as opposed to the nurses role, however, in the perioperative setting both nurses and doctors work together as a team. Chard (2010) in her descriptive, correlational study in the perioperative setting identified inexperience, lack of supervision, job overload, and faulty judgment as some of the main reasons for errors. No individual reason was identified by the majority of the participants. Miscommunication and distractions between team members were also mentioned even though there was a percentage of nurses who disagreed with these. Perioperative settings are high risk areas where the occurrences of error may be prevalent.

The prevalence and reasons for errors in the perioperative setting were researched by Kwaan *et al*. (2006) and Clarke *et al*. (2007). Kwaan *et al*. (2006) in their study of the evaluation of wrong-site surgeries reported to medical insurers from 1985 to 2004 found that claims were made in every 1 in 112,994 cases, which means that a case was taken every five to ten years in a hospital. Clarke *et al.* (2007 p395) in their American study looking at errors for wrong site surgery during a two and a half year period found that there

was “four hundred and twenty seven reports of near misses or surgical interventions started but not completed (174). They found cases involving the wrong patient (34), with wrong procedure cases (39), wrong site surgery (298), and/or wrong part (60). Eighty three patients had incorrect procedures done to completion. Incorrect procedures on the lower extremities were the most common (30)” They identified the breakdown and reasons for wrong site surgery as being “patient positioning (20) and anaesthesia interventions (29) before any planned time-out process, not verifying consents (22) or site markings (16), and not doing a proper time-out process (17). These errors were classified as medical but not associated with any particular group within the perioperative setting. Actions involving operating surgeons contributed to (92)”. These results show a high prevalence of errors within the perioperative setting. The number of surgical patient discharges reported with a diagnosis of misadventure during a surgical procedure reported to HIPE within Ireland, reduced from two hundred and thirty four in 2009 to one hundred and ninty seven in 2010 (personal correspondence from HIPE Appendix II). Kim *et al.* (2013) suggest that errors are to be expected in healthcare as it is inherently a human operation.

2.6 Safety and the Perioperative Setting

The Department of Health and Children (2008) in their report on patient safety and quality assurance suggest that there are many elements that impact on safety such as

“weak governance structures, poor communication processes, failure to develop or implement clinical audit, poor working relations, lack of senior clinical leadership, team working and structured incident reporting systems, inconsistent analysis of adverse events, lack of clarity on reporting relationships and failure to participate in continuous professional development” (Department of Health and Children 2008, p. 2).

Surgery affects the lives of millions of people as changes in disease patterns increase the necessity of surgical intervention (Department of Health and Children 2008). Approximately two hundred and thirty four million major surgical procedures are performed worldwide every year (World Health Organisation 2008a, World Health

Organisation 2008b). Major complication, disabilities and increased hospital inpatient stay occurs for three to sixteen per cent of hospitalized patients. Within developing countries death occurs in five to ten per cent of patients during major surgery, during general anaesthesia, from infections and other postoperative morbidities resulting in a minimum of one million deaths annually (World Health Organisation 2009a).

The report by the Department of Health and Children (2008) on Building a Culture of Patient Safety suggests that errors are preventable through designing safer health systems that mirrors other high risk industries such as the aviation industry. Hunter (2011) identified 83,483 incidents of patient harm and near-misses that occurred within Irish healthcare in 2010 costing the state up to €90 million approximately. These figures were similar in 2009 and are consistent with international figures of health care incidents. Incidents reported consisted of slips, trips, falls, violence/harassment/aggression/abuse, medication incidents, child/maternity incidents and surgical incidents. It was not possible to just identify the surgical incidents that pertain and have implications for the perioperative nurse. Errors are not only costly in respect of human suffering, mortality and finance but also result in loss of trust in health care systems (Department of Health and Children 2008). Human errors in the operating room may result in patient injury, complications, disability or death (Helmreich & Schaefer 1994, World Health Organisation 2009a). The World Health Organisation (2008a, 2008b) suggests that complications of surgery may include disability or prolonged stay in hospital in three to twenty five per cent of hospitalised patients**.** The Department of Health and Children (2008) suggest that complications and deaths from surgery can be avoided with good standards of care.

Surgical safety must continue to be a significant global public-health concern as the quantity of worldwide surgery is large and still has high death and complication rates from major surgical procedures (Weiser *et al*. 2008). Guaranteeing patient safety and nurses' advocating on behalf of the surgical patient for a quality service is fundamental in the perioperative setting (Schroeter 2000). Currently both nationally and globally there is an increased awareness of patient safety by both the general public and healthcare providers (Health Information and Quality Authority HIQA 2009a). The World Health Organisation

(2008a) identified the significance of surgical patient safety. In their document it recognises that the main challenges within the surgical setting centres on clean surgery, safe anaesthesia, professional competent practitioners, surgical resources and quality assurance. There is a fresh recognition for the need to effectively manage surgical patient care safely resulting in positive patient outcomes which is brought about through strong leadership, teamwork, communications and adhering to safety guidelines and policies (Association of periOperative Nurses 2012). Rule and knowledge based errors are classified as mistakes normally resulting from errors of planning or judgement. In the perioperative setting errors by nursing staff may be skill, rule or knowledge based or a combination of all three (Rothrock 2011). Therefore rules and regulations are essential in acute complex settings. Policies, guidelines and adhering to the rules of the perioperative setting assist the perioperative nurse to minimise risk in maintaining safety in the operating room so that they protect both the surgical patient and themselves in attaining positive surgical patient outcomes (Association of periOperative Registered Nurses 2012). Clarke & Jones (1998) and Association of periOperative Registered Nurses (2012) suggest that recommended practices and guidelines should be adhered to in to ensure standardised safe practice.

Protocols, policies and procedures are a requirement that help to ensure patient safety by preparing health care practitioners for the unpredictable (Catalona 2008). Rules and regulations are understood to be best practice and therefore should be adhered to (Association of periOperative Registered Nurses 2012). Nurses live and practice the rules that are laid down by the organisation to try to ensure mastery of the job they do. Policies, guidelines and rules are normally adhered to rigidly and form many of the routines within the perioperative setting as they set out the way to carry out tasks safely. Rules and regulations need to be understood and user friendly. Rules, policies and guidelines inform and guide practice (Rothrock, 2011, Association of periOperative Registered Nurses 2012). Adhering to recommended practices and guidelines create a safe perioperative environment for optimal patient outcomes (Association of periOperative Registered Nurses 2011). Standard procedures are needed to give individual and teams direction in providing safe care in a systematic way. The World Health Organisation (2009a) sought to promote practice standards of best practice guidelines that reduce injuries and save lives. Rules,

regulations, policies, standards and guidelines are support mechanisms to assist nurses to carry out their roles safely. The perioperative nurse needs to be actively involved in promoting and creating a safe environment. This involves being having knowledge, being aware and communicating well with the multi-disciplinary teams (Rothrock 2011). Patient safety is a priority for nurses in the perioperative setting who are in the prime position to understand the unreported near misses that occur daily and use that knowledge to prioritize interventions and activities to protect their patients (Steelman 2013).

Routines are essential in the perioperative setting. According to The Health Service Executive (2009) safety is the management of risks and protection of patients from adverse events which should be intrinsic in philosophy, practice and business processes. The perioperative setting is recognised as an extremely complex environment that present many dilemmas to staff such as emergency surgery that necessitate instant intervention to maintain life (Rothrock 2011). It consists of predictable and unpredictable situations, usage of large amounts of instrumentation and equipment, processing of large volumes of information and the need for excellent communication between team member and the coordination of large numbers of people working together which involves decision making. Furthermore, Vincent *et al.* (2004) suggest that heavy workload, fatigue and pressures of surgery, makes this setting more complex than other hospital settings and therefore is particularly vulnerable to adverse events.

The Irish Nurses Organisation (2007) recognises the importance of a safety statement within each perioperative setting, which should identify hazards, assess risks and outline measures to protect from these. The awareness of triggers should help in changing practices in minimising adverse events. Catalano (2008) proposes that there is no one solution that will stop all errors from occurring, but with raised awareness, will lead toward fewer and less traumatic adverse outcomes. Nurses need to take a leadership role in implementing change to maximise patient safety effectiveness (Warburton 2009). This can be achieved through identification and reporting errors and organising education and training on errors and risk management. Current reporting practice involve reporting and documenting incidences through both an internal (within surgical and hospital setting) and

external (STARS Web of the Clinical Indemnity Scheme) reporting system (Department of Health and Children 2008). The promotion of reporting errors aims to reduce error occurrence, highlight the need for a protective and transparent culture. Developing cultures of safety highlights that trust and transparency assist in resolving the practice of under reporting (Zboril-Benson & Magee 2005). Minimising risk for safe surgery must ensure that the right patient, right site and right consent has been checked and is correct using the new surgical safety checklist (World Health Organisation 2009a).

The aviation industry has developed processes and disciplines with respect to safety. They have put into practice incident-reporting systems in an attempt to improve safety (Barach & Small 2000). An error reporting system similar to the aviation industry would be of use as it is a confidential, voluntary, self-reporting incident reporting system therefore encouraging people to report error. Currently error is reported both internally and externally but is not confidential.

The Aviation Safety Reporting System (ASRS) was established in 1976 and in 2001 had process over 500,000 incidents and has withstood the stance of time and change (Aviation Safety Reporting Systems 2002). This system highlights the importance of effective communication and teamwork (Pape 2003) as opposed to placing blame and punishment (Helmreich *et al.* 2001, Hughes 2004). Currently nurses manage safety through good organisational management, communication, following routine procedure and professionally responding to events as they occur and is carried out in a spirit of trust and vigilance. Where nurses are educated to know and understand what is occurring in their area of practice, they can detect and deal with potential risk. As communication failures are a leading causes of adverse events (Leonard *et al.* 2004), it is important that nurses are aware of this. Mc Donald *et al.* (2010) suggest the use of workplace conversation in building and maintaining collaborative capital which is a model for fostering greater safety and less defensiveness between staff in the workplace as a way of overcoming communication failure. Awad *et al.* (2005) found that crew resource management principle training in the perioperative setting improved communication. They gave training sessions which consisted of didactic instruction, interactive participation, role-play, training films,

and clinical vignettes. They found that following crew resource management training there was a considerable increase in communication between anaesthetists, surgeons and nurses thus ensuring a safer environment which leads to a decrease in errors and adverse events. France *et al.* (2008) in their study of observed surgical teams found that crew management training impacted on sixty per cent of staff with regard to perioperative safety practices emphasised in the training programme. This would still be appropriate and effective for use in the perioperative setting.

2.7 Safety Culture Origins and Development

The term safety culture originated from a report on the Chernobyl nuclear power station disaster in the USSR (International Nuclear Safety Advisory Group 1988, Thompson 2011). Since its inception the term has achieved worldwide recognition in industries and is also used in healthcare. The similarities between industry and healthcare are in the use of advanced technology and human interaction (Wiegmann *et al*. 2002) and this is also present in the perioperative environment. The key feature of the safety culture are the collective perceptions and attitude among staff and managers regarding the importance of safety (Clarke 1999). Within the nursing literature this is extended to include behaviour to improve patient safety (Jones & Redman 2000, Hemman 2002, Mustard 2002, Kalisch & Aebersold 2006, Feng *et al*. 2008, Association of periOperative Registered Nurses 2010, Sammer *et al*. 2010, Thompson 2011). As in organisational culture, safety norms, values and beliefs form the foundation of patient safety culture (Clarke 1999, Cooper 2000, Glendon & Stanton 2000, Parker *et al*. 2006). Safety norms focus on the unrecorded rules that guide nurses' safety behaviours (Feng *et al*. 2008). These safety behaviours become exclusive to each group of employees joined through their belief in the significance of safety to form the group's cultural pattern. This is encouraged through a just culture in the perioperative setting (Association of periOperative Registered Nurses 2012).

Developing a safety culture decreases major accidents and disasters, associated with normal routine tasks (Clarke 1999, Cooper 2000). A safety culture in healthcare applies to both patients and employees and ultimately leads to improved positive patient outcomes

(Flin & Yule 2003, Clarke 2006, Feng *et al*. 2008, Sammer *et al*. 2010). Contrary Morello *et al*. (2013) in their systematic review looked at the effectiveness of patient safety culture strategies to improve hospital patient safety climate. In reviewing over two thousand articles with twenty one of those meeting their inclusion criterion they found that even though there was strong face validity for a variety of patient safety culture strategies, there was limited evidence to support definitive impact on patient safety climate outcomes. The safety culture of the organization contributes to giving the finest quality patient safety (Thompson 2011). Scherer & Fitzpatrick (2008) propose that a safety culture is essential in the perioperative setting as patient injury or death may result as a consequence of errors. In the survey they found that generally participants indicated that there was a culture of safety within the perioperative setting. The doctors and nurses surveyed had positive perceptions of the culture, however some gave negative responses in relation to communication and supervisor and manager behaviour.

Currently there is an emphasis on the move from individual blame towards a culture of safety (McDonald *et al*. 2006). In the past the blame and shame patient safety culture in healthcare has been noted as hindering learning from past experiences and for being at the root of medical errors (Institute of Medicine 2001, Institute of Medicine 2004, Feng *et al*., 2008, Sammer *et al*. 2010). The nursing literature has changed from focusing on the individual practitioner to the organisational context as the source of error to more systems approach (Benner *et al*. 2002). In a study by Kim *et al.* (2013) they suggest that when errors arise the use of a standardised system based evaluation is better than a person-based evaluation as it enables an objective assessment of the context and conditions under which the error occurred. Analysis of errors is also essential to identify what went wrong and why, thus striving to ensure that the same error does not reoccur. Error reporting has an important role to play in high risk settings, which is linked to reducing a personalised blame culture (Nunn Warburton 2005). The promotion of reporting errors aims to reduce a culture of non-blame (Agency for Healthcare Research and Quality Patient Safety Initiative 2001).

There is a great need to transform health care organisational safety cultures (Hewison 1996, Institute of Medicine 2000, 2001, 2004, Hemman 2002). This may be achieved by adopting a culture of non-blame as this helps to increase the reporting rate of near misses and errors (Agency for Healthcare Research and Quality Patient Safety Initiative 2001). The report of the Commission on Patient Safety and Quality Assurance by the Department of Health and Children (2008) on building a safety culture has helped to commence this transformation. The main properties of safety culture are leadership, teamwork, evidence based patient care, communications, a learning culture, a just culture and patient centred care (Sammer *et al*. 2010). Leadership is seen as having a key role for establishing a safety culture (Joint Commission 2009a, 2009b) which will involve creating an environment of accountability, respect, collaboration, and trust exists between all team members (Association of periOperative Registered Nurses 2012). A culture of safety is essential in the perioperative setting as errors may result in patient injury or death (Scherer & Fitzpatrick 2008). All perioperative settings must provide a safety culture which provides an environment where all members in the unit can share in open discussion regarding patient care, roles errors, process improvements, or system issues without fear of reprisal (Association of Operating Room Nurses 2006, O'Brien 2011b).

Currently the culture in the perioperative setting appears to be changing to incorporate these strategies in dealing with risk. Perioperative nurses are now engaging in a better reporting system. There are many different adverse event reporting systems in Irish health services operated through the Clinical Indemnity Scheme (CIS), Mental Health Commission and the Irish Medicines Board. The Irish electronic incident reporting system (STARSWeb) of the Clinical Indemnity Scheme (CIS) was set up in 2002 which reports all clinical incidences and near misses reported yearly (Department of Health and Children 2008). They found that eighteen per cent of claims submitted by incident type were of a perioperative/peri procedure incident while twenty two per cent of claims submitted by speciality to CIS in 2010 were from surgical nature (Starsweb 2010 Statistics). To date there is no universal system that gathers, assembles and reports adverse event data from all health services (Department of Health and Children 2008).

To-date the literature recommends ways in which errors may be reduced but little research has been on undertaken regarding these recommendations to see if they are successful or not. Thompson (2011) suggests that the use of surgical checklists, adhering to universal protocols, and debriefings, help to build a safe culture within the perioperative setting. Currently perioperative nurses are using the surgical checklist and adhering to recommended standards, policies and guidelines (Rothrock 2010, Association of periOperative Registered Nurses 2012). This has made a difference to practice (Haynes *et al*. 2009). Building a safe culture is achieved through communication processes that help perioperative nurses to have a voice and become competent and skilled in perioperative care (Association of Operating Room Nurses 2006). Poor communication and lack of training contribute to systems failure (The Joint Commission 2009a, 2009b) and teamwork support is perceived as advancing a culture that places patients at the forefront of care especially in the perioperative setting (Thompson 2011). Teams consist of two or more individuals working together. These teams need to aspire to having a common purpose, measurable goals, good leadership and conflict resolution, policies, excellent communication, unity and mutual respect, self and situational monitoring and flexibility (World Health Organisation 2011). All of these elements identify the great need for change within our organisations and are essential in minimising risk and maintaining safety in the perioperative setting (Association of Operating Room Nurses 2006).

Patient safety remains a constant challenge in the operating room. Surgical care is a fundamental element within health care worldwide. The impact of the cost and amount of surgical intervention on health care systems continues to rise with the increases of traumatic injuries, cancers, cardiovascular disease and new surgical technologies. Within the complexity of modern surgery many hazards are present from equipment, electrical products, laser, and storage (Association of periOperative Registered Nurses 2010). World Health Organisation (2011) identifies differing situations that increase risk such as unfamiliarity with the task, inexperience, time shortage, insufficient checking, poor procedural techniques, lacking knowledge in the use of equipment and poor supervision. Furthermore other individual reasons consist of limited memory capacity which is further decreased with fatigue, stress, hunger, illness, anger or language issues (World Health Organisation 2011). Gawande *et al*. (2003b) found that fatigue or excessive workload was associated with how thirty three per cent of surgeon-described adverse events. Paying

consideration to human factors principles may help in minimising risk. World Health Organisation (2011) suggests that errors are inevitable. Complex work environment increases the potiential of errors occurring (World Health Organisation 2011).

Zegers *et al*. (2011) found that the incident of surgical adverse events was three point six per cent of all their hospital admissions, there findings were similar to previous studies carried out on this area (Wilson *et al*. 1996, Gawande *et al*. 1999, Thomas *et al*. 2000, Kable *et al*. 2002, Davis *et al*. 2003, Baker *et al*. 2004). This highlights the fact that even though improvement in safety is continuous, adverse events continue to exist. Therefore Rothrock (2011) suggests that the nurses continually require knowledge and understanding in promoting and maintaining safety.

2.8 Justification of the Research

Perioperative nursing as a profession is central to effective health service delivery for the surgical patient. The perioperative environment is in a constant state of change in a climate of safety, risk management, professionalism, accountability and consumerism, which influence nurses working in the perioperative setting. An ability to work within an increasing range of technology while providing and overseeing the provision of patient care to the surgical patient is essential.

The researcher having trained and worked both as a staff nurse and CNM2 in the perioperative setting wished to undertake research in this specialised substantive area. When commencing the study, there was a dearth of literature written on perioperative nursing with limited access to obtaining it.

When reviewing the available literature for the writing of the research proposal in 2008 within perioperative nursing there was a dearth of literature written on stress and stressors in the perioperative setting and how nurses coped on a daily basis. Furthermore, there was a lack of theory in the area of perioperative nursing. Classic grounded theory offered an open approach to undertaking research and sought to identify what the main concern was

for nurses in the perioperative setting by letting the problem emerge. The theory generated would be grounded in the words and action of the perioperative nurse experiences enabling the generation of a theoretical account of the general features of the phenomenon under study. This theory could then impact on practice. Further justifications of classic grounded theory are further discussed within the methodology chapter three under section 3.4.

On commencing classic grounded theory data collection nurses were asked what their main concern was when working in the perioperative setting. Stress and stressors did not emerge from the data instead minimising risk emerged as their main concern. Patient safety is now both an international and global priority (Battles & Liford 2003). A safety culture is required (Hudson 2003, Department of Health and Children 2008). .Risk reduction was a question worthy of researching and explaining as it identifies the current challenge within the perioperative setting.

2.9 Conclusion

The perioperative setting is a complex work environment in which surgical patients often have multiple conditions that must be treated. Additionally, there is a large amount of technology in use at any given moment, and more technology is being added every month. Consider the coordination of people, instruments, and schedules that must be managed before any procedure can begin. By its very nature, the perioperative setting is a high risk busy environment in which the potential for safety-compromising events is high. In view of the fact that error can never be truly eradicated, there is a great need to advance the perception of perioperative nursing among health professionals and the general public in promoting and maintaining safety to ensure that error and risk are reduced. This study aims to address the issue of minimising risk in promoting and maintaining safety. The following chapter will consider the methodology underpinning this current study.

3 Chapter Three: Research Methodology

Chapter two presented the background and context leading to the emergence of the aims of the study undertaken within the perioperative setting. This chapter examines the philosophical beliefs underpinning the methodological approaches and offers a rationale for choosing classic grounded theory research. A discussion of the different versions of grounded theory is presented. Classic grounded theory as articulated by Glaser is considered and the systematic process guiding this methodology is explored. Attention is given to the evaluation and credibility of classic grounded theory.

3.1 Overview of Grounded Theory

Grounded Theory was developed in 1967 by two sociologists, Barney Glaser and Anselm Strauss. Grounded Theory has its origins in sociology. It has its roots in inductive quantitative analysis and theory generation, used by Merton and Zetterber who worked in Columbia University in the 1960s which was linked with a movement known as symbolic interactionism (Holton 2011). The term 'symbolic interactionism' was coined by Blumer in 1937 belonging to the early work of Charles Cooley (1864-1929) and George Herbert Mead (1863-1931) and refers to patterns of communication, interpretation and adjustment between people (Blumer 1969). Annells (1997b) proposes that symbolic interactionism suggests that people are active and dynamic. Blumer (1969) suggests that the meaning things have for people will determine what actions they perform; that meaning is derived from social interactions and that it is directed and modified through interpretation. Glaser maintains that symbolic interactionism is just another theoretical code and not what grounded theory is based on. Furthermore, Glaser maintains that symbolic interactionism did not influence grounded theory and suggests that grounded theory was created as a response to how theory was generated at that time (Glaser 2003, Nathaniel 2011). Glaser & Strauss (1967) distinguish their origin of 'the constant comparative method' from analytic induction on the basis that the constant comparative method is not primarily aimed at testing causal hypotheses. This interactionist approach together with naturalistic approach influenced grounded theory (Hammersley 1989). Prior to grounded theory most sociological research was based on obtaining accurate facts and rigorously testing theory

(Glaser 2012a). Origionally Glaser & Strauss (1967) viewed contemporary research (the hypothetic-deductive practice of testing sociological theories) as endeavouring to verify the theories of 'great men' instead of generating new theory which would provide understanding for those who were the subject of it. Grounded theory was not meant to replace previous research methods or approaches to generating theory but the "shedding of their claim to preconceived research and theory", which was dominant at that time (Glaser 2012a, p. 1).

Glaser studied quantitative and qualitative maths under Paul Lazarfield at Columbia University and theory construction under Robert Merton. Later in Paris, he learned the skill of '*explicationdetexte'*, which involved analysing the data line by line to extract meaning without interpreting or changing the meaning (Glaser 1998). Strauss studied symbolic interaction under Blumer in Chicago University. Grounded theory originated from these two differing schools of thought. Glaser & Strauss's ideas, assumptions and practices generated while undertaking their research on dying resulted in formalising grounded theory (Glaser & Strauss 1967). Their seminal book articulated and documented their developed systematic methodological strategies and promoted developing and generating theories from research grounded in the data of a substantive area as opposed to deducing testable hypothesis from existing theories (Charmaz 2006). Early work from the Chicago School and the Columbian school of quantitative research underpinned the methodology (Morse *et al*. 2009). From its inception grounded theory has spread rapidly as an accepted research method (Glaser 1992, 1998).

Grounded theory involves systematically collecting data creating and generating a multivariate conceptual theory (Glaser 2010). A theory consists of concepts and their properties forming a systematic structure which explains phenomena (Glaser 1992). It is a conceptual research method as opposed to a descriptive method whereby the goal is theoretical completeness rather than descriptive coverage (Glaser 2003). The main goal of grounded theory is to develop an explanatory theory that accounts for a pattern of behaviour which is relevant for participants (Glaser & Strauss, 1967, Glaser 1978, Glaser 1992). Glaser (1978) stresses the need for the theory to emerge from the data as opposed

to forcing the theory by using a pre-existing theoretical or conceptual framework. Grounded theory yields research that should fit, work, is relevant and is readily modifiable in a substantive area because it emerges from the data and the doings of those studied (Glaser 2010).

Grounded theory generates two types of theory namely substantive and formal. Substantive theory explains empirical situations, (participants are selected from one substantive setting), whereas formal theory explains conceptual areas (participants are selected from dissimilar comparative settings); both are middle range theories (Murphy *et al*. 1998). Holton (2010) suggests that grounded theory is considered as a way of studying social actors inclusive of their relationships, interactions, and conflicts in an ever-changing environment (Geiger & Turley 2003). Within research grounded theory is an inductive, multivariate, comparative, general emergent and interactive approach to theory construction (Glaser 1978, 1992, 1998). Glaser (2003) suggests that using classic grounded theory methodology combines the need for and the promise of relevancy, seeking what is happening within a specific area of research. Simmons (2011) suggests that learning by doing is a critical component within grounded theory methodology.

Traditionally, a literature review is undertaken to frame the beginning of a research study (Cresswell 1994). However within grounded theory, Andrews (2006) suggests that to maintain theoretically sensitivity and minimise preconception, a literature review should not be commenced prior to data collection. Glaser (1978) cautions that it is important to enter the research field with as little preconceived ideas or knowledge as possible. It is critical that the main concern of participants emerges and in so doing researchers are open to what they see and hear. Glaser (1992) and Hernandez & Andrews (2012) recommend the suspension of reading theoretical literature in relation to the substantive area of research until data analysis is progressing, the core category has emerged and theoretical codes (where all the codes/categories relate) have been generated. Glaser (1992) divided literature into three categories: a) professional related literature to the substantive area b) professional unrelated literature to the substantive area and c) nonprofessional, popular and ethnographic descriptive literature and suggests that grounded theory needs to be free from

the claims of related literature and its findings and assumptions in order to consider the data conceptually to be the best fit.

Early reading around an emerging core concept may direct or guide the researcher in a direction not relevant to the substantive area. General reading may be undertaken to obtain a feel for the issues occurring in the subject area, and identify any gaps that need to be considered using grounded theory. Literature was read in relation to stress and stressors in preparing the research proposal. Other reading in other substantive areas was done to increase theoretical sensitivity (Glaser 1998). However, when data collection and analysis began, the literature pertaining to the emerging concepts was suspended until the core category and sub core category emerged. Extensive methodological reading was also carried out together with experiencing the method first-hand by applying the methodological steps to the collected data (Holton 2009).

3.2 Philosophical Assumption Underpinning Grounded Theory

Philosophical views are basic belief systems or world view that direct the researcher and may consist of assumptions, concepts, values and practices (Guba & Lincoln 1994). Broadly they can be described as schools of thought (Parahoo 2006). Philosophical views provide explanations of what is open to research inquiry (what operationally counts as reality) and the research focus, which is how reality might be investigated (epistemology). Saks & Allsop (2007) suggest that philosophical views offer overarching philosophical or an ideological stance and a system of beliefs about the nature of the world. It entails a philosophical background that directs the research process that defines the belief system which underpins the research, where ontological and epistemological positions are taken into account. Savin-Baden & Howell Major (2013) claim that philosophical perspectives are challenging and suggest that philosophy is a difficult discipline to navigate that has blurred boundaries which are difficult for a person to understand.

Grounded theory is an inductive methodology. Modern inductivism originated with Francis Bacon and his ideas of what constitutes natural laws. Karl Popper believed that a hypothesis was created from ideas rather than data. Contrary to this Francis Bacon believed that observations would eventually form laws of nature, and preconceived hypotheses were excluded. An inductive approach begins with data as a starting point, then moves from specific instances in the data towards a general theory (Holloway 2009). This inductive approach is in contrast to deduction whereby there is a move from an initial general theory to testing and explaining the phenomenon under investigation. Both approaches demonstrate somewhat different world views. There is the world of objective observation and measurement; facts that are derived from logical deduction with evidence of cause and effect. On the other hand, there is the world of perception, belief and experiences which may be described as subjective. Subjectivity is associated with inductive approaches (Morse & Field 1996).

Inductive approaches have been used when little is known about the topic. It may also be used as a basis for developing theory which may be tested using a deductive approach. In grounded theory induction begins with empirical observation and builds to a theory following empirical data collection and analysis (Glaser 1978, Nathaniel 2011). Glaser (1998) classifies grounded theory as utilising an inductive approach, however this is far from a simple classification, as there are elements of deduction in classic grounded theory as one theoretically samples for comparative purposes. Classic grounded theory commences inductively with data collection, coding, conceptualising and generating hypothesis on relationships between concepts, thus developing a theory, based on systematic analysis of the data. The deductive element of the research process begins in the sourcing of more data through theoretical sampling, followed by constant comparison of the data which is used to test emergent concepts for fit and relevance (Glaser, 1998, Elliot & Higgins 2012). Glaser (1998) suggests that classic grounded theory is a grounded deduction, based on an induced category which directs future data collection. Elliot & Higgins (2012) summaries classic grounded theory as both inductive and deductive, with the deduction element primarily in the service of induction.

Glaser (2003) suggests that grounded theory is a general research method which can be used within different philosophical assumptions or views (qualitative and quantitative). Lincoln & Guba (2000) suggest that Glaser (1992) and Strauss's (1987) views remain instilled with positivism with objectivist underpinnings. Grounded theory has been classified as positivist, pragmatist, constructivist, non-empiricist and interpretivists by various authors (Sangren 2010). Nathaniel (2011) believes that classic grounded theory exists within the philosophy or beliefs of pragmatism. Lincoln & Gubas (2000) classification of research philosophical assumptions places grounded theory as post-positivist research which involves looking at research objectively assuming a learning role instead of a testing role, acknowledging the complexity of life and its different experiences. Parahoo (2006) agrees with this and suggests that post-positivists believe that it is achievable to get really close to the truth (critical realist). Post-positivists suppose that knowledge is centred on human assumptions. However, Holton (2007) concurs with Glaser that classic grounded theory is a general methodology which does not take a philosophical classification (Glaser 1998).

Kuhn (1970) states that most scientific research is actually working within a paradigm. A paradigm of enquiry is a simple belief system that guides the investigator (Guba & Lincoln 1994). It provides a framework that explains how reality is understood by the researcher (Hall *et al*. 2013). A paradigm consists of epistemological, ontological and methodological premises (Guba & Lincoln 1994). These components are interrelated: epistemology is defined by ontology. Methodology is influenced by ontology and epistemology assumptions (Guba & Lincoln 1994, Lincoln & Guba 2000). Ontological and epistemology are branches of philosophy. Epistemology, ontology and methodology are connected as ontology involves the nature of reality; epistemology addresses how we come to know that reality, while methodology identifies the particular practices used to attain the knowledge of the reality (Krauss 2005). While ontology answers the question about the what aspect of the question, epistemology looks to answers the question about how and what? Differing research approaches originate from different paradigms and from diverse assumptions about the nature of reality (ontology), the relationship between the researcher and the subject of the research (epistemology) and how knowledge should be obtained (methodology) (Hall *et al*. 2013). Furthermore, Weaver & Olson (2006) suggest

that a paradigm also links the need for knowledge (aims) with how the knowledge is produced (methods). Creswell (2009) suggest that this connection between the aims of the research and the methods represents the researcher's world view. Ontology will now be discussed in more detail.

Ontology considers assumptions about the form and nature of reality (Higgs 2001). Kant and Heidgegger presented many philosophical arguments around the principle of sufficient reason stipulating that everything must have a reason or cause for its existence. Blackburn (2008, p. 260) suggest that Kant challenges the view that:

"unaided reason can tell us in detail what kinds of thing must exist, and therefore do exist whereas, Heidegger does not tell us what exist, but instead looks to how to establish what things a theory claims to exist".

Higgs (2001) suggests that ontology is associated with the study of existence itself and with the differences between real existence and appearance. Ontology considers beliefs and realities (Denzin & Lincoln 2005) and questions what kind of being is the human being and deals with what is real. Methodology questions how we come to know the world, or gain knowledge of it (Denzin & Lincoln 2011) in relation to the research and its context (Denzin & Lincoln 2005). The methodology literature abounds with debate around the philosophical positions underpinning research methodology. Several recurring terms emerge including realism, relativism and constructivism (Guba & Lincoln 2005, Denzin & Lincoln 2011).

Realism has been defined as a belief that reality exists independently of the observers and is associated with positivism (Saalmann 2007). Positivism is usually associated with the natural sciences whereby the world is seen and determined through objective and observable phenomena and is a deductive method of inquiry. Positivism is a way of thinking developed by the French philosopher Auguste Comte who believed that social problems can be understood through the application of hierarchical rules. It is based on the

belief that it is possible to observe social life and establish reliable, valid knowledge in relation to how it works (Savin-Baden & Howell Major 2013). Realism which is an empiricist and positivist approach to research highlighting the separate existence of a single and knowable reality independent of the person (Guba & Lincoln 2005, Denzin & Lincoln 2011). It proposes that where meaning exists in objects separate from consciousness then understanding the world in its totality occurs. Hence this suggests that the thoughts, experience, value and beliefs of the researcher do not affect the outcome of the research. However, Guba & Lincoln (1994) contradict this and suggest that it is generally impossible for humans to investigate the world without influencing it. A feature of an objectivistic approach is the existence of objective, absolute and unconditional truths (Denzin & Lincoln 2011). While some researchers write of objectivist grounded theory, Glaser says that grounded theory is not objectivist but abstract (Glaser 1992).

Relativism has been defined to consist of local, specific and constructed realities (Guba & Lincoln 2005). This view considers that multiple realties exist and are dependent on individuals and the level of their self-awareness (Denzin & Lincoln 2011). This view has been expanded by Kuhn (1970) stating that scientific knowledge is socially and culturally constructed (Savin-Baden & Howell Major 2013). A feature of relativism is interpretation recognising the role of the researcher as being essential in interpreting the social world (Lincoln & Guba 2000, Royal College of Nursing 2003a). Interpretivists believe that human behaviour is only understood within the context of where the data is collected and the thinking that brings its interpretation about (Parahoo 2006). It focuses on the subjective experiences of participants, perceptions, language and behaviour. The findings of this type of research are authentic to the situation and to the participants of the study (Royal College of Nursing 2003a, Parahoo 2006). Characteristics of the interpretive approach include being self-aware, living with the data, being inquisitive, being strategic, being precise and being insightful (Royal College of Nursing 2003a, Denzin & Lincoln 2011). The interpretivist believes in multiple realities suggesting that findings in research are not just a product of one reality or that they represent reality closely. Subjectivity may suggest that a theory may be forced or interpreted based on a researchers knowledge, experience and values prior to commencing the generation of a theory (Glaser 1992).

A constructivism inductive approach aims to generate knowledge and is a perspective that developed along side social constructionism. The terms constructivism and interpretivism are frequently used 'interchangeably' (Guba *et al*. 2011). Constructivism looks at how people know and is a process of actively interpreting and constructing individual knowledge representations (Jonassen 1991, Coll & Chapman 2000, Cousin 2002). It is the opposite of objectivism and has a wide and varied viewpoint that has a strong element of radical opposition to the traditional objectivist epistemology of empiricism, positivism and post-positivism positions. Constructivism is concerned with how knowledge is constructed and how we construct our own reality through interpreting perceptual experiences of the external world. Through engaging in the mental process of perceiving and interpreting, humans construct their own realities. Schwandt (1997) identifies two forms of constructivism, radical constructivism and social constructionism. Radical constructivism accepts that it is not possible to have knowledge separate from what we experience ourselves. Social constructionism, accepts that reality is a part of shared meaning that is constructed, maintained and recreated through social life as people engage collectively together (Berger & Luckmann 1966). It views knowledge as constructed instead of being created (Andrews 2012)

Charmaz's (2003, p.250) version of grounded theory known as constructivist grounded theory assumes:

"the relativism of multiple social realities, recognises the mutual creation of knowledge by the viewer and viewed and aims towards an interpretive understanding of subjects meaning".

Charmaz (2000) suggests that classic grounded theory is subjective and must become constructivist. Glaser (1998) challenges Charmaz (2000) view that suggests that classic grounded theory was informed through the philosophical interpretative approach where reflection and meaning are interpretations of the data and instead maintains that classic grounded theory is a conceptual rather than interpretative approach. Grounded theory is commonly thought of as an interpretativist approach which leads to much confusion and

this might have been the basis for the rewriting grounded theory**.** Glaser repeatedly asserts that classic grounded theory is a methodology that is not contingent upon any particular philosophy (1978, 2003). Glaser rejects any notion of classic grounded theory as constructionist. He takes the position that classic grounded theory consists of conceptual hypothesis of relationships between categories. The researcher believes that like interpretivism, subjectivity may present problems for the emerging theory.

Glaser (2005) suggests that grounded theory is neither prepositivist, positivist, post-positivist, postmodernism, naturalism, realism, but instead is reliant on the data used for the research. Glaser concentrates on the methods of how classic grounded theory is undertaken rather than on underpinning theoretical positioning (Birk & Mills 2011). Glaser suggests that all is data in grounded theory, which may be sourced from different spheres. Furthermore he suggests that grounded theory may utilise or contain different philosophic perspectives but in doing so each viewpoint or stance needs to earn its way into the theory (Glaser 2001). Furthermore he maintains that classic grounded theory has no ontological assumption as it takes data at face value.

The philosophical discussion of how we know the (social) world is termed epistemology. The term comes from the Greek word epistêmê, which means knowledge. It is concerned with both knowledge and how we come to know (Trochim 2000). It is mainly concerned with how knowledge of reality is gained and considers the relationship between the knower and what is known. Furthermore it considers how we know what we know and what constitutes knowledge (Krauss 2005). Epistemology asks questions about the relationship between the researcher and what can be known (Denzin & Lincoln 2005). Gall *et al*. (2007) suggest that epistemology is the aspect of philosophy that studies the nature of knowledge and the method by which knowledge is acquired and validated.

The epistemological roots of grounded theory began with the influence of Strauss, qualitative research approach and symbolic interactionism and Glaser quantitative research approach and the use of the concept indicator model (Charmaz 2006). Bryant & Charmaz

(2008) suggest that grounded theory demonstrates epistemological orientations that believe reality can be discovered and understood. Glaser (1978) suggest that people need to hear how to handle what they know and theory grounded in a substantive area that works, fits and is relevant to people facilitates this. Classic grounded theory generates this discovery and understanding where the purpose is to identify the main concern of participants and its resolution, through identifying patterns of behaviour which are based on the nature of the participants realities.

Blackburn (2008) believe that epistemology has two rival metaphors. The first is of a building with good foundations as the philosopher has to describe secure foundations in discovering secure forms of construction, so that the resulting creation can be revealed to be sound. The second is of a boat without any foundation but lends it strength to the steadiness of its interlocking parts. Epistemology is concerned with the nature of knowledge and considers the association between the researcher and the data. It is now essential to consider Glaser's own philosophical position.

3.2.1 Glaser's Position

Glaser, (1978, 1992) suggests that classic grounded theory does not have any one particular ontological or epistemological position. Furthermore, Glaser (1998) does not take a position with philosophical conceptions of what truth is. He believes that it is just a method of undertaking research and a way of figuring out and identifying latent patterns in any data (Glaser 1978, 2003). He suggests that it is a simple method that can be applied to anything (Glaser 2010). This non positioning of classic grounded theory within either an epistemological or ontological position confuses critics who tend to place it in the different schools of thought based on Glaser's previous academic background and early education (Morse 2008, Mills *et al*. 2007, Clarke 2005). Glaser accepts that the: methodology of a grounded theory was founded using the skills and training he received in university. Iin his own words Glaser states that:

"Grounded theory was not thought up based on research maxims from positivism and symbolic interaction. It was written from methodological notes I did during the research for Awareness of Dying and the methodological notes taken during several years of my analysis seminar at University of California, San Francisco" (Glaser 2003, p. 62). He elaborated by stating "that in fact, grounded theory was discovered using Lazarsfeld's quantitative inductive data analysis techniques" (Glaser 2003, p. 83).

Glaser further recognises that both himself and Strauss were influenced by their university professors and combined their two schools of training during their collaboration on their book Awareness of Dying in 1965 (Glaser 1992). This combined work resulted in the origination of the method of grounded theory. Grounded theory offers a systematic rigorous guide to theory development which is closely related to the methodology of social research. Glaser (1978) claims that generating theory and undertaking social research are elements of the same process and that the social organisation of life goes on and on. Grounded theory's paradigm is to trust in emergence through constant comparison, and conceptualising the latent patterns of behaviour. Glaser summarises as follows:

"The grounded theory goal is to discover it conceptually not describe it" (Glaser 2003, p. 127) and that "the world view of grounded theory is to allow the researcher the freedom to discover and generate conceptual theory about "whatever" and not perceive its nature. Its limits are the researcher's self and resources" (Glaser 2003, p. 128).

Glaser believes his training influenced grounded theory especially the constant comparative method which is at the heart of conceptualising. It is a general method of research which consists of conceptual hypothesis of relationships between categories (Glaser & Strauss 1967, Glaser 1978). Grounded theory seeks to generate theory about issues of importance in participants' lives (Glaser & Strauss 1967, Glaser 1978). Classic grounded theory has emerged as an alternative to deductive methods of producing knowledge. Glaser's original text is similar to his current stance. His position has been consistent over time.

Patton (2002) presents a middle ground perspective within research, which he calls empathic neutrality. This suggests that there is a middle position amid becoming too

involved, which may obscure judgement and staying too distant away which may lessen understanding. Empathic neutrality requests that the researcher take a position of neutrality, while being able to understand the stance, position, feelings and experiences of others. Hence, this study is positioned within this perspective as the intension was not set out to follow a particular perspective and aimed instead to let the theory emerge from the data. Like Glaser the researcher acknowledges that classic grounded theory can draw on many epistemology and ontology positions and does not identify with any particular position. The researcher position adopted will be discussed in the following section.

3.2.2 Philosophical Position Underpinning the Research Study

Seeking clarification of the philosophical underpinning and position of this study from an ontological and epistemological view point took many long hours of reading and coming to terms with the many different views. The confusing and contradictory aspects of the literature led to exasperation, annoyance and frustration. Having spent many long hours struggling with the many debates around the underpinning philosophies, Glaser's stance was followed as it seemed practical, sensible and prudent to follow the systematic approach from beginning to end within the method of classic grounded theory. The original claims by Glaser (1978) is that grounded theory is just a method of undertaking research and a way of figuring out and identifying latent patterns in any data. More recently writings continue to endorse this stance (Glaser 1998, 2003). Acknowledging the complexity within the on-going debate of the position of classic grounded theory in the literature, a decision was taken to be guided by and informed by the writings of the originator (Glaser 1978, 1998, 2003). Glaser's belief is that classic grounded theory has neither an ontology or epistemology stance (Glaser 1998, 2003). The current study relates itself to understanding participants' articulation of the challenges they face daily in the perioperative setting.

As ontology is concerned with the form and nature of reality there was a need to be true to the data to ensure that theory emerges from the data as opposed to being forced. Glaser (2002) maintains that grounded theory is not the voice of participants but a general

abstraction of their doing and their meaning. Epistemology is concerned with the nature of knowledge and considers the relationship between the knower (researcher) and what can be known (data) about participants. In seeking a non-judgemental understanding of the research phenomenon, the researcher must remain open to the emerging data. Hence a neutral approach was taken to data collection and analysis in so far as was possible and did not interpret or impute meaning from the data but instead let the data speak for itself. Although acknowledging that a person is never absolutely truly objective attempts were made to stand back from the data. This was achieved by adhering to the fundamental tenets of classic grounded theory and the use of the constant comparison method of comparing data and its role in correcting bias. Post-positivism contends that there is an objective reality but that reality can only be problematically known (Guba & Lincoln 2005, Denzin & Lincoln 2010). Unlike objectivism, it is not possible to view knowledge and knowledge production as disembodied, however, subjectivism suggests that to influence responses or to rely on interpreting the data has the potential to force the theory thus undermining its credibility (Glaser 1998).

Grounded theorists avoid descriptions and interpretations, but are instead interested in the abstract conceptualisation of the behaviour of participants (Glaser 1998). Glaser (2003) suggests that the main properties of conceptualisation are; the conceptual naming of latent patterns of behaviour which are categories and properties, they have lasting grab and are abstract of time, place and people. Conceptualisation facilitates the discovery of repeated patterns in the data which emerge as concepts. Glaser (2003) contends that grounded theory creates abstractions through conceptualisation that transcends the description of qualitative research. Conceptualising through constant comparison is undertaken while coding the data, writing memos and saturating the concepts, which lead to the formation of the emergent theory (Glaser 2002). Classic grounded theory is a generated abstraction of participants' behaviours and their meanings which is taken as data for the conceptual generation of theory. Glaser (1992) clarifies that a grounded theory is not an authoritative truth claim but a theory compromising a series of tentative hypotheses.

Glaser's philosophical position in his original text written with Strauss in his book Awareness of dying (1965) remains the same as his current thinking; this view has not shifted (Glaser 1967, 1978**).** Therefore in this study adhering to Glaser's systematic method of data collection, analysis, constant comparison and conceptualisation, provides a knowledge and understanding of the world of working in an acute complex setting by way of an explanatory substantive theory. Also Glaser acknowledges the complexity of participants' worlds and suggests that data collection is from the perspective of participants (Glaser 2001). The following section considers the different versions of grounded theory.

3.3 Different Versions of Grounded Theory

Different versions of grounded theory were considered when identifying which approach best suited this study. Over the years grounded theory methodology developed predominantly into three versions, one originated by Glaser & Strauss (1967) and elaborated on by Glaser (1978, 1992, 1996, 1998, 2001, 2003, 2005) which has come to be known as classic grounded theory, the version by Strauss & Corbin (1998) and Corbin & Strauss (2008) and the version by Charmaz (2006, 2009) known as constructionist grounded theory. Although various approaches to grounded theory are consistent with generating theory there are differences in the processes used. Both Glaser (1978), Strauss & Corbin (1994) and Charmaz (2006, 2009) are consistent in the view that generating grounded theory produces a theory applicable to its users. Glaser (1996) argues that classic grounded theorists' focus should be on the emergence of theory from the data.

However, Strauss & Corbin (1990) suggest a different version of grounded theory, which consisted of a more prescriptive approach to coding, memoing and analysis which according to Glaser (1992) hinders the emergence of the theory. It consists of three stages of coding which lead to developing categories that evolve into theory generation and hypotheses development. The classic approach incorporates an eminently flexible process (Glaser 2004). Glaser maintains that Strauss & Corbin are no longer doing grounded theory and describe their approach as 'full conceptual description' claiming that it forces the theory rather than allowing it to emerge. Glaser (2004) suggests that the classic

grounded theory seeks to systematically generate a theory that explains process or interaction by being flexible and systematic. Annells (1997a) suggests that grounded theory is considered to be the most comprehensive research methodology available to date. Charmaz (2006) identifies flexibility as the main advantage of grounded theory. Similarly, Annells (1996) agrees and suggests that the fluidity of grounded theory while not tightly prescriptive still requires exploration of each new situation to see how it might fit the substantive area.

McCallin (2006) discusses the reformulation of grounded theory by Strauss & Corbin (1990) whereby suggesting that they seem to have taken a qualitative approach. Strauss & Corbin (1994) suggest that the differentiating factor between grounded theory and other qualitative methods is the development of theory. Glaser (1992) maintains that Strauss & Corbin's version of grounded theory is just another qualitative methodology. Phyllis Stern who undertook doctoral studies at the University of California San Francesco (UCSF) and studied under Strauss and Glaser, believes that this variant of grounded theory developed as a reaction to the critics of grounded theory who maintained that it was a loose, confused descriptive method which required further explanation (Stern 1994). This has led to a more limited, inflexible model of grounded theory. Glaser accepts that the initial writings needed further elaboration and has done so in subsequent publications (Glaser 1992).

The earlier Strauss & Corbin version provided a very detailed precise research method with numerous smaller steps in the analysis process which some researchers believe is too prescriptive (McCallin 2009). The latest version as identified by Corbin is far less prescriptive. The key components of this version have their basis in symbolic interactionism and the use of axial coding which looks at the conditions and scope of a situation. The findings of this version of grounded theory may not always clarify what is significant to participants as they have used a structured stepped method of research with clear philosophical underpinnings, which may force theory development as opposed to letting the main concern emerge (Glaser 1992). Glaser (1992) criticises this version of grounded theory suggesting that it forces the data to fit a set of conceptual descriptors. However novice researchers like this version of grounded theory as the framework gives a

prescriptive, clear approach when looking at specific circumstances such as how, where, when, and why (McCallin 2009). In Glaser's approach the researcher acts as an observer while in Strauss & Corbin approach they acknowledge that the researcher plays the role of interpreter of the findings. Likewise iin the constructivist approach the co-construction of data between the researcher and participants in interpreting the data is explained (Charmaz 2006).

Charmaz (1994, 2003, 2006, 2009) developed the social constructivist version of grounded theory. Charmaz (2006) proposed that constructivist studies are derived and expanded from interpretive approaches which calls for the "imaginative understanding of the phenomena under study" (p.126), resulting in additional knowledge of the subjective experience of people. In addition Charmaz focuses more on the importance of meanings that people give to their everyday experiences. The thoughts, feelings, stances, viewpoints and assertions are incorporated into data collection and analysis. This also allows for researcher's own sense of values, beliefs and feeling to be incorporated into the data. Classic grounded theory is a general method, which can use any type of data and is not attached to any one theoretical perspective; it is essentially ontologically and epistemologically neutral. Charmaz (2006) suggests that the relativist stance within constructivist grounded theory seeks to develop a true and verifiable theory of reality, whereas the focus in classic grounded theory is not on accurate truths or verifying facts but instead is on generating concepts that are variable and modifiable (Glaser 2004). Therefore, constructivism is different to the general inductive nature of the classic approach (Breckenridge *et al*. 2012).

Constructivist grounded theory values a more flexible approach compared to Strauss & Corbin (1998), where interpretations of individuals' experiences are consistently taken into account. Charmaz (2009, p. 141) believes that there are multiple realities and "generalisations are partial, conditional and situated in time and space" and that no view is privileged above any other. The narrative and value of story telling which is rich, accurate and meaningful are the key characteristics of constructivist grounded theory where themes

(through interpretive analysis) are identified unlike the concepts and categories which emerge from the classic grounded theory approach (Charmaz 2006, McCallin 2009).

Hernandez & Andrews (2012) identified five major differences between the constructivist grounded theory and classic grounded theory.

Firstly is the development versus discovery of the research problem. In constructivist grounded theory the research problem is developed through reviewing the literature and identifying a gap whereas in classic grounded theory, the study is undertaken on an area of interest and the research problem emerges. The type of research questions also differs, as in constructivist grounded theory they are specifi,c whereas in classic grounded theory they are open (Glaser 1978).

Secondly is the timing and approach in reviewing the literature. Researchers using constructivist grounded theory begin with the literature to identify the research problem whereas in classical grounded theory reviewing the literature is delayed so that it does not influence the data to fit pre-existing concepts (Glaser 1978, p.31).

Thirdly is the methodological versus philosophical positioning of grounded theory. Constructivist grounded theory involves an epistemologically subjective and an ontologically relativistic stance (Hernandez & Andrews 2012) which guides the research method, decisions and research product. In contrast, Glaser proposes that classic grounded theory is a methodology that is not reliant upon any particular philosophy.

Fourthly constructivist grounded theory utilises three types of coding: open, focused and theoretical coding. Whereas classic grounded theory utilises two coding phases open and selective. While open coding is similar in both versions theoretical coding differs in constructivist grounded theory as it refers to the organisation of concepts into groups or

thematic categories where it is a continuous process in classic grounded theory throughout both open and selective coding (Hernandez 2009). In classic grounded theory integration occurs with the use of theoretical codes which conceptually relates the core category to its properties. There is no integration of the core category with other categories in constructivist grounded theory as theoretical coding is not utilised. Theoretical sensitivity differs in both methods. In constructivist grounded theory it depends on the researcher's intuitive and interpretive analysis of the data while in classic grounded theory intuition and preconceptions are deferred and instead researchers seek to discover what is found in the data. In constructivist grounded theory prior knowledge of the researcher is utilised to improve theoretical sensitivity and the literature assists the development of the aims and objectives as well as questions to be asked of participants. In classic grounded theory prior knowledge of the researcher enhances theoretical sensitivity to begin with and then is used as data for constant comparison purposes. In constructivist grounded theory the researcher is seen as a reflective participant during the data collection and data analysis stages while in classic grounded theory the researcher is seen as a discoverer of the main concern of participants when carried out in an open non-preconceived manner. Theory in classic grounded theory is either static or processed whereas in constructivist grounded theory, process is deliberately built into the analysis (Hernandez & Andrews 2012).

Finally the research (theoretical) product differs. The theory produced in constructivist grounded theory is a rich, descriptive theory that captures the core social and psychological processes of participants (Hernandez & Andrews 2012). In classic grounded theory, the research product is an explanatory theory which explains how the problem discovered in the substantive area is continuously being processed, solved, or resolved. Classic grounded theory takes account of the multiple perspectives of participants, raising these to the abstract level of conceptualisation.

Charmaz (2003) suggest that constructivist grounded theory stays at a more intuitive and impressionistic level than what she considers to be a more objectivist's approach. Glaser disagrees with this view and offers that patterns of behaviour are grounded by constant comparison and must pattern out, therefore cannot be intuitively or impressionisticly

generated (Glaser 1998). Glaser (2002) suggests that Charmaz is trying to correct worrisome accuracy in gaining multiple interpretations with her remodelled version of grounded theory. Her mission is not to take data as it arrives as Glaser does but she needs to be sure it is correct by mutual interpretation of the data between the researcher and the participant. The constructivist approach views data and analysis as created from shared experiences seeking both respondents and researchers' meaning (Charmaz 2006).

Glaser (2002) acknowledges that while Charmaz writes of conceptualisation also there is a greater emphasis on description. Whereas classic grounded theory aims for a conceptual understanding of social behaviour, rather than the constructivist focus on interpretive understandings of participants' descriptive meanings.

The Strauss & Corbin version of grounded theory forces the data because of its structured analysis process (Glaser 1992) and Charmaz's version allows for meaning to be constructed through the researchers interpretive understanding (Charmaz 2009). In contrast the classic grounded theory approach allows the main concern to emerge which is grounded in the data thus making it a more open and unstructured approach when identifying current issues in a substantive area (Glaser 2002). Glaser (2004) suggests that classic grounded theory is an approach that usefully and pragmatically links diverse facts and explains relationships and connections that represent the best fit, with the data. As a result, the classic approach seemed flexible enough to allow researchers the freedom to follow leads and use a variety of data collection methods and sources, as ideas emerged. The following section discusses justifying of the use of classic grounded theory in a perioperative study.

3.4 Justification of Classic Grounded Theory

When seeking a methodological approach the classic approach was chosen as it emphasises the need to let the main concern of participants emerge from their perspective. Hence, it explains what is actually happening in the real world rather than describing what is going

on. This conceptualisation is a compelling reason for using this approach and there is ample evidence that it works in nursing practice (Andrews 2007, Higgins 2007, Elliot, 2010). Glaser (2003) suggests that classic grounded theory combines the need for and the promise of relevancy about what is happening within a specific area of research. Furthermore it is centred on an understanding that individuals within a substantive area define situations, resulting in the emergence of common patterns of behaviour (Glaser 1998). Therefore, the data collected has currency and relevance identifying the main concern of nurses working in the perioperative setting and its resolution.

One of the many strengths of grounded theory is that it is both a way to do research and a way to create theory. There is a lack of theoretical development and understanding in the current literature around the area of perioperative nursing. Theories reflect and offer insights useful for clinical practice and provide a bridge for adding to theory based research from a nursing perspective. Glaser & Strauss were critical of verification research as they believed that data was frequently forced to fit preconceived theory, whereas grounded theory offers an emergent theory that integrates theoretical experiential explanation of a concern (Glaser & Strauss 1967). This approach to research was appropriate in choosing the methodology as it allowed the main concern of participants to emerge as opposed to anything identified by the literature or preconceptions that the researcher may have had. The emergent theory has relevance, fit and workability (Glaser & Strauss 1967, Glaser 1978). Therefore any theory generated is potentially of value to participants in their substantive area. Theories are considered to be logical in nature so it is hoped that the theory developed will be utilised by perioperative nurses to guide and improve their clinical practice (Glaser & Strauss 1967). The key strengths of classic grounded theory, therefore appeared to outweigh the strengths of other approaches for this particular study as the best method of obtaining the personal, private and professional concerns of the nurses under study. Classic grounded theory allows nurses' viewpoint to emerge inductively seeking knowledge and understanding from participants in a substantive area and contribute to the body of knowledge.

Choosing a classic grounded theory methodology allowed the opportunity to explore directly what was actually going on in the perioperative setting. Following the initial decision to use grounded theory there was a need to read around the different types to decide which version to use for the study. As classic grounded theory allowed a more flexible and open approach through the emergence of theory, it was seen as an appropriate method to use. The findings within the data are representative of the main concerns of perioperative nurses and therefore are relevant to their practice. Classic grounded theory raises the level of the data collected towards a conceptual level and was chosen over other qualitative research approaches, which are based on gathering rich descriptive data. Such conceptualisations in classic grounded theory leads to the development of theory. The conceptualisation of data grounded in reality offers understanding for developing action strategies that help to resolve the main concern of participants (Glaser & Strauss 1967).

When reviewing the literature for the writing of the research proposal in 2008 there was a dearth of literature written on stress and stressors in the perioperative setting and how nurses coped on a daily basis. Furthermore, there was a lack of theory in the area. Classic grounded theory offered a more open approach to undertaking the research and sought to identify what was actually the main problem for nurses in the perioperative setting. It is hoped that the theory discovered will make meaningful and lasting contributions to nursing within the perioperative setting. Classic grounded theory, gave justification for going straight into the field, which was required to ensure that no preconceived ideas as to the outcome of the study would influence the study. This flexible and open-ended approach to discovery was seen to be a particular strength, allowing the real challenges that perioperative nurses face daily to emerge. Therefore a greater insight could be gained through this flexible research approach. In undertaking a classic grounded theory approach it was hoped to develop an explanatory theory about nurses' role in perioperative nursing as it gives an explanation of what is happening and an understanding of the process as to why it happens. This resulted in developing a theory of anticipatory vigilance, which consisted of process-oriented conceptualised explanations of how nurses deal with minimising risk in the perioperative setting. It is envisaged that this study's explanatory potential may offer perioperative nurses useful perspectives in how to minimise risk. The main strength of classic grounded theory is that it offers an explanation of what is actually

happening in practical life, rather than describing what should be going on (McCallin 2003) therefore it was found to be the most appropriate methodology for this study. It is important for any study to demonstrate credibility. The following section considers the criteria against which grounded theory is judged.

3.5 Evaluation and Credibility of the Classic Grounded Theory Research

All good theories are supported by the evidence presented in data as concepts and propositions which have emerged. Theories should offer new insights into the phenomena under study. The constant comparison process of comparing incident to incident and concept to concept is the method's own verification for the credibility of the concepts (Glaser 1998). Qualitative research methodologies are concerned with description and accuracy (Denzin & Lincoln 2012, Lincoln & Guba 2000) whereas in classic grounded theory concept and theory development is fundamental. Consequently the criteria against which a grounded theory is judged, normally focussed on the value of its theoretical products (Glaser 1978, 1998, 2003). Four criteria has been repeatively used by Glaser for judging the credibility of grounded theory namely fit, work, relevancy, and modifiability (Glaser 1998). A grounded theory study is never right or wrong but explains conceptually what is going on in an area (Glaser 1998). The fit, workability, modifiability and relevance will now be considered as they are the evaluation criteria for the theory generated in this study

Fit relates to the way the categories express and match the patterns of behaviour within the data (Glaser 2001). It is an aspect of validity (Sangren 2010). In grounded theory where the categories are derived and conceptualised from data in a substantive area, the emerging theory should fit the reality of participants working in the area Glaser (1991, 1992, 1998). When discussing fit, validity is implied (when conceptualising a category and its properties) ensuring that it fits the data (Glaser 1998). Glaser (2005, p. 133) suggests that "emergent fit is the key to a truly generated grounded theory".

Workability accounts for the capacity of the theory to explain and predict how the main concern of participants in the substantive area is continually resolved (Glaser 1998). The workability of the theory predicts what may happen in the future (Glaser 2001). Furthermore it offers an explanation of the main variation in the patterns of behaviour of participants in the substantive areas (Glaser 1992). Additionally it also questions whether the way concepts are related into hypotheses; adequately explain how the main concern is continually resolved by participants (Glaser 1992, 1998). Workability also informs the every day practice of participants in the substantive area (Glaser 1998).

Relevance relates to the applicability of the theory to a specific area (Glaser 2001). For relevance to be present the theory must give people insight, and understanding into the main area of the study (Glaser 1998) allowing people to see and identify with, what had previously been hidden knowledge or practice. The theory must be of interest and be important and significant to someone, therefore the concepts should relate to what is occurring in the substantive area and how it is continually processed or resolved (Sangren 2010). Relevance is normally achieved when fit and workability are present (Glaser 1992). The theory offers explanations that make sense of what is going on in the substantive area so should be relevant and have relevance (Glaser 1998).

Modifiability relates to the flexibility and durability of how the theory can be applied in practice and research (Glaser 2001). Glaser (1978, 1992, 1998) suggests that a classic grounded theory must be modifiable and be ready to accommodate new data, if and when any presents. Modifiability in grounded theory is a living quality that ensures the theory continues to be relevant and of value to participants in the substantive area (Sangren 2010). These are the criteria that are used to evaluate the theory that emerged within this study.

3.6 Summary

This chapter provides an overview of grounded theory methodology and discussed the philosophical underpinnings of different versions of grounded theory and provided

justification for using classic grounded theory. Classic grounded theory is an inductive methodology that can be used across different research paradigms. It is commonly used by social science researchers looking for underlying social processes that shape interaction and is practicable for perioperative nurse researchers. Grounded theory has been accepted as a general method and has been acknowledged as a rigorous, systematic procedure for data collection (Glaser 1978, 1998, 2003, 2012b). Classic grounded theory has been differentiated from other versions of grounded theory and is consistent with the original method and its subsequent elaboration.

This chapter has attempted to explain the development of classic grounded theory as a methodology and explain the assumptions underpinning its philosophy. The justification for choosing classic grounded theory as a methodology for this study within the field of perioperative nursing has been explored. This chapter has provided a rationale for the choice in undertaking a research enquiry whose aim was to discover the main concern facing perioperative nurses in minimising risk and consider how they resolved this concern. Furthermore it lays the foundation, of the value and potential in developing the theory of anticipatory vigilance. The methodology principles as devised and refined by Glaser provide a systematic and valuable approach to undertaking classic grounded theory research with nurses in the perioperative setting within a doctoral study.

4 Chapter Four: Method and Application of Classic Grounded Theory

Chapter three presented the philosophical beliefs underpinning grounded theory. This chapter continues with the operationalising of classic grounded theory for this study, beginning with an overview and the aims and objectives of the study and addresses the methods involved in the emergence of the substantive theory. It discusses access, recruitment, sampling, data collection, theoretical sensitivity, memos, data analysis and ethical consideration within this study. The focus of this study concentrates on a classic grounded theory approach in researching the substantive area of the perioperative setting.

4.1 Overview

In undertaking the research proposal for submission to University College Cork, a preliminary literature review was undertaken on the role of the nurse and stressors in the perioperative setting. However once the study began, reading of the literature was suspended while collecting and analysing data, as early reading around an emerging core concept may direct or guide a researcher in a direction not relevant to the substantive area (Glaser 1978, Andrews 2006). This was done in order to avoid preconceptions about the substantive area and to avoid sensitisation by borrowed concepts from the literature. Background reading on the methodology was undertaken using Glaser's books. Attendance at Dr. Barney Glaser's troubleshooting grounded theory seminars provided confidence in sharing differing challenges faced in the study. These seminars were invaluable as they generated discussion in an open and supportive manner and allowed for the sharing of insights by listening and talking with other classic grounded theory researchers. At the outset of the PhD journey, Glaser & Strauss (1967) book on the discovery of grounded theory was read as a starting point to gain understanding of grounded theory. This was quickly followed by reading other grounded theory books such as theoretical sensitivity and doing grounded theory.

4.2 Aim and Objectives

The aim of the study was to discover the main concern facing nurses working in the perioperative setting.

The objectives of the study were to:

- Examine the patterns of behaviour and interactions of perioperative nurses with the intentsion of uncovering their main concern
- Develop/generate an explanatory theory of how they resolved their main concern

Initially the aim of the study was kept broad and general in keeping with classic grounded theory. As the main concern emerged (minimising risk) the aim of the study became more focused on the emerging data.

4.3 Access

Gaining access to the research site is a critical element in undertaking research (Johl 2010). Buchanan *et al*. (1988) created a four step access model which consisted of getting in, getting on, getting out and getting back. Denzin & Lincoln (2012) suggest that the solution to access is through multiple gatekeepers. Prior to undertaking research the researcher must think through how to gain access to the research area that involves knowing which participants would best provide the information they seek (Johl 2010). Gatekeepers generally want to know all about the research project, how it will affect and benefit them and how the results will be used (Cresswell 2009). Ethical approval and access to participants must be granted prior to the commencement of the research (Savin-Baden & Howell-Major 2013).

The study was undertaken within the perioperative settings across eight different teaching hospitals. At the same time as ethical approval was being processed the relevant directorates of perioperative suites were approached and informed of the proposed study. Following speaking or meeting with the relevant directorates, permission for access pending ethical approval was granted. Once ethical approval was granted (Appendix III) the gate keeper of each potential sample site was contacted by letter (Appendix IV) giving details of the proposed research study in order to gain access to the sites and seeking permission to advertise by placing an invitation on the staff notice board inviting possible participants to contact the researcher (Appendix V).

4.4 Inclusion and Exclusion Criterion

The inclusion criterion for this study was that all participants were:

- Nurses registered with An BordAltranais (General Section) currently employed in a perioperative setting.

The exclusion criterion was:

- All nurses who were not working in the perioperative setting.

4.5 Recruitment

Following ethical approval discussion and subsequent agreement with the identified gatekeepers the following steps were taken in recruiting volunteers for the interviews. An agreed letter of invitation (Appendix V) was placed on the relevant notice boards. Opportunities were taken at the team meeting to discuss and raise awareness of the research. Letters were distributed through gate keepers and the researcher to nurses working in the perioperative setting detailing their potential involvement in the study, and inviting their participation. The letter also informed potential participants of their rights and that they were free to withdraw at any time. During all stages of recruitment for the

study a subject information sheet (Appendix VI) was provided and distributed to potential participants. As the research progressed participants informed colleagues of the study, who then became possible participants for the study and subsequently these potential participants contacted the researcher and became involved. Informal contacts during meetings at the hospital led to further participants approaching the researcher offering to participate in an interview. Initially these steps took time in clarifying queries and when one interview took place at each site a cascade of volunteers came forward. As the research progressed many more people were interested in taking part even when data collection was complete.

The access and recruitment process for non-participant observation data collection, site and organisation was guided by several factors. Initially a letter was sent to the Assistant Director of Nursing of the perioperative setting requesting access to the perioperative sites for non-participant observation (Appendix VII). Once granted (Appendix VIII) contact was made with the Clinical Nurse Managers (CNM) 3's or Clinical Nurse Managers (CNM) 2's by both telephone and a letter requesting their co-operation with regard to non participant observation (Appendix IX). Following either a telephone call or meetings with each of the the theatre managers, they agreed to become gate keepers in deciding when and where the observations could be facilitated. Each CNM3/CNM2 spoke and liaised with the teams and circulated the information regarding the expectations within nonparticipant involvement of staff. The CNM3/CNM2 then made a decision as to how to best facilitate the data collection in terms of the time of day and the availability and organisation of the theatre list and willingness of staff to be involved. Another factor was the day of the week which was dependent upon the researcher being free from teaching commitment and the practicality of travel distances to undertake the observations. A confirmation letter was requested and then forwarded to the gatekeepers stating the agreed dates and times (Appendix X). All of these factors led to the non-participant observations taking place in seven theatres from a potential of twelve within HSE Mid-western hospital complex. Non participant observations were commenced on 22nd February 2010. No difficulties or problems were encountered during the data collection process. It is suggested that the smooth access to sites and potiential participants was due to the attention to detail when collaborating with the gatekeepers. Much time was spent in liaising with both gatekeepers

and potiential participants in organising and agreeing the data collection processes. Throughout this period the emphasis was on working around their workloads and time constraints thus minimising any disruption.

4.6 Sampling

Sampling involves selecting a group of people, events, behaviours or other elements with which to conduct a study (Burns & Grove 2003). The approach to sampling within the original research proposal was informed by the work of Glaser & Strauss (1967) and Glaser (1978, 1998) in that the use of theoretical sampling is required in grounded theory**.** The research population identified for this study were nurses working in the perioperative setting. The sampling was initially purposeful followed by theoretical sampling in developing the core concept. Initially nurses working in perioperative settings in hospitals within the Mid-Western region of Ireland were invited to participate in the study. Secondly nurses who attended a perioperative theatre conference were also invited to participate in the study. Five nurses expressed an interest and agreed to be interviewed following on from the conference. The data collected from these interviews were similar to the data already collected

Theoretical sampling was utilised to gather in-depth and broad data to inform and develop a theory. Theoretical sampling is sampling for ideas and involves the process of data collection directed by the evolving theory. The emerging codes and categories from the data directed future data collection by focussing on this new specific pattern and explored these in each subsequent interview and incidents. The goal was to gain a deeper understanding of the main concern and facilitate the development of concepts. Theoretical sampling continued until data saturation was reached. Saturation of categories occurred when no new properties emerged for the core concept and sub core concepts.

4.6.1 Profile of Participants and Non Observation Sites

The profile of the participants varied with, gender, age, experience, rank and education

experience. They worked across the settings of operating room anaesthetic room and recovery room. Thirty seven perioperative nurses participated in the formal interviews. Profile as outlined below.

Figure 1. Profile of Participants

Gender	Age	Qualified	Position	Education	Perioperative Courses	Sites
35 Female	22- 63	1-35 years	24 RGN*	5 PG*	27	8
2 Male			3 CNM* I	14 Degree		
			9 CNM* II	9 Diploma		
			1 CNM* III	9 Certificate		

- *CNM Clinical Nurse Manager
- *RGN Registered Nurse
- *PG Post Graduate (level 9)

Non participant observations were undertaken in seven different perioperative areas (theatres and recovery settings) within three different sites. At each theatre there was a minimum of three nurses in the room and at least one surgeon and one anaesthetist present.

4.6.2 Setting

Interviews should be undertaken in as natural an environment that is available with simple access and where participants can feel relaxed (Savin-Badden & Howell-Major 2013). Morse & Field (2002) suggest that choice of venue should be given to the participant. In all cases the participants were asked to choose a venue of their choice and convenience. Interviews were conducted in varied settings: the researcher office at her place of work, her home, a vacant room or office in the participant's hospital or the participant's home. The research settings in all cases were comfortable for the participant and conducive in undertaking the interview. Regardless of the venue refreshments were made available and all necessary equipment was at the ready; audiotaping equipment, notepad, pens, batteries, subject information sheet and consent forms.

4.7 Data Collection

Data collection methods are utilised to gather information in a systematic way (Savin-Baden & Howell Major 2013). Data utilised in quantitative studies are of a numerical nature and require statistical analysis whereas data utilised in qualitative studies are text-based and subject to coding. Within the literature different types of data collection methods were identified. The most common types were physiological measurements, psychometric instrumentation, questionnaires, interviews, focus groups and observations (Houser 2008). The survey method is the most popular data collection method which collects information about experiences, behaviours, attitudes or perceptions (Brewerton & Millward 2003). Whereas interviews collects rich data and allows the researcher to explore topics as they arise (Houser 2008).

In keeping with classic grounded theory the research field was entered immediately following ethical approval which was at a very early stage of the research process (Glaser 1978, 1998). For the purpose of this research study data was collected through interviews and non-participant observations during 2008–2010. Data was collected formally with thirty seven perioperative nurses (two men and thirty five women). In keeping with ethical principles a letter of invitation was give to each participant (Appendix XI) and they were also requested to sign a consent form (Appendix XII) declaring they understood the process and the study they were engaging in (Savin-Baden & Howell Major 2013).

Overall fifty hours of interviewing was recorded, excluding time spent with participants, prior to the interview getting to know them and building up a rapport, or after the interviews in social conversation. All data collected was stored in the researchers password protected computer. Data collection was “controlled by the emerging theory” in that the emerging codes directed future data collection (Glaser 1978 p36).

4.7.1 The Interview Process

The purpose of the interview is to collect descriptions of the world of the participant in respect to understanding the meaning of the described experience (Kvale 2007). Interviews are an intentional form of data collection that can yield information on a specific research question and can be used to probe and follow up (Savin-Badden & Howell-Major 2013). There are many types of interview: face to face, telephone and internet (Opdenakker 2006). Face to face interviews have long been popular in qualitative research and are a personal form of research as the researcher speaks directly with the participant (Savin-Badden & Howell-Major 2013). Interviews can be synchronous (in real time) and asynchronous (independent from time and place) environments. Face to face interviews are synchronous communication in time and place which uses social cues of participants such as voice, intonation, body language etc. This information can be included in the interview field notes, whereas telephone and internet are asynchronous and social cues are less or not important sources of information (Opdenakker 2006). Interviews are a well-recognised, credible and respected form of data collection by qualitative researchers (Savin-Badden & Howell-Major 2013). The drawback to interview is that it places a large responsibility on the skill of the researcher (Houser 2008). Face to face interviews are time consuming, resource intensive and may be expensive due to travelling expenses (Opdenakker 2006, Houser 2008, Savin-Badden & Howell-Major 2013). The quality of the interview is dependent on the questions of interviewer and the honesty of interviewee (Kvale 2007, Savin-Badden & Howell-Major 2013).

Within this study the interview process allowed for in-depth exploration of the phenomena through broad introductory questions followed by probing questions. According to Morse and Field (2002) the interview is a conversation with a focus. Unstructured interviews varied from being extremely planned initially to free flowing as the process developed using an unstructured approach. The in-depth discovery and exploration of participant's experiences, feelings, perceptions, viewpoints and behaviours was the main focus of the study. Once participants made contact, the interview arrangements were made for a date, time and venue of their choice.

Every effort was made to remain open and transparent and establish rapport with participants throughout the interview process. It was essential to be aware of the importance of putting participants at ease and taking time to acknowledge their contribution and commitment in being involved in the research. This introduction to every interview aimed to open up the conversation where the intention was to stimulate and share conversation and generate rich data. An information sheet was given to each participant (Appendix VI) regarding the research study which enabled an informed judgement to be made by the participants on whether to participate in the study. Written consent was obtained from all participants prior to commencement of the interview by requesting them to read and sign the prepared consent form (Appendix X11). Throughout the research confidentiality was paramount in safeguarding the participants' details, in accordance with the ethical guidelines. These principals include the right of protection and freedom to withdraw.

Initially interviews were carried out using a general interview guide (Appendix XIII). However this quickly moved to a more focused interviewing approach as the researcher wished to follow up on the information being identified. There was continuous interplay between data collection and analysis. A broad introductory question utilised during the interviewing process as the discovery of participant's main concern of working in the area was paramount. The participants were actively listened to and detailed field notes were written up following each interview. All information was considered as data. Participants had no difficulty in revealing their thoughts about the perioperative setting. Key areas which emerged through the data collection process include routines, organisational practices and how people adapt to changing situations and were probed for further clarity. The length of the interviews varied between twenty five minutes to ninety minutes and the venue was chosen by the participants.

The first fifteen interviews were recorded and transcribed: the following twenty two interviews were recorded contrary to Glaser's (1998) recommendations. This was mainly due to the lack of confidence in the researcher. Being a novice to classic grounded theory the researcher was apprehensive and afraid that vital data would be missed and needed the

reassurance of being able to replay the interview and recheck coding. Field notes were taken for all interviews and observations (Appendix XIV). During non-participant observations perioperative nurses were observed in the clinical setting and conversations were listened to.

4.7.2 Non Participant Observations

Observational research is used for studying observable on-going behaviours and is normally non-invasive (Creswell 2003). There are two main types of observational research; non participant also known as indirect and participant also known as direct. Non participant is watching on-going behaviours that occur naturally in the setting and recording data unobtrusively and has no intervention by the researcher. In this situation the participants are either unaware or have become familiar with the observations. Its advantage is that it measures what behaviour is really like but the disadvantages is that we do not know the reason for the behaviours or if it is a representative of what normally occurs (Houser 2008).

With Participant observation, participants agree to be part of the research. Here, the researcher intervenes in the environment by being a member of a group in order to observe behaviour and the participants know that they are being observed (Houser 2008). The advantage of participant observation research is that it allows information to be collected that one wouldn't have otherwise had access to while remaining relatively natural. The disadvantages of participant observation research is that the participant being observed have no opportunity to provide informed consent to be a participant in the research and objectivity may be lost which may influence what being measured.

While undertaking the non-participant observation the researcher dressed in theatre attire in order to meet the dress code for the perioperative setting and blend into the environment. On arrival to the perioperative complex the CNM3 or CNM2 was met on each occasion.

As a visitor, conducting non participant observation, clarification and confirmation was obtained regarding the appropriateness of entering each individual theatre from a work load and person involvement perspective. On entering individual theatres introductions were made with the person in charge and other members of staff and a brief explanation of the research study was given again. Offers to leave if required due to complex procedures or unexpected events was never reqested by a theatre manager or required. Non participant observations were undertaken observing for patterns of behaviour of the nurses working in the setting which meant observing both individual and teamwork in action. These observations sessions also provided opportunities to talk to all staff during quiet periods. These informal conversations allowed questioning about their practice when seeking explanations and clarity on different situations in understanding what was actually occurring. These informal conversations became part of the observation data collection. Memos were written during and following non participant observations (Appendix XV). Coding of the nurses behaviour was similar during non participant observations and interviews as similar incidents and behaviours presented themselves. However the pattern of behaviours were easily called during non participant observation as the nurses were doing the action as opposed to telling you about it. The observation gave greater insight in how the theoretical coding could weave the emerging concepts together to form a theory.

4.8 Theoretical Sensitivity

Theoretical sensitivity is described here to aid clarity to data collection. It is acknowledged that theoretical sensitivity pervades all aspects of data collection, data analysis and generation of theory. Theoretical sensitivity relates to the insights, in understanding the meaning, nuances and delicacy of the data in developing conceptually dense theory (Glaser, 1978, 1992). As Glaser & Holton (2004) suggest adhering to the principal of coding and constantly comparing the data, supports theoretical sensitivity in generating concepts from data and linking them together in developing a substantive theory. There was no preconceived idea that participants would identify the area of risk or safety as their main concern but had considered that stress may be a large concern in the perioperative setting. Furthermore, some of the confusion surrounding the methodology allowed theoretical sensitivity to occur as extra time was spent immersed in the data

becoming familiar with the nuances and intricacies of the participant's words and actions, memoing and coding thus allowing the theory to emerge. Secondly, the duration of the data collection and analysis, methodological reading and attendance at grounded theory workshops in San Francisco, New York and Malmo allowed the development of theoretical insight to occur through listening to grounded theory fellows speaking and other grounded theory troubleshootees and receiving feedback on one's research. This developed understanding of the research method together with reading and studying it. The following section will look at the part memos played in the research process.

4.8.1 Memos

Data collection, note-taking, coding and memoing occur simultaneously from the beginning of the research. Memos were written before interviews, immediately following interviews, non-participant observations and when reading and reviewing the interview transcripts so that the ideas would not be lost. They were also written on codes, concepts and categories (Appendix XVI). Memos were written in a notebook or on scraps of paper, which were later typed up within three to five days and kept in a password protected computer. The typing of the memos encouraged familiarisation with the memo pile through reading memos again and allowing the memos to be expanded on should another idea/ connection occur, which may have improved the explanatory explanation of the concept or category. Modification of the memos when typing only occurred as growth and realisation occurred. Memos were written whenever and wherever the ideas emerged in the interview venue, office, car, in bed or at home. They were the subject of field notes and consisted of ideas, comments, concepts and theoretical notes recording ideas that emerge during the data collection and analysis process, which assisted in developing concepts and aided the theoretical write up of ideas about codes and their relationships. They were kept separate from the data but referenced to interviews, non-participant observations and field notes. Each memo was titled and dated.

Memos were written continuously until a rich memo bank was formed, demonstrating how, when and where the early concepts and categories were derived from. Once the main

concern was identified memos were also written on minimising risk and maintaining safety (Appendix XVII). They were then sorted into piles comparing them one with another and identifying relationships between the different categories. Combining memos into relevant piles was eased through having memos typed as it enabled cutting and pasting of the different memos and moving them to the appropriate categories in a new word document. Different colour fonts were assigned to coding categories and sub core categories, which was then cut and pasted in separated word documents. Over five hundred memos were written allowing the conceptual development of the theory. By integrating codes the core variable and its categories emerged explaining the main behaviour of nurses working in the perioperative setting (Appendix XVIII). This core category was central and reoccurring frequently in the data that related easily and meaningfully to other categories. The memoing helped to increase the level of thinking and the connections and relationship of the theory to the data. Memo writing throughout the process enabled conceptualisation of the data. Data analysis and data collection occurs simultaneously in classic grounded theory (Glaser 1978) looking for all possible coding options. The following section will now consider how the data was analysed.

4.9 Data Analysis

Analysis in classic grounded theory is undertaken primarily through coding. Coding is a dictum of grounded theory and consists of naming and conceptualising what is happening in the data (Glaser 1998). The study adhered to the properties of conceptualisation in undertaking the study. Glaser (2003, p. 51) suggests that conceptualisation consists of: "the conceptual naming of latent patterns of behaviour, which are categories and properties, the lasting grab of the concept and that the concepts are abstract of time, place and people". The relationship between the data and the theory is identified as a conceptual code, which conceptualised the underlying pattern of behaviour and empirical indicators. Within this study, it is acknowledged that social reality is conceptualised and related in terms of how people see the world and how these perceptions direct their behaviour towards others. Therefore the emerging data was grounded in participants' actions and patterns of behaviour, which then conceptualises the way these perioperative nurses resolved their main concern on a daily bases in part taking in their work.

Two types of coding are used in grounded theory substantive and theoretical. Preliminary analysis began with substantive coding, which consisted of open coding and selective coding. Open Coding: As data was collected initial open coding began whereby names and codes were given freely to the interview content. Initially all transcripts were read for familiarisation with the data, looking for patterns of behaviour (incidents) as opposed to seeking themes within the data, which was difficult to comprehend. Many attempts at open coding were undertaken and the then the understanding of the need for experiential learning when undertaking classic grounded theory was realised. The first four transcripts were recoded for patterns of behaviour. However, as the interviews increased and the data was openly considered in many different ways using Glasers (1978, 1998, p. 140) four questions about how to explore the emerging data. 1) "What is this data a study of? 2) What category does this incident indicate? 3) What is actually happening in the data? and 4) what accounts for the basic problem and process?' A greater understanding of classic grounded theory occurred when concepts and patterns of behaviour began to emerge. Management of the data was systematic (interview/non participant observation was given both a number and date), organised (all memos and code were titled, dated and linked to interviews/nonparticipant observations) and readily assessable and traceable back to the data within word documents files. This was managed through Microsoft word package.

Open coding was carried out following each interview so that incidents and codes identified were incorporated into the analysis of the next interview. Data was analysed using line by line in vivo coding (e.g. checking swabs, checking instruments and checking surgical lists) looking for codes in each sentence or paragraph and then memoing on these codes until the concepts began to emerge. All concepts and their properties were derived from the coding procedure such as words, sentences and phrases that specified behaviour. Coding was written in the large margins on the side of field notes. A document was prepared and divided into three columns for each interview using the headings: transcript, codes and concepts. This allowed the writing of the codes and concepts next to the transcript, which allowed the traceability of concepts back to the data. Analysis yielded codes, which had probable meaning and relevance. Memos were written continuously when coding. These were reduced and grouped into categories during constant comparison method by comparing data and looking for similarities and differences across incidents

(Moghaddam 2006). Open coding continued until patterns started to emerge from the data. In identifying the core category concepts began to emerge from the early interviews. Following interview five when presenting the initial concepts at the grounded theory workshop in San Francisco it was thought that the study centred on a structured environment and the ability to momentary adapt when the need arises. However on further interviewing it became clearer that the central reoccurring concern to emerge from the data was minimising risk in the high risk setting of the perioperative area. Therefore main concern for nurses working in the perioperative setting emerged as minimising risk in a high risk setting. This core category of minimising risk emerged from the data as a result of the rigorous process of constant comparison method.

Selective coding: When the core category emerged, concepts were then delimited by selectively coding for the core and its related categories. More focused questions were used during the interview process, which centred on the emerging theory. Selective coding was interrupted to memo as ideas and connections to other concepts occurred. In undertaking theoretical sampling selective coding became more focused and the categories became saturated. An examples of selective coding occurred when open code such as checking swabs, checking instruments and checking the surgical list was conceptualised into habitual checking. When saturation of the core concept and the related sub categories was accomplished the memos were looked at and sorted for their connections and relationship to the core concept. During memo sorting the relationship between the concept of habitual checking and category of routinising emerged. Any category not related to the core concept was omitted as suggested by Glaser (1978).

While the data was initially coded using invivo/open coding these moved to more abstract conceptual codes through the constant comparison method and codes were modified to best fit the emerging theory. Memos were written continuously during this time capturing the ideas and connection that emerged from the data. The selected memos aided the write up of the theory as they raise the data to a conceptual level, assisted in the development of properties, presented hypotheses about relationships between categories and reduced confusion.

On further interviewing the core concept of anticipatory vigilance emerged as resolving the concern of minimising risk since it accounted for and explained much of the variation in the pattern of their behaviour. This was arrived at through looking at the data to see what was central and what kept reoccurring within the data. The concept of anticipatory vigilance was present in the data when undertaking selective coding. Memos were written on anticipatory vigilance (Appendix XVIII) and its relationships to other categories. It appeared to have lasting 'grab' beyond the substantive field. Other concepts were considered at this time such as constantly watching and constantly monitoring but on memoing they did not capture the essences of the patterns of behaviour. Therefore anticipatory vigilance emerged as the core concept . The non-participant observations helped to verify and saturate the data for the core category and its related categories of orchestrating, routinising and momentary adapting. As suggested by Glaser (1998), data collection was discontinued when no new properties of categories emerged when data saturation occurred.

Conceptualisation is carried out by the constant comparison method. Constant comparison was used to analyse the data received from the participants. This was done by comparing the data seeking out emerging patterns of behaviour and looking at what was similar and different across data incidents (Moghaddam 2006). This systematic analytic process as identified by Glaser (2004) involves comparing incidents to incidents (establishing underlying consistency and its varying conditions), which then became concepts. Then, comparing these new concepts to more incidents (generating new theoretical properties of the concept and hypotheses) and finally comparing concept to concept. This guided the conceptual refit of early concepts such as the concept of professional knowing becoming advanced knowing, the concept of contextual adapting becoming momentary structuring and finally becoming temporary restructuring, the concept of legality awareness becoming rule following, the concept of anticipatory expectations becoming heightened awareness and the concept of turn taking becoming rapid responsible responding. Conceptual refit of the concepts occurred when it became obvious that the concept required modification. Reading what had been written on the concept identified the modification required and aided development of conceptual refit. This allowed an improved explanation of the concept, which was more workable, had fit and had relevance for the data.

Theoretical codes are the relational model in how the substantive codes/categories are related to the core category (Glaser 2009). They are the building blocks in classic grounded theory (Glaser 1978) in enabling the thinking through of the main types of relationships between categories within the theory (Gibson & Hartman 2014). Theoretical coding can be implicit or explicit and conceptualises how substantive codes relate together and integrates into the theory (Glaser 2005) as interconnected multivariate hypotheses in explaining how the main concern is resolved (Glaser 1998). Substantive codes break down the data while theoretical codes weave the data back together again (Glaser 1978) into an organised theory (Glaser 1998). Theoretical codes offer a selection of options for the integration of substantive codes, categories and their relations. The choice of a particular theoretical code as the overarching code or most relevant code should reflect best fit with data and emergent categories (Glaser 1978).

On reading pertinent sections in the methodology books on the eighteen families of theoretical codes (demonstrating the myriad set of relationship that could be discovered between variable when writing up and integrating the theory), memos were written on the different aspects of different coding families. As each theoretical code was considered it was looked at for relevance and fit to the data. A discussion also took place with the supervisor in gaining understanding of how the integration of theoretical codes unfolded when writing the theory. Therefore after much reading on theoretical codes, reviewing concepts and writing memos, the interrelationship between the categories and the relationship to the core emerged. The strategy family (which includes, strategies, tactics, mechanisms, managed, way, manipulation, manoeuvring, dealing with, handling, techniques, ploys, means, goal, arrangements, dominating, positioning) and the six Cs (which included causes, context, contingencies, consequences, covariance's, conditions) emerged as the overarching theoretical codes. These theoretical codes enabled connections between the substantive categories and their properties when memoing. The discovery of the six C's and the strategic family integrated the substantive theory after the core category had emerged and the categories were saturated, which occurred during the selective coding phase. These theoretical codes integrated and aided the write-up of the substantive theory resulting in a more complex and multivariate theory through maintaining a conceptual level when writing about concepts and the relationships and preventing overuse of endless

illustrations. Glaser's approach of using theoretical coding for integrating the core concepts and the main concern was adhered to. This approach was useful in relating the core to sub core categories, which emerged from the data and this then assisted the theory write up.

4.9.1 The Audit Trail of a Code

Invovo codes/ open Codes	Checking counts Checking instruments Checking swabs Checking Lists Looking at lists Seeking lists Writing up lists Checking patient consents Checking patient notes Checking surgical sites Doing checks Constantly counting
Connection to Selective Coding	Conceptualised to habitual checking
Connection to Category	Habitual checking explained as a dimension of routinising
Connection to Core Concept	Routinising is a category of anticipatory vigilance
Connection Core Category	Habitual checking is a dimension of routinising, which is a category of anticipatory vigilance. Anticipatory vigilance minimising risk in the perioperative Setting
Theoretical Codes	The theoretical coding families: Strategy family and 6C's offered options for the integration of substantive codes, categories and their relationships to the core concept and core category.

The following section will consider the ethical consideration of the research which should always be foremost in the research process.

4.10 Ethical Consideration

Protection of the rights of participants was paramount during this study in keeping with the Nuremburg Code of Ethics 1949 (Beauchamp *et al*. 2008). Ethical approval was sought and granted from three different ethical committees between 2008 and 2010 (Appendix III). Further ethical approval was sought and granted from UCC Clinical Research ethical committee in 2009 broadening the sample site. (Appendix III). Initially ethical approval was obtained and limited to one year, which is a normal duration for the approval process within health service guidelines. Following one year an extension for ethical approval was sought to continue interviewing, which included the additional application for non-participation observation from HSE Midwestern regional hospital complex in December, 2009 and granted in February 2010 (Appendix XIX) with the aim of enhancing the quality of the data collection. No amendments were requested and no difficulties were encountered with either application. Ethics is a system of moral values which are concerned with the researcher's adherence to professional, social and legal obligations to participants (Polit *et al*. 2001, Polit & Beck 2006). Ethical guidelines as laid down by the Belmont Report (1978) and the International Council of Nursing (2006) is in keeping with Parahoo (2006), Burns & Grove (2003), An Bord Altranais guidelines (An Board Altranais 2007b). Polit & Beck (2004 p481) suggests that ethics in research involves the principles of respect for all persons, together with beneficence and justice which are always pertinent to the conduct of research.

The Belmont Report (1978) identifies three ethical principles, respect for the persons, beneficence and justice, while the International Council of Nursing (2006) established six ethical principles to protect the rights of the participants in nursing research. They are beneficence, non-maleficence, fidelity, justice, veracity and confidentiality. All principals were considered and adhered to for the research. Beneficence denotes that participants should benefit from the research in some way for example the research should add to the body of knowledge on the subject under research (Parahoo 2006). Non-maleficence denotes that the research should not cause any harm to participants in the process of carrying out the research (Burns & Grove 2005). No potential risks for the participants were identified in the present study. In accordance with the ethical principle of autonomy

(Polit & Beck 2013), each participant was made aware that they were free to withdraw from the study at any stage. Fidelity is concerned with the building of trust between the researcher and the participant (Polit & Beck 2006). This was done by creating a rapport with participants by making them feel comfortable and by speaking with them, giving a good explanation of the study thereby ensuring that they fully understood the reason for undertaking the research. Establishing the credibility of the researcher's intent to research the area of nursing within the perioperative setting was done by giving an overview of the researcher, clinical and academic history and the reason why she wished to research this area. Justice is about being fair and equitable. Justice for participants ensures that the researcher did not preference one participant over another by emphasising that their needs came before the needs of the study (Polit *et al*. 2001, Polit & Beck 2006). This was accomplished by treating each participant with respect and dignity and emphasising the voluntary nature of their participation. Veracity denotes that the truth must be told about the research at all times even if it leads to the withdrawal of participants. Being economical with the truth can be interpreted as a form of deception (Parahoo 2006). When undertaking the face to face interviews there was an ethical responsibility to respect and uphold individuals' right to anonymity, privacy, freedom from harm, and autonomy within the study. In ensuring this, informed verbal and written consent was obtained from all participants. Participants were given a clear explanation of the aim and objectives of the proposed research prior to commencement of the study. They were informed of their rights and these were adhered to throughout the study.

Confidentiality and anonymity are concerned with keeping the identity of participants protected (Grbich 1999). This was done by creating an atmosphere of privacy (participants identified the venue, and time of the interview) and by using psuedonym on the transcripts. Identifiers of person and place were removed from all data including tapes, transcripts, coded material and the final report. All data was stored in a password protected computer. To preserve anonymity, code numbers (participant 1, 2, 3 etc.) was given to the tape recordings and written transcripts, thus avoiding linkage of the transcript to an individual participant. The participants were informed of their right to withdraw at any time without consequence. Ethical guidelines were adhered throughout the study: right of determination, privacy and dignity, anonymity and confidentiality, protection from discomfort and harm

(Burns & Grove 2003, Polit & Beck 2004, Liobindo-Wood & Haber, 2006). The provision of an information sheet enabled an informed decision to be made by participants on whether to participate in the study or not. This research did not involve any interventions and could be classified as low risk and therefore no harm was anticipated during interviews.

The two most common ethical issues are informed consent and privacy (Polit & Beck 2006). Informed consent permits people to protect their own interests when participating in research and incorporates giving relevant information on the study to them (Polit *et al*. 2001). During all stages of recruitment for the study a subject information sheet (Appendix VI) was provided and distributed to potential participants. Participants were requested to sign a consent form (Appendix XII) declaring that they understood the process and the study they were engaging in. Participants were fully informed in writing on the research and their responses were kept private. Potential participants were reassured that all data obtained would be stored in a password protected computer. Assurances were conveyed to all participants with regard to confidentiality and anonymity. These principles underpinned all aspects of the research. Protection of the rights of participants was paramount during this study.

4.11 Search Strategy for Discussion

The literature was considered again once the core category (minimising risk), core concept (anticipatory vigilance), theoretical codes (Strategy Family and Six C's) and the shape/outline and structure of the theory (categories and subcategories) had been formed. Initially literature was reviewed and considered around the area of risk, safety, nursing and perioperative nursing. Following on from this, a literary search was undertaken for other theories on risk using electronic data bases to see if there were similarities and/or differences in relation to healthcare. MeSH headings and key words included: 'theory', 'risk', 'nursing', 'healthcare' and 'perioperative nursing' These were then combined using Boolean operators through the 'track searches' feature in the selected databases. The

terms combined included; (“risk AND theory”), (“nursing AND theory AND risk”), (“healthcare AND theory AND risk”),

Then as the name of the theory was anticipatory vigilance, the literature was once again searched for theories on vigilance using the electronic data bases. MeSH headings and key words included: ‘theory’, ‘risk’, ‘nursing’ and ‘healthcare’. These were then combined using Boolean operators through the ‘track searches’ feature in the selected databases. The terms combined included; (“vigilance AND theory”), (“nursing AND theory AND vigilance”). This presented the early vigilant theories written with regard to industry and aviation. On sourcing these early theories, it was essential to go through interlibrary loan to access and retrieve those early textbooks for to gain understanding and clarity on the theories. On reading the early complex textbook, it seemed prudent to consider other literature from the unrelated fields to nursing and healthcare such as aviation and Industry. Once again the electronic databases were search. MeSH headings and key words included: ‘vigilance’, ‘risk’, ‘industry’ and aviation’. These were then combined using Boolean operators through the ‘track searches’ feature in the selected databases. The terms combined included; (“vigilance AND industry”), (“vigilance AND aviation”). This was then limited when risk and safety were added to the literature search. This literature was considered for its relevance and position for increasing understanding, when writing the discussion chapter on how the literature and/or theory contributed or expanded the theory of anticipatory vigilance. This literature enhanced the discussion and identified how the theory of anticipatory vigilance added to the body of knowledge.

Ensuring that the literature was reviewed thoroughly, help and support was requested from the librarian in searching the databases. The literature was then considered with regard to trusting relations and the categories of orchestrating, routinising and momentary adapting. A literature search of the electronic data bases was commenced for orchestrating, MeSH headings and key words included: ‘management’, ‘nursing’, ‘perioperative nursing’ and ‘risk’. These were then combined using Boolean operators through the ‘track searches’ feature in the selected databases. The terms combined for relevancy included; (“management AND nursing”), (“management AND nursing AND risk”), (“management

AND nursing AND risk AND vigilance"). Similarly a literature search of the electronic data bases was commenced for routinising. MeSH headings and key words included: 'routine', 'routine practice', 'nursing', 'perioperative nursing', 'vigilance' and 'risk'. These were then combined using Boolean operators through the 'track searches' feature in the selected databases. The terms combined for relevancy included; ("routine AND nursing"), ("routine" AND nursing AND risk"), ("routine" AND perioperative nursing AND risk"), ("routine practices" AND 'nursing') and ("routine practices" AND nursing AND risk AND vigilance"). Similarly a literature search of the electronic data bases was commenced for momentary adapting. MeSH headings and key words included: 'adapting', 'responding', 'nursing', 'perioperative nursing', 'vigilance' and 'risk'. These were then combined using Boolean operators through the 'track searches' feature in the selected databases. The terms combined for relevancy included; ("adapting AND nursing"), ("adapting" AND nursing AND risk"), ("adapting AND perioperative nursing AND risk"), ("responding" AND 'nursing') and ("responding" AND 'nursing' AND risk AND vigilance"). Finally the literature search of the electronic data bases was considered for trusting relations. MeSH headings and key words included: 'trust', 'relationship', 'nursing', 'perioperative nursing', 'vigilance' and 'risk'. These were then combined using Boolean operators through the 'track searches' feature in the selected databases. The terms combined for relevancy included; ("trust AND relationship"), ("trust AND nursing"), ("trust AND nursing And risk"), ("trust AND perioperative nursing AND risk"), ("relationship" AND 'nursing') and ("relationship" AND 'nursing' AND risk AND vigilance"). All of these individual search strategies aided a detailed review of the literature.

4.12 Summary

This chapter discussed the application and operationalisation of the methods of classic grounded theory in identifing the main concern for nurses in relation to the challenges they face on a daily basis working in the perioperative setting. It has considered the practical implications of using and applying a grounded theory method in the field of perioperative nursing. It identified the decisions taken during the emergence of the substantive theory. Ethical approval was sought and granted from three different ethical committee boards.

The study was undertaken within the perioperative setting across eight different teaching hospitals. It looked at how participants were accessed and recruited, how theoretical conceptualisation was sought within the concepts. This provided the way for the theory to emerge connecting and integrating concepts into categories which gave an explanatory power to the data. The data collected, was analysed in terms of naming of a social pattern of behaviour (concept) grounded in the data obtained through interviewing and observing nurses in the perioperative setting which lead to the development of an explanatory theory. By adhering rigorously to the classic grounded theory methodology challenges and confusion was overcome.

Classic grounded theory has enabled the development of a conceptual explanatory substantive theory which offers an explanation of what the main concern is for perioperative nurses and how they resolve this issue. This theory demonstrated the process through which staff in the perioperative setting minimise risk. In keeping with the principles of classical grounded theory, the theory of anticipatory vigilance emerged and is traceable back to the data connecting and integrating concepts into categories through theoretical coding. Grounded theory enabled the development of the theory of anticipatory vigilance that will have an impact and potentially influence practice in the substantive area in the future.

5 Chapter Five: Theory Chapter

Chapter four presented the operationalising of grounded theory for the current research. This study focused on nurses working in the perioperative setting. The core category to emerge from the data was anticipatory vigilance. This chapter will present an explanation of the theory of anticipatory vigilance. Identifying this substantive theory has given insight into what is currently the main concern of nurses working in the perioperative setting.

5.1 Outline of Theory of Anticipatory Vigilance

The main concern of nurses working in the perioperative setting is minimising risk and this is resolved through the process of anticipatory vigilance. Anticipatory vigilance refers to a pattern of behaviour in which nurses engage in and are committed to, in ensuring that patients' exposure to risk is minimised while in the perioperative setting. It is where staff anticipates, watch and act upon what they observe and hear in order to minimise risk. The nurses' main concern of minimising risk to ensure safety is related to achieving a positive and successful experience for all patients in their care before, during and after surgery. Anticipatory vigilance is essentially a theory of minimising risk in a high risk highly structured environment. It is a constant and fundamental behaviour that attempts to ensure that behaviours and practices are noted and acted on by anticipating and actively responding effectively to any event or activity associated with risk. When done successfully anticipatory vigilance creates and maintains a safe environment thus minimising risk. Nurses engage in and practice anticipatory vigilance in three ways, through orchestrating, routinising and momentary adapting. These are intrinsically linked through trusting relations. Each category has a related dependency to one another in assisting and shaping the theory of anticipatory vigilance.

Orchestrating is a strategy employed by nurses in managing people and workloads in the perioperative setting in carrying out the safe management of the department. Orchestrating consists of macro orchestrating, locational orchestrating, situational orchestrating and

being in the know. Routinising provides structure for organising, planning and implementing activities within the setting. Routinising consists of habitual checking, rule following, mutual watching and mutual dependency. Momentary adapting is the strategy used by nurses in responding to unscheduled or unexpected events which is part of daily work. Momentary adapting consists of heightened awareness, responsible responding, temporary restructuring and advanced knowing.

Each category is related to one another and in turn is related to anticipatory vigilance as strategies that minimise risk in the perioperative setting. Orchestrating creates the structural conditions for anticipatory vigilance to occur through delegating different roles to nurses. The orchestrating of people and workloads support routinising, which in turn creates a systematic and structured approach to work practices. Routinising underpins all levels of orchestrating and is co-dependent. Orchestrating underpins momentary adapting, as through good planning it enables momentary adapting to occur smoothly and safely in response to an unexpected event.

Each category may be independent or interdependent as the predictability and unpredictability of situations arise. Altering circumstances when something unexpected occurs influence how anticipatory vigilance is practiced. How anticipatory vigilance is enacted is situational dependent and will be outlined below. The theory will be outlined in the following sections, starting with trusting relations since it is fundamental to anticipatory vigilance. Figure 2 presents the outline of the categories and properties/dimensions of anticipatory vigilance.

Figure 2: The Categories and Subcore Categories of Anticipatory Vigilance

	Category	*Property/Dimension*
Trusting Relations	**Orchestrating**	**Macro orchestrating**
		Locational orchestrating
		Situational orchestrating
		Being in the know
	Routinising	**Habitual Checking**
		Rule Following
		Mutual Watching
		Mutual Dependency
	Momentary Adapting	**Heightened Awareness**
		Responsible Responding
		Temporary Restructuring
		Advanced knowing

5.2 Trusting Relations

Trusting relations is a necessary precondition for minimising risk through anticipatory vigilance. It underpins the whole process and ensures the effectiveness of orchestrating, routinising and momentary adapting. Trusting relations is indicated by listening, abiding by requests made by others and joint decision making. Building trusting relations takes time and involves interaction where rapport is built through working together, recognising strengths and weakness of colleagues. One nurse suggested that:

> The presence of trust is required within all relationships between the multidisciplinary team in the operating room (Participant 6).

Physical proximity provides opportunities that encourage the development of trusting relations. The presence of trusting relations minimises the intensity of anticipatory vigilance. Where trusting relations are lacking, anticipatory vigilance is heightened such as when senior nurses are working with inexperienced junior and/or unfamiliar staff. Where trusting relations are diminished (distrust may occur), senior nurses appear to be more overtly vigilant in considering the level of competence, interpersonal ability and

dependability. Having knowledge of the work experiences of colleagues, promotes trusting relations. Another nurse suggested that:

> For trust to be present you need to know and understand the people around you, so that you can know when and where you can trust. She suggested that a relaxed work ethic can only occur within trustful relationships which leads to a more relaxed and seamless work flow within the perioperative setting (Participant 19).

The greater the level of trusting relations between staff the less the need to engage in anticipatory vigilance. When trusting relations are present people speak and express themselves more freely. When trusting relations are good communication, cooperation and support of seamless work practices are facilitated. Trusting relations enable and support tasks being undertaken. The categories and subcategories of the theory of anticipatory vigilance will now be discussed.

5.3 Orchestrating

Orchestrating is fundamental to providing safety within the perioperative setting. It consists of macro orchestrating, locational orchestrating, situational orchestrating and being in the know which are dependent on one another. Orchestrating is essentially how people and workloads are managed in the perioperative setting and consists of effective and efficient planning, delegating, co-ordinating and communicating. It is carried out through macro orchestrating by different people depending on their knowledge, expertise and the task that is required to be undertaken. Orchestrating aims to increase positive patient outcomes through efficient managing, pacing and timing of how the work is done. By taking account of competency, risk is minimised by delegating appropriately; matching competency to task, which normally helps work performance. Orchestrating is a continuous process that occurs throughout the twenty four hour staff roster, seven days a week. Structures such as rosters and workforce planning promote safety through balancing levels of competence across the staff. Orchestrating creates the structural conditions for anticipatory vigilance to occur through people having different roles delegated to them. It

is essential in the management of the perioperative setting in providing order for staff to carry out their work. Efficient and effective orchestrating is exercised through clinical management and leadership roles within orchestrating. One nurse explained:

"When I'm planning the roster for staff, I have to figure out that there are different levels of staff for each theatre. The organisation and management of this is time consuming in ensuring that all staff get their time off and at the same time that the theatre is staffed. It is one of the several management roles within the operating room which are normally undertaken by Clinical Nurse Managers 3, Clinical Nurse Managers 2, Clinical Nurse Managers 1 and staff nurses" (Participant 7).

Orchestrating is a strategy employed whereby people may be appointed to or delegated a role within the setting. Another nurse explained:

That on reporting to the theatre manager at the beginning of a shift, the manager normally delegates different nurses to a particular theatre. Further delegation occurs thereafter in each individual theatre (Participant 25).

Orchestrating can be undertaken at department level, at a location level, and at an individual level. More specifically orchestrating consists of macro orchestrating, locational orchestrating, situational orchestrating and being in the know. Macro orchestrating will now be considered.

5.3.1 Macro Orchestrating

Macro orchestrating is the means by which workloads and responsibilities are distributed fairly. Macro orchestrating involves leading, co-ordinating and planning the day to day business of the operating theatre. It includes budgeting, resourcing, scheduling and rostering all theatres within the department. Several nurses commented that:

The Clinical Nurse Manager 3 needs to be a good planner, co-ordinator, organiser and a good delegator to ensure that the tasks are allocated in a safe and responsible manner. They plan the daily and weekly schedules (Participant 7, Participant 25, Participant 29 and Participant 33).

Macro orchestrating is an appointed authoritative role reserved for a particular person within the workplace. It is how the work of nurses is organised within the department through overseeing and delegating staff to perform tasks, thus ensuring that risk is minimised and patients have a safe and successful surgical experience. One nurse said:

"First thing in the morning I check the theatre list, the number of staff allocated to our theatre and the estimated time it will take to work through the surgical cases. We then look to the order and sequence of the lists for to organise who is doing what for the day ahead" (Participant 13).

It involves accountability and responsibility for the work of the department. Macro orchestrating occurs when the person in charge manages people and workload within the department/unit. Macro orchestrating is used for preplanning and is vital for the smooth management of the entire perioperative department. It involves supervising and overseeing nursing and auxiliary staff through the delegation of tasks and roles**.** Macro orchestrating ensures that work is normally allocated to people fairly so that work is equal and manageable across staff in the department. This ensures that staff know what is asked and expected of them within the allocated role. Normally macro orchestrating is enacted at the beginning of a work shift and can be undertaken by phone, documentation or face to face interaction. An essential component within macro orchestrating is the ability to skill match which requires delegation of an appropriate task to the right person based on levels of knowledge, experience and skill. One nurse told me that:

If a manager delegates something to somebody they must know that the person can do the task proficiently. A manager can't just put a nurse on call in the operating room unless they know they can do the job and be of a useful support to others (Participant 1).

When a person is macro orchestrating it is important to develop trusting relations with colleagues and co-workers in allocating different workloads within the department so that their abilities are matched with the task. Staff generally co-ordinate their work with their colleagues to complete an activity but adjust as necessary when required during both planned and unplanned events. Successful macro orchestrating is enhanced when there is mutual agreement on the allocated daily work achieved through delegation of task and activities. Macro orchestrating involves scheduling work, time planning and time management through preplanning workloads. When work is allocated without a clearly discernible plan, then there is a perception of lack of leadership and is more likely to lead to confusion. The position of power within the role of macro orchestrating can be used positively or negatively. The use of power in a positive way helps to motivate staff through support and encouragement, whereas the use of negative power demotivates by being unsupportive or discouraging to staff. The positive use of power enables staff to undertake their role more effectively especially when they are under pressure due to reduced staff, thus creating the conditions for anticipatory vigilance to occur. Macro orchestrating involves structure, control and organisation around all aspects of the work to ensure risk is minimised. This enables and supports the flow of work which is informed and guided by being in the know. One nurse explained how she perceived how seamless work flow occurs:

> She said that the days you go into the perioperative setting and things looked really easy from an outsider's viewpoint, is always the day that a lot more work has gone into the planning and organising of the day's events and at any given point you must be alert to and aware of errors that may occur when working in the theatre setting (Participant 6).

Macro orchestrating is fundamental to orchestrating activities within the department without which disorder would occur as there would be no systems or structure in place to minimise risk and maintain safety. Effective macro orchestrating is the basis for locational orchestrating and situational orchestrating through organising and delegating of various activities with staff to ensure that the daily work is done. Macro orchestrating is a senior management function and oversees locational orchestrating.

5.3.2 Locational Orchestrating

Locational orchestrating involves an identified person organising work and managing people within a particular theatre within the operating department. It involves either an appointed role at CNM2 level or a temporary delegated management role which involves being in charge of a particular theatre.

Macro orchestrating is a prerequisite for locational orchestrating. Macro orchestrating is concerned with the transference of responsibility to a person in charge of a specific location such as a single operating room. Locational orchestrating is concerned with co-ordinating the surgical list within a particular operating room, co-ordinating a smaller number of staff, scheduling procedures and overseeing staff performance. The role is normally undertaken by a CNM2 or a CNM1. One nurse said that:

> Each operating room is normally managed by either a CNM2 or sometimes a CNM1. These people in charge manage the workloads of the individual theatre and take part in all aspects of the work. Normally there are three to four nurses assigned to each theatre (Participant 22).

The person undertaking locational orchestrating works as a member of a team. This helps to provide the environment for people to get to know one another and form trusting relations by engaging in conversations with colleagues and judging each other's performances against their own. Locational orchestrating relies on collegial support and understanding which helps to promote the identification of an individual's capabilities strengths and limitations through establishing trusting relationships. Locational orchestrating endeavours to continue to uphold structure in maintaining a safety culture within a micro environment. A manager assigns roles and a person is delegated to a specific task. This allocation of tasks when carried out in a positive manner encourages staff to take responsibility and be accountable for their actions. The allocation of roles is normally an informal arrangement based on mutual agreement, however, this may become a formal instruction when an unexpected event occurs as specific tasks need to be undertaken thus reducing the occurrence of errors and risks. A nurse said:

"If I come on duty in the morning and have been allocated to check the anaesthetic machine, I have to check the gasses, equipment, suctioning etc. in connection with the machine. This is critical as otherwise when the anaesthetic machine is in use things could go badly wrong for the patients. So this is why we are always checking, the buck stops with me, so I have a responsibility to ensure that mistakes do not happen" (Participant 18).

Locational orchestrating facilitates workflow within the operating room by ensuring that everyone has an identified designated role. However part of the working life within the perioperative setting is the management of unscheduled events. This demands a change in staff behaviour due to the urgency of the task. Untoward events are normally dealt with effectively through locational orchestrating by identifying a team member who can deal successfully with the situation at hand. It is important to empower all team members through sharing responsibilities with different individuals within the theatre. Giving responsibility to different individuals within the team may promote decision making regarding assigned tasks and encourage greater individual autonomy and accountability. The nature of the decision making is influenced by what is happening at a given time. It is important to ensure smooth running of the department and it enables situational orchestrating to occur.

5.3.3 Situational Orchestrating

Situational orchestrating involves an individual organising and working with others to perform different tasks such as setting up sterile trolleys, scrubbing for an operation and carrying out the task in a specific and systematic manner. Situational orchestrating is influenced by the co-reliance of people within the environment when undertaking a task and is a delegated role. It is enacted through locational orchestrating. The individual who has been delegated the task has a responsibility to take on the role and the organisation of the task involved. Implicit within a delegated role is the expectation that an individual will undertake the task assigned. One nurse commented that:

Usually the CNM2 in charge of the theatre works with the team she has been given and appoints or delegats different surgical cases or jobs to different nurses. This depends on the workloads of the day and the experience of the nurses at hand (Participant 20).

Situational orchestrating has a co-dependency with both macro orchestrating and locational orchestrating as it is both a delegated and temporary role. Working with another team member on an assigned task facilitates and encourages mutual watching to identify and minimise potential risk.

Near misses (which are unplanned events that occur that do not result in harm or injury but have the potential to do so), are observed and managed through situational orchestrating as the individual is alert to and recognises potential error and takes the necessary steps to rectify or offset the situation thus minimising risk. Whilst situational orchestrating is enacted to minimise risk, staff are still reliant and co-dependent on other team members in carrying out the work safely. One nurse said that:

"In theatre all staff are dependent on each other and a person needs to feel safe with co-workers. So when a person sees a new face the first thing they think of is will they be safe today. That has a very bad impact on the poor misfortunate nurse who walked in the door. The first thing that happens is that the newcomer gets an interrogation about their experience and knowledge base" (Participant 3).

Situational orchestrating is important as it involves planning, preparing, managing and working as an individual and/or working with a small group of co-workers. Lack of preplanning and preparation for different tasks in the workplace may threaten the structural control of the environment and increase the potential for mistakes. Another nurses suggested that:

It is standard practice to lay out specific requisites for each surgical case like the basic pack for a hip replacement, and the correct surgical set, prior to the commencement of the theatre list. This activity ensures that everything has been collected so everything is in the right place at the right time (Participant 34).

Situational orchestrating is present when working as part of a team for the smooth running of activities in aiming to achieve positive patient outcomes. In the absence of planned situational orchestration, disorder may occur as an individual is not organised and the possibility for error and risk is heightened and anticipatory vigilance is altered. Within this disordered context anticipatory vigilance could be heightened or lowered depending on the

awareness of staff. Situational orchestrating endeavours to ensure good quality care as one takes full responsibility as an individual in managing varying types of activities such as providing individual patient care or preparing for a surgical case. Situational orchestrating differs from macro orchestrating and locational orchestrating as it is a delegated function. It is how the work is done. Individuals are delegated responsibility for a particular task consistent with their level of expertise. They must know what to do, when to do it and how to do it. This is related to and enhanced by being in the know.

5.3.4 Being in the Know

This is about being informed and being aware of what is happening within the setting. Its function is to enable nurses to understand what is happening in the operating room and is dependent on appropriate and timely communication. One nurse told me that:

> "being kept informed through good communication is very important in the operating room to ensure that nurses are informed at all times of what is going on around them, so that if things change which they can do on a minute to minute basis the perioperative nurse can adapt to the new situation. Good communications ensures smooth running of the operating room list and effective management of patients and staff" (Participant 2).

This is enhanced by forming purposeful and trusting relations with colleagues through verbal and nonverbal communication. Being in the know is a two way process in giving and receiving information from all staff on what is happening and is relevant for everyone**.** When communication is good and effective being in the know maintains the culture of patient safety as this ensures that people are up to date with what is happening around them. Being in the know keeps people informed thus making them more aware of their surroundings and more responsive to what is going on. When working in a high risk acute and complex setting being in the know enhances anticipatory vigilance as staff are more informed, trusting and responsive.

Being in the know facilitates orchestrating at all levels through providing varying types of information on people and activities within the department. Physical, emotional and mental presence is important in a high risk setting. It facilitates staff to carry out tasks in an informed, timely, competent, and efficient manner. Knowledge, training and heightened awareness are prerequisites for being in the know. Being in the know is a process that extends from having overall information regarding the operating department such as budgets to precise tasks and activities related to specific patient care issues and information related to colleagues. It helps to inform the response to both planned and unscheduled events as it allows a person to be prepared for and undertake any activity.

Being in the know is enhanced by documenting the care provided by the nurse as it provides a written record of nurses' contribution to the care given during the surgical experience. This provides information and written communication thus updating and informing others of what is happening. Non-verbal cuing also enhances being in the know, which is achieved through the observation of gestures, touch, body posture, facial expression and eye contact. Trusting relations facilitate being in the know through open communication, cooperation and support as a rapport is formed between people. One nurse suggested that:

> Communication is much better when staff get on well together as they talk more and share their thinking thus informing one another of what is happening (Participant 14).

The consequences of not being in the know lead to poor quality care as a result of not being informed and updated of situations occurring. All staff within the workplace strive to keep themselves informed by regularly updating one another on what is happening within the moment and the extended happenings of the department such as the updating surgical lists. Being in the know is an evolving state of communication within the perioperative setting. Being in the know is required for macro orchestrating, locational orchestrating and situational orchestrating to be effective within the operating department providing current information on activities.

5.3.5 Summary

The culture of maintaining safety within a high risk setting involves macro orchestrating, locational orchestrating and situational orchestrating which are dependent on being in the know. Orchestrating ensures that anticipatory vigilance occurs by coordinating all activities and tasks within the workplace. Successful orchestration gives responsibility to different nurses to deal with different events and promotes good team work. The orchestrating of people and workloads is vital in ensuring safety through anticipatory vigilance. Trusting relations are perquisites for orchestrating and increasing anticipatory vigilance within and across all personnel in the perioperative setting.

Orchestrating consists of macro orchestrating, locational orchestrating, situational orchestrating and being in the know. Macro orchestrating is a daily activity that ensures the smooth and safe management of the department which endeavours to maintain structural safety. It involves leading, managing and co-ordinating staff to achieve a culture of safety within the perioperative setting through anticipatory vigilance. Locational orchestrating ensures the smooth and safe management of a specific operating room, while situational orchestrating ensures the clarity of responsiblity of the individuals and co-workers in minimising risk. Macro orchestrating and locational orchestrating are normally appointed roles whereas situational orchestrating is normally a delegated role. Being in the know is essential for macro orchestrating, locational orchestrating and situational orchestrating to occur. Macro orchestrating and locational orchestrating enables the seamless flow of work to occur as a result of being in the know, the absence of which leads to difficulties in enabling orchestrating to occur. Routinising underpins all levels of orchestrating and is co-dependent. Routinising will now be considered.

5.4 Routinising

Routinising consists of habitual checking, rule following, mutual watching and mutual dependency. It is the usual pattern of how work or activities are carried out to minimise

risk. The function of routinising is to get the daily task/work done in an effective and safe manner. It is operationalised through tasking. One nurse emphasised that:

"Routine practices are part and parcel of all aspects of the work within the perioperative setting" (Participant 14).

Routinising is one strategy for reducing the uncertainty of missing or forgetting a vital component of a task and ensures safety by minimising risk through the systematic way work is undertaken. It is task orientated and dependent on policy, training and tradition and is always present regardless of the type of work being carried out. People engage in structures created by orchestrating through routinising. Checklists are one way of providing and operationalizing routinising. It may appear automated as it relies on repetition.

Routinising appears to facilitate the maintenance of safety through the use of rules, policies and guidelines. There are guidelines and policies on most activities ranging from checking patients into the surgical suite, scrubbing techniques for surgical cases, with the aim of promoting safe practices. Routinising is ensured through rule following.

Routinising is dependent on task recognition and task ordering through macro orchestrating. Efficiency normally equates with safety when preparing for a surgical case. Routinising is operationalised through repetitive tasking. It ensures that work gets done in a timely and orderly manner that appears to enhance the smooth running of work. Time accountability is an element of routinising whereby people are given specific time to carry out a task. Routinising may be counter-productive if a task is performed incorrectly due to lack of knowledge or awareness, therefore, knowledge and awareness are preconditions necessary for successful routinising. In the absence of routinising, tasks could be more challenging as these are necessary to ensure safety and minimise risk. Routinising is how risk is managed. Risk increases where there is a failure to engage in routinising which may

be due to a lack of understanding of the expectations in the performance of the allocated task. Another nurse commented that:

"Nurses sometimes find it difficult when they do not understand what task is being asked of them, like when they are told to prepare for a case that they are not familiar with. This can result in mistakes occurring due to lack of understanding and knowledge" (Participant, 33).

Routinising within the perioperative setting involves adhering to best practice principles which minimise risk and is realised by performing tasks through habitual checking. When routinising is utilised it may give rise to feelings of pseudo safety. This occurs when there is an over-reliance on routinising or when routinising is taken for granted during habitual checking. For example, where swabs and instruments are seen to be purposefully counted, which are rituals when undertaking a surgical procedure within the perioperative setting. During routinising, subtle cues whereby nurses nod at one another may be missed if staff are not alert to what is happening, tired or if they are in a hurry. Being present in the moment increases awareness, lessening the likelihood of pseudo safety. Being present in the moment and being situational aware allows a nurse to focus on what is happening, staying alert to errors or changes that occur during routinising thus minimising risk. Being focused in the moment sustains routinising. An integral part of routinising is habitual checking.

5.4.1 Habitual Checking

Habitual checking is how routinising is enacted. Habitual checking is undertaken to detect and avoid error so that risk is minimised and safety is promoted. Routinising is both maintained and operationalised through habitual checking. One nurse suggested that:

The constancy of routine work practices help to maintain patient safety throughout their stay in the operating room but it is imperative to remember that one needs to constantly check everything and remain focused on the patient first and foremost so that things will not go wrong (Participant 3).

Habitual checking is regimental and a repetitive part of routinising. It involves the constant verification of tasks by staff, visibly and verbally, ensuring that error does not occur. Habitual checking involves two or more people looking, inspecting, or counting and is normally carried out before during and after any surgical procedure. Nurses were observed to:

Constantly check and inspect patient's notes, instruments and equipment as they went about their work (Non Participant Observations, Period 7).

At interview, habitual checking was described by a nurse who said that:

*"*Checking swabs counts and instruments counts are fundamental for all surgical cases to ensure that nothing gets lost or left behind within a body cavity"(Participant 8).

Habitual checking of the environment and equipment ensures that all equipment is in working order, the temperature of the operating room or autoclaves are correct, and these positive checks help to minimise risk. It operationalises and maintains anticipatory vigilance because it increases competency levels as the repetitive checking normally leads to a better understanding and knowledge of the task being undertaken such as checking instruments to ensure they are assembled correctly. One nurse explained:

"Repetitive checking is the mother of perfection and it is important to do everything to perfection in the perioperative setting so that the surgical patient comes to no harm. The more you repeat a task the better you get at it and the more automatic it becomes for the person doing it" (Participant 2).

Engaging in habitual checking is a way of assuring safety. It is a mechanism whereby junior staff gain experience and learn under the supervision of senior staff. Habitual checking by its repetitive nature may become monotonous and less purposeful leading to an over reliance on of the practice itself, thus resulting in pseudo safety. Such habitual

checking may lead to nurses behaving in an automated fashion especially during repetitively similar case loads. Being in the moment and concentrating on the task is a prerequisite for successful habitual checking.

Having a prior knowledge of predicted workloads, requirements and preparation of equipment for the daily activities and events within the workplace is fundamental in the perioperative setting. The theatre list requires that each surgical case has a list of requisite equipment and instruments normally verified through habitual checking.

Habitual checking can have many different presentations. It may be automatic, visible, mandatory or consequential. Normally habitual checking is automated: when an experienced person knows what to do. Mandatory checking occurs with the multidisciplinary team prior to surgery, when there is a responsibility and/or a legal requirement to check an activity such as when completing patient safety checklists for allergies, correct patient, correct surgical site. It also occurs during surgery when organs are removed, as these organs require habitual checking to ensure they are intact and have been removed in their entirety. Mistakes are minimised through habitual checking as it helps to prevent errors.

5.4.2 Rule Following

Rule following is another way in considering how routinising is enacted. Rule following aims to ensure that policies and guidelines are followed. Rule following protects against and minimises risk during surgical procedures and is undertaken by nurses to protect themselves and their patients against error or mistakes. Rule following is fundamental to anticipatory vigilance. One nurse said that:

> There are a lot of rules and regulations in the perioperative setting which need to be followed and she felt that these policies and procedures were required to be put into practice so that the best evidence based practice and best evidence based care can be given to the surgical patients. She also mentioned that these rules and regulations are carried out for both patients benefit as well as staff benefit (Participant 8).

Rule following is ensured through rule enforcement during supervision involving mutual watching, implementing or applying the appropriate rules and policies. One of the nurses during the interview told me that:

> Monitoring and documenting practice is essential for safe surgical practice as nowadays everything is much more legal than before and therefore we need to have documented evidence of care being given in the perioperative setting (Participant 17).

It also involves policy maintenance through ensuring that all staff are aware of the need to read and understood the rules and policies of the workplace. Rule following is monitored and reviewed by others through written evidence such as patient registration data. Monitoring and recording in this way ensures that rule following occurs. As a safety mechanism it is utilised to minimise risk and is identified, for example, through observing others', documenting care and reporting incidences to management. Nurses are informed by colleagues and supervisors of the overt rules and shown the written policies, protocol and guidelines in relation to surgical activities and procedures and advised to read them in detail to become familiar with them. Nurses within the setting take part in overt and covert rule following. It is overt when it is enforced through mutual watching and is confirmed verbally and documented. A more covert approach can occur when people silently agree a checking activity.

Rule following has two functions, one of safety and another of ensuring that the surgical list runs smoothly. Nurses are required to partake in rule following as a legal requirement. It may be supportive when it gives a focus to the activity being undertaken but can be suppressive as it may not reveal the decision making process and therefore may diminish accountability. Rule following as a consequence may take from knowledge requirements and autonomy. Giving order and sequence to an activity through rule following helps to prioritise care. When care is not prioritised, delivered and documented in a systematic way the potential for error and risk is increased. Documentation such as checklists which are legal documents, protect and support both patients and staff. One nurse told me:

About a recent incorporation of the surgical safety check list which is normally completed during surgical time out (STO) with another perioperative nurse and the rest of the surgical team. This is utilised to ensure the safety of the patient during surgery (right patient, right site, right consent) and all results are documented (Participant 4).

Junior staff may use rule following instead of exercising decision making regarding patient care due to lack of knowledge, understanding and an inability to see beyond the specific rule in relation to a specific task. Consequently junior staff may exercise limited decision making, which may diminish the professional requirement of accountability thereby potently increasing risk. Staff new to the perioperative setting need supervision and guidance in acquiring such knowledge. Rule following without exercising decision making and judgement may lead to increased risk, as one is not being mindful and not using and applying knowledge and experience to inform the task or activity they are doing. This is a paradox since failure to part take in rule following may increase risk. Rule following is the norm within the operating theatre. One nurse commented on:

The importance of using one's head when undertaking routine work. It is not simply doing things right but doing things the right way. She recalled an event when she was positioning a patient for a gynaecological case, but could not follow policy as the patient had had back surgery some weeks previously so therefore could not follow the usual rule for positioning a patient. Iinstead had to improvise and make a new decision regarding patient care (Participant 29).

Nurses are normally reassured when rule following occurs as they believe that such checking will help in minimising risk. It can be taught quickly when dealing with simple tasks or learned over time when dealing with more complex situations. Any deviation from rule following is dependent on the complexity of the situation and the degree of risk involved. Critical actions require more than one simple rule to follow by one individual.

Rule following gives structure and clear guidance for different procedures in the perioperative setting. Nurses follow the rules because they are being watched and because of fear of the negative consequences for the patient such as complications, disability or death. It is normally enforced but deviation may occur during an unscheduled event

resulting in new rules being implemented for the duration of this event. Rules cannot apply for every situation but their presence leads to more positive patient outcomes.

5.4.3 Mutual Watching

Mutual watching ensures that rule-following is undertaken and that nothing is missed. It is a form of surveillance which is both explicit and implicit depending on whether a person is watching/observing an action or is the instigator of an action. Mutual watching of actions and performance ensure that staff observe if something untoward occurs and that procedure is followed, in maintaining safety. This is normally done at the same time. If people do not engage in mutual watching, errors may occur, as cues, signals or essential tasks may be missed resulting in increased risk. A lack of experience or tiredness reduces the impact of mutual watching.

Mutual watching involves the application of knowledge, skills and attitudes for the purpose of minimising risk. Staff must remain alert, attentive, focused, and watchful, paying attention to detail at all times in supporting one another. A nurse told me that:

> She always watched her colleagues to ensure that they were doing their job competently and that she expected them to do the same for her so that errors or mistakes would be reduced (Participant 35).

Mutual watching is carried out when working with others and is a function of routinising. It is a form of shared responsibility which is enacted through listening and/or giving verbal instruction and making recommendations to others. It is achieved by being present in the moment and is part of teamwork. Nurses were observed to:

> Be constantly watching their colleagues whether it was when preparing for surgery or during the surgical procedure and seemed to be constantly alert to what was going on around them (Non Participant Observations, Period 3).

Changing roles affects the explicitness or implicitness of the situation. Mutual watching is more explicit during an unscheduled event as everything is happening quickly and staff tend to verbalise what they are seeing. It is more implicit during scheduled or routine events as staff anticipate what is required and therefore are inclined to remain more silent.

It is a collaborative action between staff and normally ensures that work is carried out with precision, prudence and accuracy as someone is always watching or checking a task or procedure to see if it is being performed safely. This intense and constant watching when a person is carrying out an activity appears to be somewhat intrusive, which may diminish the nurses' initiative, responsibility and/or autonomy, but appears to be an acceptable way of working in the perioperative setting. A person needs to be focused on what is being done in order to minimise risk. Mutual watching is an integral part of teamwork as people normally work collaboratively and competently together. When people work together as a team they normally communicate regarding their shared objective for the surgical patient. This leads to prioritising safe care which is a basic requirement within the surgical setting. Mutual watching is therefore a way of actualising shared responsibility.

In relation to less experienced staff, mutual watching has a supervisory role, where they benefit from the experience of others. When mutual watching is present, anticipatory vigilance is maintained and risk is minimised. It is fundamental to working together effectively as a team as it aims to ensure risk is minimised. It occurs more easily when trusting relations are present as staff know what to expect of one another. Mutual watching involves constantly observing, watching, listening and tuning in to the actions of others in ensuring safe practice. Thus safe practice is both an individual and a team effort. It is a precondition for anticipatory vigilance which involves observing and supporting others and occurs through mutual dependency.

5.4.4 Mutual Dependency

Mutual dependency both creates and is a basis for team working. One nurse explained that:

> The operating room can be a great place to work in because I,t involves working in a team as one always relies on the whole multi-disciplinary team. It doesn't matter whether it is the porter, the care attendant, the surgeon, or the nurse as the whole team depends on one another and all are treated with respect. Everyone has a part to play for the patient to wake up from the surgical procedure safely and on time (Participant 6).

Mutual dependency is co-dependent on mutual watching as nurses depend on colleagues supporting them when carrying out their tasks contributing to a responsible and accountable performance. Each member of the team is co-dependent on one another, watching out for one another through mutual watching and mutual agreement. Team formation may evolve through mutual agreement between colleagues depending on the time available and their experience or may come about through locational orchestrating. Team formation is influenced by individual personalities, knowledge levels and the skill mix of the team. Mutual dependency occurs within teamwork as two or more people are required to work collaboratively to achieve a shared goal. The development of trusting relations and collaboration constantly contributes to mutual dependency. Mutual dependency enables and encourages mutual watching, providing opportunities to observe colleagues during team interaction in achieving shared goals. When mutual dependency is reduced or lacking, such as when people are working alone or non-collaboratively, then anticipatory vigilance is increased through individualised habitual checking and increased rule following to ensure that safety is not compromised. Trusting relations take time to establish and may not be present when a new staff member commences work in the department.

Mutual dependency is situational dependent and is increased during intense, complex and rapidly changing situations. It is fundamental to being part of a team and involves both

mental and physical energy. When mutual dependency is enacted and people work well together tasks appear easier and more enjoyable. A nurse explained that:

In theatre you are dependent on other team members so if one member of that team is not pulling their weight it will affect or interfere with the work of other team members. It's like being a cog in the wheel; you need all the cogs in place for the wheel to work properly (Participant 5).

Where people do not work well together the tasks and the ease of relationship may become challenging due to personality clashes or a lack of trust. Such difficulties may lead to mistakes or error occurring as people are focusing more on the challenging relations and less on the event occurring. Another nurse said that:

"Things can go wrong when there is no trust between us and we are not a real team" (Participant 30).

Within mutual dependency people interact with one another. Verbal and nonverbal communications contribute to enhance mutual dependency enabling people to know one another better. When undertaking different tasks in high risk settings it is important to know who is supporting who. Team interaction leads to good communication and team work and vice versa thus ensuring risk is minimised. Team members are mutually dependent on one another, which is a prerequisite for effective team work within the culture of the perioperative setting. The energy and unity between team members within mutual dependency is essential in enabling anticipatory vigilance to occur. Such connectivity between team members occurs more easily when trusting relations are present.

5.4.5 Summary

Routinising ensures anticipatory vigilance is maintained. Engagement in routinising reduces risk. The use of anticipatory vigilance within routinising is dependent on the knowledge and experience of nurses working in the perioperative setting. Less experienced nurses are more dependent on routinising. It is operationalised through good teamwork and effective communication. Trusting relations underpin routinising as they promote effective communication. Routinising operationalises and maintains anticipatory vigilance. Anticipatory vigilance requires the accurate and careful application of routinising. The consequence of failure to practice routinising leads to the possibility of increased errors and negative outcomes for patients.

Routinising consists of habitual checking, rule following, mutual watching and mutual dependency and is required for anticipatory vigilance to occur. Habitual checking is fundamental within routinising as it is a regimental process that requires task repetition. Habitual checking promotes efficient practice through repeat checking systems. Rule following is enforced and monitored through mutual watching as a safety mechanism used by nurses to minimise risk and is supported by policies, rules and guidelines with the aim of reducing error and minimising risk. Rule following aims to ensure that policies and guidelines are followed which is fundamental to anticipatory vigilance. Compliance of nurses with rules and policies is an element of the promotion of safety and positive patient outcomes, whereas noncompliance of rule following may lead to increased risk of error. The less experienced nurse may be more dependent on rule following. Mutual watching enforces and reinforces routinising which is a fundamental component of anticipatory vigilance involving mutual dependency as staff rely on their colleague to undertake the process of mutual watching. Routinising through mutual watching and mutual dependency allows for work to appear seamless when the team work well together through having formed trusting relations. The more advanced practice generates a more seamless use of routinising within the perioperative setting

Routinising helps to maintain systems and structure through habitual checking and rule following and the process is enacted through a collaborative mutual watching, leading to the promotion of positive patient outcomes and safety. Routinising is getting the daily task/work done in an effective and safe manner, whereas momentary adapting is a response to an unexpected event where a higher level of performance is required. Momentary adapting will now be explained.

5.5 Momentary Adapting

Momentary adapting is fundamental to providing safety within the perioperative setting. It consists of heightened awareness, rapid responsible responding, temporary structuring, and advanced knowing. Momentary adapting is a rapid response to an unexpected event such as an unscheduled surgical case or an unexpected happening during the surgical procedure and is how emergency situations are dealt with. Anticipatory vigilance leads to momentary adapting. It is a heightened skilled response to an unexpected event. During momentary adapting anticipatory vigilance is further promoted in minimising risk in the perioperative setting. Momentary adapting occurs in the moment, when an unscheduled event arises as a way of managing risk. Changing and responding with a new plan of action is essential in adapting during an unplanned event. All nurses need to be focused in the moment when responding to an unexpected event. A nurse explained the responsive role of a perioperative nurse by telling me that:

> While on call at night with emergency surgery it is much more challenging than the normal elective procedures which are normally carried on during the day the unexpected, unsocial and late hours of being on call require the nurse to react to the situation. Regardless of the time or the hour of the night all staff need to keep on their toes so that the patient will receive the best surgical outcome (Participant 1).

Momentary adapting is initiated in response to an unexpected event. Such a response requires a high level of skill, confidence and competence. Risk is minimised through momentary adaptation, were staff react rapidly to the situation. It is a mechanism also for

regaining control of an unexpected event such as when a patient's condition deteriorates rapidly. During momentary adapting all requests and orders are responded to instantly helping to deal with the unfolding situation. The usual activities of routinising such as mutual watching and mutual dependency continue. One nurse shared with me:

Her experiences of the dramatic nature of the chaotic order of unscheduled events. She talked about the adrenaline rush experienced when one becomes informed that there's an aortic aneurysm on the way up to the operating room and how there is only five minutes preparation and set up time to get the instrument trolleys, equipment and surgical requisites ready for life saving surgery. The sense of urgency and responsibility is essential for a successful outcome for the patient. All hell appears to break out within the theatre and people just have to adapt and adjust to the new situation as quickly as they can. They (surgeons and anaesthetists) are looking for fifteen units of blood. You don't know if there's anyone there to go and get the damned blood, plus you don't know if there's anyone there to suction the patient, let alone anybody to be able to go and get the graft material ready or if that stage of the surgery will ever be reached. The adrenaline rush is fantastic but the downside is you're so exhausted and mentally spent afterwards. (Participant 3).

She went on to say that then you spend the next twelve hours thinking

"Did I do that right thing? Did we as a team do it right? Could we have done it better? Could we have done it differently? I'll try to remember that for the next time, "God was that a good experience or was it not?"(Participant 3)

Mutual watching is a perquisite of momentary adapting as it enables it to occur quickly and smoothly. It is dependent on knowledge and skills requiring a person having the ability to step up to what needs to be done, through having the required knowledge and advanced skills. It is about maintaining safety through flexible work practices in responding to unscheduled events. The nature of the work within the perioperative setting is such that the team expect the unexpected. The ability of nurses to engage in momentary adapting enables the delivery of effective, responsive safe care. Another nurse said that:

"All nurses in the perioperative setting expect to be challenged with new or unexpected situations and are trained to act quickly and responsibly" (Participant 31).

If momentary adapting is threatened there may be increased risk to safe care. This may be evident when inexperienced nurses respond to an activity or role without the necessary skills to adapt to the new situation. When an inexperienced nurse is unable to partake in momentary adapting, a more experienced nurse may take over a lead role. Anticipatory vigilance enables momentary adapting to occur smoothly in relation to role change or work practice. All members of the team work together through a team response to minimise risk. They adapt individually and collectively to the situational changes as the need arise, adjusting quickly by changing their plan of action for the task and forming a new plan for the new situation. One nurse said that:

Being alert and ready to adapt to alarms and new unexpected situations is essential in maintaining safety in the operating room (Participant 22).

Momentary adapting involves temporary restructuring which is enhanced through trusting relations to get the work done in a way that minimises risk. Orchestrating underpins momentary adapting as the orchestrating of people and workloads through good planning enables momentary adapting to occur smoothly and safely during unexpected events. During an unexpected event a team leader, usually a senior staff member leads and integrates the strategies of orchestrating, routinising and momentary adapting, thus minimising risk. The organisational function of orchestrating combined with habitual checking and rule following enables momentary adapting to be enacted.

5.5.1 Heightened Awareness

Heightened awareness is a prerequisite for momentary adapting. It occurs when the nurse becomes more aware of and conscious about a situation. This normally happens just before an unscheduled event occurrence. It is an intuitive sense of knowing that the situation is about to change and is a forerunner to momentary adapting. Intuitive knowing

and being focused in the moment supports heightened awareness. A sense of unease of something not being right increases heighted awareness. One nurse related her experience:

"Sometimes just before something happens or goes wrong you get this sense or feeling that something is not right and you become more focused and ready to react, adjust or adapt to this unknown situation that is about to occur. I know this may appear strange to some people but it seems to occur more frequently the more experience you have" (Participant 28).

Heightened awareness is influenced by the level of knowledge, experience and skill of the nurse which brings together highly developed skills of observation relating to alterations in patient conditions and/or hemodynamic status. It consists of an increased sense of cautious alertness and watchfulness and may happen at any time throughout surgery. It involves predicting or anticipating what is about to happen through advanced knowledge and experience. Another nurse related a story of:

How she intuitively felt something was different and not right when she checked a baby into theatre setting and she felt more medical expertise was required before putting the baby to sleep. She shared her intuitive thoughts with the consultant anaesthetist who took her advice as she was a proficient experienced perioperative nurse and requested another medical colleague to assist him at the intubation. The nurse's thoughts were well founded and there were problems trying to anaesthetise the baby. A decision was taken to defer the surgery. Later the nurses realised that when she picked up the baby, his head was very heavy and she realised that she had possibly noted this information when checking the baby into theatre without thinking consciously about it (Participant 1).

Sharing heightened awareness with other team members is guided by the level of trusting relations within the team. Good relationships within and across teams create an atmosphere of openness whereby nurses feels free to express concerns. This is influenced by mutual dependency, advanced knowing and an ability to partake in rapid responsible responding and temporary restructuring. During this process of heightened awareness nurses are constantly anticipating, watching, planning, making decisions and solving issues. Increased risk is either minimised or anticipated through heightened awareness. This is informed by

the competence and proficiency of nurses in dealing with the new situation. The ability to draw upon experience is normally required when dealing with unexpected events. Heightened awareness is a prerequisite in undertaking a task or for participating in an activity during an unexpected event as nurses never know what to expect, which is why they engage in anticipatory vigilance. It occurs within the perioperative setting when staff are competent and have a body of professional knowledge. Consequently competencies make heightened awareness more likely to happen. People who engaged in macro orchestrating must try matching learner needs with the needs of the department. Staff development increases expertise and leads to fulfilling the many roles that contribute to anticipatory vigilance. When advanced knowing is present, heightened awareness is likely to occur more frequently due to increased knowledge, experience and the development of intuition.

5.5.2 Rapid Responsible Responding

This is performing rapidly in an accountable and effective safe manner to an unexpected event and includes the revolving roles of nurses. In normal events orchestration and routinising are enacted in a continuous way on a daily basis. However when an unexpected event arise the swift response of momentarily adapting is realised. A scrub nurse was observed that:

> Dealing with a major trauma victim who had being diagnosed with a fractured femur following a road traffic accident. Suddenly his vital signs rapidly deteriorated which required an emergency laparotomy to confirm a major abdominal bleed. Nurses in the midst of the unfolding surgical emergency responded instantly and responsibly to the new situation (Non Participant Observations, Period 7).

Rapid responsible responding is normally initiated and enacted through temporary restructuring. Nurses have to be able to undertake different and interchangeable roles adapting to the new aspects and requirements of the surgical case in a seamless and accountable manner. Nurses were observed to:

Change roles and facilitate and support their colleagues. Four different aspects of roles were observed with different demands or requirements which were the scrub role, circulating role, anaesthetic role and recovery nurses role (Non Participant Observations, Period 2).

Maintaining alertness is essential in rapid responsible responding to the many roles and skills of the nurse working in the perioperative setting. Rapid responsible responding is the basis for staff to become experienced and competent in all aspects of the work within the setting and is a requirement of momentary adapting so that risk is minimised. For rapid responsible responding to occur smoothly and successfully nurses need to be trained and competent so that they understand what is occurring and have the skill to undertake the different roles required. It requires practice, knowledge and training. The education and training of staff provides them with the knowledge and skill to be flexible and responsive. Senior staff create training opportunities on how to prepare for unscheduled events through rehearsing, which is tailored to meet individual learning needs. Learning in this way prepares staff to respond and work quickly, smoothly and effectively in the midst of intense critical activities through rapid responsible responding and temporary restructuring. This learning is an integral part of understanding the role of individual team members as they respond to untoward events. In this way rapid responsible responding, temporary restructuring and mutual watching are fundamental to anticipatory vigilance in providing support enabling nurses to work together

Situational orchestrating when initiated by a colleague enables rapid responsible responding to occur when undertaking a task or taking part in an activity during an unexpected event. The versatility of staff in rapid responsible responding ensures that all nurses are multi-skilled and flexible in undertaking all types of work within the setting. Multi-skilling and compliance are prerequisites. Compliance to direction, orders or requests is normally present in the moment of an unexpected event due to staff commitment in achieving positive patient outcomes. Nurses were observed to:

Be multi-skilled and were involved in multi-tasking undertaking different tasks at the same time such as checking in the patient, completing the register and answering queries by

other nursing and medical colleagues at the same time (Non Participant Observations, Period 4).

Rapid responsible responding minimises risk during momentary adaptation and is a mechanism for maintaining focus, maintaining anticipatory vigilance and is situational dependent. It involves collaborating with other nurses and having the ability to take part in momentary adapting. Several nurses suggested that:

Nurses working in the perioperative setting need to be flexible for the differing roles required within the setting and to be able to adapt to the different tasks required of them (Participant, 1, Participant 5, Participant 13 Participant 16, Participant 23 and Participant 30).

Momentary adapting is facilitated by the ability of nurses to be flexible at different stages of the unexpected event and is facilitated by rapid responsible responding so that the event is dealt with effectively due to the high risk nature of the work. Rapid responsible responding is a requirement of momentary adapting in minimising risk as it is a mechanism for maintaining focus in maintaining anticipatory vigilance and is situational dependent. The structure of the setting and the ability to participate in momentary adapting through rapid responsible responding enhances temporary restructuring when an unexpected event occurs.

5.5.3 Temporary Restructuring

Momentary adapting requires temporary restructuring in response to an unexpected situation in the midst of planned (elective) or emergency surgery. It occurs at various levels of intensity and speed depending on the event where skilful staff come together in response to an unexpected event to minimise risk. One nurse suggested that:

Automated structuring occurs in the operating room as a mechanism for maintaining safety, which involves team working and staff coming together for the greater good of the surgical patient (Participant 29).

Temporary restructuring may be obvious or less obvious and subtle. It is obvious when the role within the team is delegated by the person in charge either through macro orchestrating or locational orchestrating during an unexpected event. Competency levels are taken into account, responding to the needs of the situation in minimise risk and reducing error. It may be less obvious and subtle when an individual restructures and assumes a different role within the team. This restructuring occurs in response to an unscheduled event and is immediate. One nurse talked about how:

People come together quickly to form a surgical team especially when an emergency surgical case comes to the operating room. Furthermore she said that perioperative nurses take different roles. One nurse will immediately take the scrub nurses role and go to scrub for the surgical procedure and another will take the circulating role where they will gather requisites and equipment for the procedure and help prepare the scrub nurse for the surgical case and another will assist the anaesthetist. Everything happens together (Informal Interview 3).

No team is constant or permanent as many different people and roles make up the team. It is normally formed depending on the competencies required for the untoward situation and reformed when the situation is brought under control. Trusting relations enhance team cooperation and the team works together for the length of time required to bring the situation under control. The structure of the setting and the ability to participate in momentary adapting through temporary restructuring is supported through advanced knowing.

5.5.4 Advanced Knowing

Advanced knowing is vital during the rapid response required in momentary adapting in minimising risk. Whilst it is always important there is no time for detailed explanations (explaining how things are done) or training during the crisis of an unexpected event.

Advanced knowing is based on the interaction of knowledge and practice experience. Such knowledge informs nurses in performing their daily work safely. They draw on knowledge from the biological sciences, anaesthetics, surgical procedures and the corresponding technical skills. In addition nurses utilise learning through experience. All these elements form part of competencies. Advanced knowing is integrated and dependent on a high level of skill and knowledge within momentary adapting. During an unexpected event advanced knowing increases the awareness and responsiveness of nurses as they know what to look out for in undertaking anticipatory vigilance.

Advanced knowing ensures that nurses are aware of the risks and consequences of not performing in a safe manner in their work practices for both themselves and patients. This enables them to manage risk more successfully. It increases when working together in a team, combining and sharing in the group knowledge and experience. This is enabled and supported through the trusting relations. Advanced knowing is promoted and reinforced by on the job training as new learning opportunities arise. One nurse told me that:

> A good training is the key to safety and surgical competence within the perioperative setting. This means that within the first few weeks when a new nurse come to the perioperative setting, they need to be shown the importance of the basic things they will take with them throughout their time in the operating room. A person at that stage is beginning to educate themselves about simple tasks within the setting. Simple things will give them a basic beginning and helps to make them interested and identify areas that require further training at a more in-depth level (Participant 3).

Advanced knowing requires an understanding of individual ability and knowing how all parts of working environment interact. It enables staff to respond, accept and adapt to the changing situation as they arise. It is an essential component of momentary adaptation. It requires having understanding and awareness of what is going on with equipment, patients, subsequent surgery and the consequences of what may happen if the normal order and flow is not maintained. Nurses need to be analytical, assertive, flexible, organised and structured in their thinking and responses. Advanced knowing involves constantly keeping up to date with education, new techniques and new technology thus maintaining professional competencies. Several nurses told me that:

There is a need to constantly keep abreast of new technology and ensure that training happens when any new equipment is introduced so that people can become competent and knowledgeable (Participant 25, Participant 26, Participant 30 and Participant 3).

Skills and training are learned through instruction and practice. Learning may also occur experientially from incidences which enhance advanced knowing, by undertaking specialised courses and by reading around the specialised area. It is expected of a person within the role enabling and supporting competent performance. Trusting relations lead to a more open working environment whereby nurses are aware of their own capabilities and that of their colleagues. Such a positive working environment is influenced by macro orchestration and locational orchestration as staff have the measure of their colleagues capabilities. Advanced knowing, demands that staff understand the importance of adhering to rule following and regulations within the setting, therefore advanced knowing is a prerequisite in minimising risk in any situation. It contributes to anticipatory vigilance through the provision of knowledge, understanding and skill acquisition, which helps minimise risk within the perioperative setting and is essential for rapid responsible responding to occur smoothly as staff understand and know what to do when exchanging roles. If nurses fail to understand and appreciate the knowledge underpinning their daily practice, levels of competence may diminish and risk is increased.

5.5.5 Summary

Momentary adapting is a rapid response to an unexpected event such as an unscheduled surgical case or an unexpected happening during the surgical procedure and is how emergency situations are dealt with. Establishing trusting relations promotes good team work, which enables momentary adaption to occur smoothly as staff trust one another to maintain a standard of care. The greater the trusting relations between staff the smoother the work flows, when momentary adapting to different situations. Momentary adapting promotes anticipatory vigilance in relation to a swift role change or work practice.

Momentary adapting consists of temporary structuring, rapid responsible responding, heightened awareness and advanced knowing. Rapid responsible responding is central to momentary adapting as it allows temporary restructuring to take place. This is performing rapidly in an accountable and effective safe manner to an unexpected event and includes the revolving roles of nurses. Temporary restructuring is the forming of a group of people quickly in response to an untoward event. Advanced knowing is essential and is a prerequisite to momentary adapting. Being a competent perioperative nurse is informed by knowledge and understanding of advancing technology and surgical practice and is fundamental in assisting momentary adapting. Heightened awareness is the intuitive bringing together of advanced knowledge, skills and attitudes which help in the realisation of momentary adapting.

Momentary adapting always involves temporary restructuring, incorporating the formation of a new plan for the team. Embracing and confronting the need to momentary adapting is helped through flexibility within rapid responsible responding and having professional knowledge and heightened awareness in adapting to new unexpected situations. Being flexible within different roles, which are an aspect of rapid responsible responding seems to be an accepted part of perioperative practice due to the nature of the perioperative environment.

5.6 Summary of Theory Chapter

The perioperative setting is a high risk, highly structured setting where events occur in a scheduled and an unscheduled way. The main concern for perioperative staff is minimising risk in a high risk, highly structured setting to maintain safety. Anticipatory vigilance is how perioperative nurses minimise risk in this setting. Anticipatory vigilance refers to the strategies that nursing practitioners use to resolve their main concern of minimising risk in the perioperative setting. Trusting relations is a necessary precondition for minimising risk through anticipatory vigilance. It underpins the process and ensures the effectiveness of orchestrating, routinising and momentary adapting. Trusting relations supports good communication and cooperation,n therefore enabling staff to support

colleagues in the work being carried out. Anticipatory vigilance is dependent upon trusting relations and is irreducible and interlinked to orchestrating, routinising and momentary adapting in promoting safety and minimising risk.

Orchestrating consists of macro orchestrating, locational orchestrating, situational orchestrating and being in the know. Orchestrating is underpinned by trusting relations. It moves from managing the suite of theatres, to managing an individual theatre, to managing individual activities in an informed way. Orchestrating is a management role, which allows for the smooth and logical implementation of routinising. Nurses work effectively together in a team for positive outcomes through good communication by being in the know. Orchestrating creates the condition for routinisin,g which is a strategy used in managing others in getting the work done, maximises safety while matching the experience of the team to the designated task. Orchestrating enables managing of the people and workloads thus ensuring that routinising is carried out safely. Routinising consists of habitual checking, rule following, mutual watching and mutual dependency. Trusting relation underpins routinising as it promotes effective communication. Routinising underpins all levels of orchestrating and is co-dependent. It is operationalised through repetitive tasking, which aims to minimise risk. Mutual watching is a form of surveillance of action and behaviours by staff when carrying out their daily work with each other. Mutual dependency is co-dependent on mutual watching, contributing to responsible and accountable performance. Habitual checking and rule following in the workplace enables managers to undertake the strategy of orchestrating more easily in managing the workloads and people, which in turn is ensured through the strategy of routinising. Routinising is fundamental to the daily routines within the perioperative setting. Momentary adapting is the heightened response enacted during an unexpected event.

Momentary adapting consists of rapid responsible responding, temporary structuring, heightened awareness and advanced knowing. The establishing of trusting relations promotes good team work, which enables momentary adaption to occur smoothly as staff trust one another to maintain a standard of care. Rapid responsible responding and temporal restructuring is realised during an unexpected event. Knowledgeable and

experienced nurses have an ability to experience a sense of heightened awareness that enables momentary adapting and responding to unexpected events which are part of the role of the nurse within the perioperative setting. Orchestrating and routinising is related to momentary adapting. Routinising through mutual dependency and mutual watching allows for smooth momentary adapting to occur while is still depending on collegial support. People engage in the structures created by orchestrating through routinising such as habitual checking, rule following and mutual watching allowing for momentary adapting to occur smoothly when an unexpected event occurs.

Orchestrating and routinising ensure that the normal daily activities are continuously undertaken on a daily basis to minimise risk, whereas momentary adapting occurs in response to an unexpected event. Orchestrating underpins the enactment of routinising. Routinising lends itself to safety therefore the greater the level of routinising, the more risk is reduced. Routinising ensures that fewer negative consequences occur during anticipatory vigilance. Orchestrating of people and workloads underpins momentary adapting through the implementation of structure and process enabling a rapid response during critical situations. The more adaptable people are, the safer the environment as the team supports one another. Momentary adapting is guided by routinising as checking, rule following and watching are fundamental in the workplace. Therefore routinising and momentary adapting promotes safety and minimises risk. The ability of nurses to engage in anticipatory vigilance is dependent on the level of competency of the nurse when engaging in orchestrating, routinising and momentary adapting.

6 Chapter Six: Discussion

Chapter five presented the explanation of the theory of anticipatory vigilance. This chapter discusses the theory of anticipatory vigilance within the current literature. This theory advances and contributes new knowledge to current understandings of minimising risk which promotes safety. The theory is generated from interviews and observations of nurses working in a perioperative nursing environment and extends beyond. The theory is examined and compared to the relevant literature and research. Initially an overview of anticipatory vigilance is presented. Vigilance is explored from an industrial, healthcare and human performance perspective. The relationship between managing risk and theories of risk is then explored. Trusting relations which is an essential thread linking the categories within the theory is presented. Literature is then framed around the categories of the theory namely orchestrating, routinising and momentary adapting which are critical to minimising risk. The importance of training in anticipatory vigilance is also considered. Finally conclusions are drawn and summarised.

6.1 Literature Search

A review of relevant literature between 1950 and 2013 around the core concept of anticipatory vigilance was carried out. The literature search sought research such as primary studies and conceptual/theoretical papers. An all-embracing search of keywords and combinations of identified key words and phrases was carried out. The main data bases used were Academic Search Complete, Wiley Blackwell, Pubmed, Cinahl and Science Direct. Key search words and Boolean terms utilised were perioperative, nursing, vigilance, risk and safety. Other academic, healthcare studies, health strategies and policies were also reviewed. The references within each publication were also considered giving guidance towards other papers worthy of consideration

The complexities within the theory of anticipatory vigilance identify several concepts while considered separately for the purpose of the discussion chapter remains intrinsically

linked. The theory of anticipatory vigilance offers a unique view of the connection between anticipatory vigilance and minimising risk within perioperative nursing. The discussion has not addressed all theories within the literature in relation to vigilance or risk. Given the challenges and constraints within the vastness and broadness of the literature. However the discussion has examined and compared the theory to the relevant literature and research. Therefore a more focused discussion has been developed in considering the relevance of the literature to the theory of anticipatory vigilance emerging from this study as vigilance, risk and nursing. This has not being found to be as closely integrated up to now. This theory makes a unique contribution in linking vigilance, risk and nursing.

6.2 Anticipatory Vigilance: An Overview

Anticipatory vigilance is essentially a theory of minimising risk in a high risk environment. When done successfully anticipatory vigilance creates and maintains a safe environment. Within the literature risk is associated with uncertainties and events that occur which may threaten or worsen a situation (Ayyub *et al*. 2010) causing errors to occur. The Institute of Medicine (2000) reports on errors and preventable errors in healthcare and patient safety. Failure to detect error or risk, results in suboptimal care (Yang & Thompson 2011). Similarly in the current study errors are detected and dealt with through the theory of anticipatory vigilance which ensures that situations or conditions do not further deteriorate minimising risk and managing it should it arise. O' Byrne (2008) suggests that risk is under researched in the nursing literature but is central to nursing practice and the prevention and reduction of risk as it is a type of surveillance. The theory of anticipatory vigilance is potentially central to nursing practice and adds to the available existing body of knowledge by explaining how risk can be minimised and managed in a high risk setting.

Nurses engage in and practice anticipatory vigilance in three ways, through orchestrating, routinising and momentary adapting which are underpinned by trusting relations. The multivariate nature of the theory has been presented in the previous chapter. Anticipatory vigilance is important in preventing errors and is fundamental for positive patient outcomes in the perioperative setting. This expands and adds understanding to the current literature

on risk management which will be discussed in this chapter. The literature proposes that risk management benefits organisations by ensuring that there are efficient strategies and processes in place (Hopkin 2010). Clinical risk management was originally introduced as a way of controlling medical litigation (Vincent, 1997) but is now relevant in all areas of clinical care. Compliance with good quality standards assists risk reduction (Melloni 2007, Hopkin 2010). Promoting safety awareness is essential in risk management. It is vital that all health care workers have an awareness of, and are instrumental to risk management. They should be encouraged to share information and report identified risks in a non-judgmental way (Irish Nurses Organisation 2007). Within Ireland, the Department of Health and Children DOHC (2008) highlight the importance of risk management, and recognises its role in the current health system in creating a culture of change by promoting better quality service. It maintains that health care quality and risk are managed effectively through the implementation of an integrated management system that ensures continuous improvement in quality of care. The theory of anticipatory vigilance has the potential to form the basis for such a system.

Risk management has now become an essential part of clinical practice and is audited through the Risk Register for Directorate in the hospital setting. Scott & Summerbell (2004) highlighted three fundamental reasons for risk management. Firstly to investigate so that lessons may be learned, secondly to reduce mistakes and errors and thirdly to guarantee that staff are risk aware and active in managing risk. The theory of anticipatory vigilance explains the patterns of behaviour in minimising risk as opposed to dealing with the aftermath of error. Risk management is fundamental in increasing the efficient functioning of the workplace within any organisation (Ebright *et al*. 2003). Hence the promotion of a culture of safety for patients through quality and risk management must become an integral part of practice (Drumm 2006). The theory of anticipatory vigilance suggests how risk is minimised and managed effectively through orchestrating, routinising and momentary adapting. The literature suggests that risk assessment is vital in acute care settings (Yang & Thomson 2011). The ability of a person to partake in risk detection and assessment of a patient's conditions is challenging (Despins *et al*. 2010). Although errors are inevitable, safety awareness and maintenance can reduce their occurrence (Van de Castle *et al*. 2004 and Institute of Medicine 2004). Similarly the theory of anticipatory

vigilance conceptualises awareness as a prerequisite of mutual watching where nurses are constantly watching one another and also explained the maintenance of safety through all aspects of the theory. As vigilance reduces errors by early observation and rapid response actions therefore a lack of vigilance is potentially linked to error. Error identification, prevention and reduction have been part of healthcare since it inception however reporting an error has been uncommon (Nunn Warburton 2005). Dudley & Carr (2004) suggest that the theoretical understanding of vigilance enhance the ability of health care providers to provide care. Cooke (2006) highlights the importance of physical presence and vigilance, which they suggest outweighs the assessment of care using audits in assuring high quality care. The importance of human presence and vigilance is supported by the current theor,y which presents a detailed explanation of the complexities and interrelated elements within risk reduction. It draws attention to the interrelationship between individuals, teams and management that go beyond simplistic implementation of checklists and other audit and risk systems. In this way the theory of anticipatory vigilance portrays the importance of having knowledge and understanding and an appreciation of safety. The current theory adds to and is supported by the literature.

6.3 Vigilance

Vigilance is defined by Hirter and Van Nest (1995, p. 96) as:

"a state of watchful attention, of maximal physiological and psychological readiness to act and of having the ability to detect and react to danger".

This represents what the theory of anticipatory vigilance is, where everybody is watching and focused on what is going on around them in order to minimise risk. This definition has been expanded from a nursing perspective by Meyer & Lavin (2005) in defining professional nursing vigilance as:

"a state of scientifically, intellectually, and experientially grounded in: attention to and identification of clinically significant observations, signals or cues, calculation of risk inherent in nursing practice situations and readiness to act appropriately and efficiently to minimize risks and to respond to threats"(2005, p. 2).

This definition has similarities to the theory of anticipatory vigilance where attention and observation are linked with mutual watching. This could be considered a form of surveillance which is both explicit and implicit depending on whether a person is watching or observing an action or is the instigator of an action. When considering vigilance a person needs to undertake several different actions such as observing other people's behaviour and activities and carrying out their own task at the same time. The study of vigilance has grown since the 1940s due to increased technological development and complexities of equipment usage by people in the workplace and the need for monitoring and the detection of deviations from the norm (Rothrock 2011). Vigilance has become an essential element of human performance and is present in work environments other than health care. These include the military, (McBride et al. 2007), air traffic control (Kontogiannis & Malakis 2009), aviation (Molloy & Parasuraman 1996,) airport security (Hancock & Hart 2002), cockpit monitoring (Satchell 1993), seaboard navigation/naval, industrial process/quality control, train driving (Dorrian et al. 2007) long-distance driving, and agricultural inspection tasks (Hartley, et al. 1989). Vigilance is a requirement by air traffic controllers regarding inspection and quality control, pilots regarding automated navigation, bankers regarding the stock exchanges, train drivers regarding signals, police and military services regarding law and order, farmers regarding insects or machinery and chemical operators regarding his workshop conditions. As vigilance is required in different work environments aspects of the theory of anticipatory vigilance will have application for all of these professions.

6.3.1 Vigilance in Industry and the Theory of Anticipatory Vigilance

The theory of anticipatory vigilance considers the main concern of nurses in the substantive area of the perioperative setting. Within the literature vigilance in industry has been looked at from a more experimental angles. Mackworth introduced the clock test (stimulated radar display) and the term vigilance decrement or decrement function (Warm

1993) which signified a reduction in performance and signal detection over time (Mackworth, 1969, Eysenck & Eysenck 1985, Warm 1993) with both experienced and non-experienced people (Warm *et al*. 2008). Vigilance tasks vary in their diversity (Warm 1993). Early experimental studies on vigilance tasks were generally completed in laboratories. Tasks differ in time, duration and maybe concurrent or successive (Parasuraman & Davies 1977). The term vigilance decrement has been used to identify a decrease in vigilance which is reduced by rest periods and regular knowledge of results of what is being observed (Matthews *et al*. 2000). Matthews *et al*. (1997) identify vigilance as a readiness to detect and respond to the needs of the environment. This readiness to respond emerged within the current study as rapid responsible responding.

In the past vigilance has been considered to be related with low cognitive demand and vigilance decrement (Frankmann & Adams 1962). Matthews *et al*. (2000) suggests that vigilance decrement can be reduced by rest periods and by regular informative feedback. This is relevant to the perioperative setting as frequently the staff use non-verbal communication in giving informational feedback such as eye movement and hand gestures to make colleagues aware or to inform others. This was conceptualised in the theory of anticipatory vigilance as being in the know where people are constantly informed of what is occurring around them. Botella *et al*. (2001) suggests that vigilance decrement occurs in long tedious jobs. Vigilance decrement is normally related to monitoring weak target signals (Parasuraman 1986). Pattyn *et al*. (2008 p369) added to the definition of vigilance decrement in suggesting it is "a slowing in reaction times or an increase in error rates as an effort of time on task during tedious monitoring tasks". This is perceived to be the most ubiquitous finding within vigilance experiments (Warm *et al*. 1996). Vigilance decrement results in a reduction in the arousal pursuant reaction (Frankmann & Adams 1962). In opposition to Frankman & Adams (1962) thinking on vigilance, there is now a change in how this is perceived as current studies recognise that vigilance is difficult work, requiring the need for significant cognitive resources which may result in significant levels of stress (Parasuraman & Davies 1977). Vigilance decrement may have relevance in the perioperative setting as some surgical cases require long focused attention, which can be challenging, difficult and stressful for staff working in the environment. Within the theory of anticipatory vigilance, mutual watching is constantly undertaken by staff to detect

behaviours and reduce the risk of error. This has the potential to detect and prevent vigilance decrement as the potential risk can be dealt with. The delegation of knowledgeable skilled staff by people in charge within orchestration also helps to reduce or eliminate vigilance decrement.

Bonnefond *et al*. (2010) suggest that deteriorating vigilance levels resulting in reduced performance may be a consequence of a person's inability to keep an alert state with time-on-task, regardless of the intention to complete the task. Warm *et al*. (1992) suggest that human performance reduces over time. This contrasted with the theory of anticipatory vigilance as even though the importance of being alert and attentive were identified as extremely significant properties within the concept of mutual watching, deteriorating vigilance over time did not emerge from the data. This maybe because the current study was undertaken in the substantive clinical area of the perioperative setting and risk is minimised or dealt with through mutual watching, mutual dependency and habitual checking. These strategies could be a way of reducing deteriorating vigilance and in doing so may add to the body of knowledge on vigilance. Nevertheless this literature could offer comparative data for the modification of anticipatory vigilance, should formal theory be considered involving other disciplines or professionals from dissimilar comparative settings.

Several vigilant theories were written following Mackworth's (1950) pioneering work such as Learning Models which consist of Pavlovian and Hullian Inhibition Theory and Skinnerian Theory (observing responses); Neurological Models which consist of Arousal Theory, Motivation Theory, Neural Habituation Theory; Psychophysical or Information Processing Models which consists of Filter Theory, Expectancy Theory, Signal Detection Theory, Probability Matching, Information theory and channel capacity and the Combined effects of possible mechanisms and Psychomotor Performance Models which consists of Inhibition Theory, Inhibition Reinforcement Theory and Reminiscence Consolidation Theory (Appendix XX). Mackworth (1950, 1969, 1970) found that vigilance performance is both a state of being and a stimulus response conditioning. Davies and Parasuraman (1982) suggest that vigilance theories consider three areas, the reason for the decline in any

performance when undertaking a vigilant task and the reason that decides the level of a performance depending on the level of understanding and the skill of the person undertaking a task or activity. Factors that detract from vigilance have been identified as long extended tasks, boredom, raised number of false alarms, isolated work practices, unevaluated efficiency auditing, complicated and difficult tasks and long response times (Buckner & McGrath1963, Davis & Tune 1969, Kooken 2008). These detractors are relevant also within the perioperative setting where detractors are normally dealt with through good management of workloads and people. These detractors did not emerge within the theory of anticipatory vigilance. This may be because of orchestrating, where people and workloads are delegated matching the skill to the person. In long cases that extend over several hours the possibility of the tasks becoming boring and the risk of staff becoming less attentive, situational orchestrating is evoked. In such situations scrubbed or circulating staff may alternate roles in agreement with the team to ensure a fresh level of attention and alertness. This encourages staff to take responsibility for different tasks and situations. Working within a team also benefits staff to participate in mutual watching so if someone is becoming less attentive they can be reminded by others.

Factors that enhanced vigilance were found to be short quick tasks. Early vigilance theories were developed to explain and test the Mackwork clock test, checking the decreased number of hits (HS) or increases in reaction time (RT) observed as 'time on tasks'. In general vigilance theories have been developed from scientific experimentation research and not developed from a behavioural perspective (Loeb & Alluisi 1984). However in contrast the theory of anticipatory vigilance was generated from a behavioural perspective in clinical perioperative setting, which explains the pattern of behaviour of perioperative nurses in minimising risk. Early vigilant theories included (Appendix XX): Signal detection theory, Inhibition Theory, Reinforcement Theory, Filter Theory, Expectancy Theory, Arousal Theory (Buckner & McGrath 1963, Stroh 1971). In all of these theories vigilance was seen as a task and measured by physiological response to signals (Stroh 1971). The current theory explains vigilance as a way of doing as oppose to undertaking a task. It adds another way of explaining and understanding vigilance from a behavioural perspective. Experimental theory looks at a particular aspect of a phenomenon with the objective of verifying, refuting or ascertaining the validity of a hypothesis. It

seeks insight into the cause and effect of an event by showing what occurs when a particular factor of the experiment is manipulated in a controlled environment. In constrast behavioural theory looks at the behaviour of people or animals from a multidimensional perspective in their own normal environment. Loeb & Alluisi (1984) suggest that the main vigilance theories can be classified into the following vigilance behaviours; reflecting, learning, neurological and psychophysical or processing models.

These early theories were developed mostly from an experimental perspective whereas the current theory was generated from a behavioural perspective. Learning theories have impacted on later theories by supporting their findings or expanding their association with vigilance. The neurological theories have impacted on how vigilance involves an amalgamation of propositions with regard to arousal, habituattion of arousal and sensory habituation (Loeb & Alluisi 1984). Davies & Parasuraman (1982) suggest that these theories highlight the way the person is when the vigilant task is carried out and suggest that the motivation theory also incorporates this. The psychophysical or information processing models have impacted on vigilance through how a person performs while undertaking a task. To date no sole theory explains vigilance given its complexity. The current theory expands existing theories by identifing vigilance in connection with minimising risk in perioperative care. Loeb & Alluisi (1984) conclude that vigilance cannot be explained as a single mechanism, the majority of theories are not well formulated or verifiable from a quantitative perspective and there are challenges in the application of the theories even though some clarify the findings better than others. Broadly, these early theories have some similarities and application for some of the concepts to the theory of anticipatory vigilance, which involve alertness and paying attention within habitual checking, rule following and mutual watching. The current theory expands these earlier theories which are primarily quantitative, where much of their findings have not emerged or are too vague or abstract to have earned their way into the data within the theory of anticipatory vigilance.

Vigilance is also a significant component of competent performance in medical settings such as with cytological screening (Rowen et al 1991, Gill 1996), electrocardiogram

monitoring (Daly & Wilson 1993), anaesthesia gauges inspections (Weinger & Englund 1990), patient care monitoring (Herdman *et al*. 2009) and patient monitoring during surgery (Slagle & Weinger 2009). The current theory adds to the available literature through the inclusion of nursing within the perioperative setting. The explanations of the theory identifies concepts that contribute to the practice of anticipatory vigilance and this is supported by Hess's (2009) suggestion within an industrial setting that vigilance include wakefulness, alertness and attention. Within industry, airline, and defence literature vigilance is frequently referred to only in terms of stimulus recognition and response (Kooken 2008). However within the broader literature vigilance is referred to or discussed in the context of attention (Jonides 1983, Paterson & Neufeld 1987, Krohne 1993, Lavie *et al*. 2004, Miltner *et al*. 2004, Myers 2008) alertness (Berch & Kanter 1984, Weinger & Englund 1990, Parasuraman & Giambra 1991, Deaton & Parasuraman 1993, Bonnefond *et al*. 2010), consciousness (Janis 1962, Lzurus 1966, 1984) watchfulness or watch keeping (Berch & Kanter 1984, Hirter & Van Nest 1995) monitoring (Krohne 1993, Daly & Wilson 1993, Loeb 1994) and surveillance (Clarke & Aiken 2003, Clarke 2004, Institute of Medicine 2004, Manoijlovich & Talsma 2007, Kutney-Lee *et al*. 2009, Kelly & Vincent 2011). The different terms used in describing vigilance highlight the complexity of definition and requirement of the skills of understanding, observing and being focused (Davies & Parasuraman 1982, Warm 1984), paying attention (Parasuraman 1984) being stimulated (Parasuraman 1984) and responding and adapting to the needs of the environment (Shaw *et al*. 2010). These terms of attention, alertness and watchfulness also emerged within routinising, momentary adapting and orchestrating within the theory of anticipatory vigilance. Vigilance may be enhanced and maximised through using these concepts to inform practice. Monitoring and surveillance appear more consistently within the nursing and medical literature (Krohne 1993, Daly & Wilson 1993, Loeb 1994, Clarke & Aiken 2003, Clarke 2004, Institute of Medicine 2004, Manoijlovich & Talsma 2007, Kutney-Lee *et al*. 2009, Kelly & Vincent 2011).

6.3.2 Vigilance in Health Care and the Theory of Anticipatory Vigilance

The majority of research to date around the area of vigilance has being undertaken in industry and the defence industry in particular (Eysenck & Eysenck 1985, Botella *et al*.

2001, Bonnefond *et al*. 2010). This research has normally been of an experimental nature. By comparison there is limited research being undertaken in relation to healthcare. To-date there appears to be no nursing research related to vigilance within the perioperative setting, however some research has been undertaken in healthcare generally. The theory of anticipatory vigilance will add to the body of knowledge in this area as it links vigilance, risk and nursing

The majority of research on vigilance within the health care setting has been undertaken from a qualitative viewpoint (Dudley & Carr 2004, Mahoney *et al*. 2003, Meyer 2002) as distinct to quantitatively (Loeb 1994, Howard *et al*. 2003). Similar to the industry and defence literature, the healthcare literature also looks at vigilance as a task as opposed to a behaviour, a way of doing (Mahoney *et al*. 2003, Howard *et al.* 2003). There are few studies which mention vigilance in a broad sense from a nursing perspective (Meyers 2002, Cooke 2006, Schrieber & Mac Donald 2010a, Schrieber & Mac Donald 2010b). Generally vigilance has emerged as a theme within the findings of the research studies as opposed to being directly researched (Kooken 2008). Even though the theory of anticipatory vigilance is a theory of risk management, anticipatory vigilance is required to minimise risk. The focus of the theory of anticipatory vigilance was to obtain a multivariate theory, where concepts emerged through speaking with and observing staff regarding their main concern in the perioperative setting and how they resolved it.

Anticipatory vigilance is essentially a theory of minimising risk in a high risk environment. The Institute of Medicine (2004) suggests vigilance is a necessary component, required to minimise risks in healthcare. Vigilance is not a stand-alone activity, in maintaining safety but is part of an overall risk management strategy. Risk involves being aware, making decisions and utilising actions required to observe and evade risks. Health care workers including nurses need to remain vigilant at all times regarding their work, in terms of awareness, having the knowledge, being diligent, checking and rechecking to ensure that risk is minimised so that safety is maintained. In anticipatory vigilance, being aware and diligent were properties of mutual watching, having knowledge was conceptualised as professional knowing, checking and rechecking was conceptualised as habitual checking.

Employing a nursing workforce that is knowledgeable and capable is important in preventing errors and maintaining safety (Institute of Medicine (IOM), 2004). Vigilance was first alluded to within the nursing literature by Nightingale (1860/1969), when writing about the importance of observation (Moore & Duffy 2007). Patient observation was identified as fundamental to nursing (Hamer & Henderson 1939). McClain (1950, p. 51) suggests that observations consisted of "knowledge, interest and attention" . This idea of observation is consistent with the theory of anticipatory vigilance where it is referred to as mutual watching and where knowledge is likened to advanced knowing. This concept of observations was further enhanced with the development of nursing theories (Marriner-Tomey *et al*. 2006). Meyer & Lavin (2005) suggests that vigilance is the condition in which nursing activities are performed and this finding is consistent with the theory of anticipatory vigilance as all vigilant activities are performed by all professions.

Vigilance can be maintained by encouraging team members to be aware of their surroundings (Carthey & Clarke 2011). Being aware enables the team members to actively observe and assess what is happening around them so they can identify and build information enabling them to notice deviations (Hughes 2008, Shepart 2012). Mesmer-Magnus & DeChurch (2009) in their meta-analysis found that information sharing is a central process through which team members collectively utilise their available informational resources. They identified three elements which enhance team information sharing: task demonstrability, discussion structure, and cooperation. Three factors were identified that detract from team information sharing: information distribution, informational interdependence, and member heterogeneity. The exchange of information between all team members can reduce the possibility of small errors from becoming big errors thus influencing positive patient outcomes. Greenberg *et al*. (2007) suggests that intraoperative team behaviours such as briefings, information sharing, inquiry, and vigilance have the potential to be useful in preventing negative outcomes. These proposed interventions could prevent forty five per cent to seventy three per cent of communication breakdowns. Similar explanations of how vigilance can be maintained and error reduced emerged within anticipatory vigilance through being in the know, mutual watching, rapid responsible responding and temporary restructuring which enables risk to be minimisied, thus adding to the body of knowledge on vigilance and risk.

The ever changing modern environment that nurses work in, incorporates learning new skills and adjusting to a new situation,n which lends itself to uncertainty and increased incidences of risk (Ebright *et al*. 2003). Nursing is multifaceted due to the many dimensions of the job from administration, caring, understanding disease process, giving specialised care and working in high risk settings such as perioperative and intensive care units (Scott *et al*. 2006, Rothrock 2011). Vigilance is required for positive patient outcomes (Ebright *et al*. 2003, Hughes 2006), good quality care ((Ebright 2004, Thomas *et al* 2006) to minimise risk for all involved in the working unit and as a component in risk management (Ramanujam 2003, Ramanujam & Goodman 2003, Wellbrink *et al*. 2004, Wellbrink & Buss 2004). In minimising risk the theory of anticipatory vigilance also potentially promotes positive patient outcomes.

Attributes identified within the current theory have beeb identified in literature in relation to vigilance. Vigilance was identified within the healthcare and nursing literature as watchful attention (Hirter & Van Nest 1995), being observant of signals and cues (Meyer & Lavin 2005) while Loeb (1994) identified elements of being watchful and the use of a response to an artificial signal (monitor) as an indicator of monitoring surveillance. Similar explanations of vigilance emerged within the theory anticipatory vigilance, where mutual watching which is a form of surveillance is both explicit and implicit depending on whether a person is watching/observing an action or is the instigator of an action. Mutual watching of actions and performance ensure that staff observe if something untoward occurs and that procedures are followed, in maintaining safety. These similarities all involve patterns of behaviour required in watching out, promoting and maintaining safety.

A Canadian study by Jeffs *et al*. (2012) using a constructivist grounded theory looked at how clinicians perceive and respond to safety events and errors. They found that communication between staff experiencing near misses involved clarifying and consulting on near misses and errors. However they found that collective vigilance could lead to a belief that others would detect and correct the errors, which resulted in a reduced personal vigilance and accountability. Aspects of this study are similar to the theory of anticipatory vigilance as it explains the behaviour of how nurses respond to unexpected events and

where the concept of mutual watching over others and pseudo safety was explained. However, the current theory differs as it suggests that risk can be minimised where staff are given or assume individual responsibility through locational orchestrating and also when they engage in mutual watching where staff look out for one another. Mutual watching involved the application of knowledge, skill and attitudes where staff need to remain alert, attentive, focused and watchful paying attention at all times, in order to minimise risk. Then such a process has the potential to increase responsibility and accountability thus minimising risk.

In the literature, vigilance and attentiveness are terms used in recognising the role of the nurse in detection of and preventing errors (Meyer & Lavin 2005, Bitz *et al*. 2009). Studies identified the importance of closeness to the patient and nursing vigilance (Needleman 2001, Clarke 2004) while Cooke (2006) identified the importance of presence and vigilance in maintaining quality standards. The current theory while identifying similarities found in these studies differs in that it offers an explanation on how risk is minimised through anticipatory vigilance, thus promoting better quality standards in practice

Vigilance is an essential element in speciality settings across diverse areas within nursing (Balas 2007). Some studies have qualitatively examined vigilance experiences of patients (Meyer 2002), their family members (Mahoney *et al*. 2003), parents (Dugley & Carr 2004), or nurses (Cooke 2006, Schrieber & Mac Donald 2010a, Schrieber & Mac Donald 2010b). While Meyer & Lavin (2005) and Scott *et al*. (2006) have written on nurses and vigilance, Moore & Duffy (2007) have written on patients. Vigilance was identified as an element of care in preventing negative outcomes in tuberculosis (Saral *et al*. 2005), lead poisoning (Florin *et al*. 2005), diabetes and bipolar disorder (McIntyre *et al*. 2005), patient safety activities (Lindblad *et al*. 2004), recording oxygen saturation levels (Gallagher & Mason 2004), cystic fibrosis (Dunne *et al*. 2011) and cancer treatment (Ganz 2001, Viele 2003, Casillas & Ganz 2009).

Ebright (2004) suggest that to improve patient outcomes and safety, the activities nurses undertake needs to be studied in their substantive environment. This has been addressed within the theory of anticipatory vigilance. This study was conducted in the natural setting of the perioperative environment and is multifaceted. Some studies conducted to-date in healthcare, specific to nurses and vigilance have presented a simplistic view of nursing vigilance as a task performance. However, more recent studies using a grounded theory methodological approach have identified a more explanatory theory to include vigilance, which explains how an aspect of human behaviour or performance is organised in connection with vigilance (Meyer 2002, Schrieber & Mac Donald 2010a, Schrieber & Mac Donald 2010b). The current theory of anticipatory vigilance identifies a strategy of behaviour used by nurses in the perioperative setting to minimise risk. Previous vigilance studies of nurses focused on the role that fatigue played in nurses' abilities to remain vigilant and respond to stimuli (Howard *et al*. 2003, Scott *et al*. 2006). Personal fatigue has been identified as an element in the occurrence of errors (Joint Commission's 2001, West *et al*. 2009), however this does not feature in the current theory.

6.3.3 Human Performance: Vigilance and the Theory of Anticipatory Vigilance

Vigilance is an essential element of human performance and is in keeping with the theory of anticipatory vigilance. Human factors accept the inevitability of error and human fallibility and believe that errors occur (World Health Organisation 2011). The National Health Service Institute for Innovation and Improvement (2010) suggest that some human factors such as effective communication, teamwork and decision making may benefit patient safety. This occurs through attaining a deeper understanding of human related clinical tasks and risks, which involve the human element of clinical processes to involve cognitive, social and behavioural factors. This is in keeping with the theory of anticipatory vigilance where communication is acknowledged within the concept of being in the know, teamwork is acknowledged within the concept of mutual watching, mutual dependency and temporary restructuring and decision making is acknowledged within the concept of trusting relations and situational orchestrating. The current theory has emphasised the importance of these elements and their interconnectedness. Organisational factors such as

culture, structure, efficiency, management, quality control and conflict, influence human performance (Helmreich & Schaefer 1994). Knowledge, understanding and awareness of the human factors that affect vigilance performance are vital for system reliability and maintaining safety (Nickerson 1992). Similarly, this is related to the theory of anticipatory vigilance as it identifies the importance of knowledge which is conceptualised as advanced knowing. Understanding and awareness are identified as properties of the concept of mutual watching, and heightened awareness.

Equipment should be designed in the workplace to try to minimize the likelihood of error and its consequences thus reducing the need for vigilance (Powell-Cope 2008). The theory of anticipatory vigilance while not disagreeing with this, emphasises that error is minimised through people. Recognising the impact of human factors on safety are fundamental in changing the safety culture of the perioperative setting. When teams work well together errors can be recognised, prioritised and managed before an expected unfavourable outcome becomes a reality (Association of periOperative Registered Nurses 2012). Similarly, within the current theory staff working in a team engage in mutual watching, thereby anticipating and identifying potential risk and should a potential risk arise, engage in momentary adapting, where staff respond rapidly to an unexpected event. The importance of human factors have been recognised in aviation, manufacturing and the military for some time, but has only recently being acknowledged in healthcare as a fundamental element of patient safety. Human factors accept the inevitability of error and human fallibility and believe that errors occur (World Health Organisation 2011). The theory of anticipatory vigilance adds to the available literature by suggesting that by using the specific strategies of orchestrating, routinising and momentary adapting for the perioperative nursing setting, risk can be minimised. It suggests that human behaviour is a major contributor involved within these strategies in minimising risk in promoting and maintaining safety.

6.3.4 Vigilance in Managing Risk and the Theory of Anticipatory Vigilance

Vigilance is a complex skill (Moore & Duffy 2007) and while there are many definitions of vigilance the majority of them appear to involve some form of watch keeping event either as a listener or an observer. In a Scandinavian qualitative study on operating theatre nurses' experience of patient-related, intraoperative nursing care, they found that one element of patient safety was maintained by keeping a watchful eye on patients (Kelvered *et al*. 2012). The current theory does not comment specifically on direct patient observation in maintaining safety, but could be considered to be similar to mutual watching whereby staff observe one another. Parasuraman (1984) suggests that vigilance is a characteristic of attention, which can be subdivided into selective and intensive sections (Posner & Boies 1971, Warm 1984), therefore aligning vigilance to sustained attention as oppose to selective attention (Parasuraman 1984). Furthermore he suggests that arousal is also related to vigilance, but only to the "overall level of vigilance" (Parasuraman 1984, p. 90). According to Oken *et al*. (2006) vigilance is generally referred to as sustained attention or tonic alertness. Selective and sustained attention were not separated within the theory of anticipatory vigilance but instead are identified within the whole theory. Shaw *et al*. (2010) suggests that vigilance considers the ability to tolerate and hold attention and to respond appropriately to the tasks and challenges of the environment. Within vigilance important cues are identified and noted (Moore & Duffy 2007). These cues may include a look, a request or a gesture from which meaning and assumptions are made in order to respond to a signal or deal with the potential adverse situation occurring. This is enacted through mutual watching ensuring that staff observe if something untoward is about to happen following procedures to minimise risk and maintain safety. The current theory adds to the literature on minimising risk explaining how trusting relations ensure the effectiveness of orchestrating, routinising and momentary adapting.

6.4 Theories of Risk and the Theory of Anticipatory Vigilance

Several theories of risk and safety have been identified in the nursing literature (Cook 2009, Despins *et al.* 2010). Cook (2009) considered normal accident theory, high reliability theory and the grid-group cultural theory and their relevance to nursing. The

normal accident theory developed by Charles Perrow (Perrow 1984) looked at how accidents are caused and the management of risk and safety in organisations. Firstly his framework consists of tight and loose coupling and secondly of complex and linear systems (Perrow 1984). Normal Accident Theory identifies the two types of coupling as tight and loose. In circumstances of tight coupling delays in processing are not possible, sequences are essential as there is only one way to achieve a goal, there is little leeway in terms of supplies or personnel and organisational supports, which may provide occasion and flexibility to rectify errors. In circumstances of loose coupling delays in processing are possible, as the sequences of activities or events can be changed and different methods are available to achieve a goal due to slack and flexibility in the system (Perrow 1984).

For normal accidents to occur, organisational coupling is tight rather than loose (Cook 2009). The theory of anticipatory vigilance acknowledges loose coupling during momentary adapting, where staff come together in temporary restructuring and rapid responsible responding with advanced professional knowing and heightened awareness. Normal Accident Theory identifies systems as complex and linear. Complex systems are characterised by "proximate, interconnected systems with multiple interdependent components and feedback loops" (Perrow 1984, p. 88). Within this, it is challenging to identify and separate failed components. Normally individual workers are highly specialised thus having a limited overview of the whole system. Linear systems have simpler processes which are less tightly spaced and allows for limited interdependence between individual components and have less feedback loops. Therefore it is easier to separate and identify failed components. Individual operators normally have a better understanding of the whole system (Perrow 1984). For normal accidents to occur processes in the workplace are normally characterised by interactive complexity systems rather than linearity systems (Cook 2009). The theory of anticipatory vigilance acknowledges complex systems as the pattern behaviour presented by staff when working in the complex environment of the perioperative setting (where people are co-dependent). When an accident occurs within a complex system normally there is something wrong and more than one element in a system is at fault. Well-designed complex systems contain redundancy, so that an individual fault does not prevent proper operation. Normal accident theory highlights, that social redundancy can disperse and reduce responsibility for

identifying errors (Tamuz & Harrison 2006). The theory of anticipatory vigilance increase the responsibility of individual nurses for identifying and detecting error through routinising where habitual checking, rule following and mutual watching is carried out while being mindful of the task being undertaking. Therefore the theory suggests that by increasing responsibility for error identification and detection then error can be reduced. Perrow (1984) suggests that accidents are inevitable and high risk industries should utilise loose coupling and linear systems to reduce risk. Tamuz & Harrison (2006) suggests that the application of normal accident theory frames and impacts on patient safety by raising awareness of unavoidable risks and highlighting essential issues around introducing safety practices from industry into the hospital setting. Similarly the theory of anticipatory vigilance offers a framework which clarifies understanding and in this way promotes patient safety. Furthermore it adds to this theory in how to respond when an unexpected event occurs and how to minimise potiential risk

The high reliability theory was generated as an alternative to the normal accident theory. It was designed for all organisations. The aim of the high reliability theory was to create highly reliable organisations where catastrophes would "nearly never" happen (Cook 2009, p. 259). In building failure free organisations, high reliability organisations need to put safety central to all that they do, foster informal flexible networks with the experience to respond to risk or danger, build a culture of mindfulness where people learn from their mistakes, create 'redundancies' thus avoiding the development of systemic errors (Rijpma 2003). The promotion of a safety culture is fundamental in high reliability theory and suggests that open reporting systems prevent errors as the organisation learns from these incidences. Another suggestion of the theory within healthcare gives priority to the decreasing difference in service delivery by encouraging standardisation of care policies, which is linked to evidence based practice. Cook (2009) suggests that safe care is synonymous with care given when adhering to evidence based guidelines or protocols. This is consistent with the theory of anticipatory vigilance where nurses understand the importance of guidelines and protocols as they use routinising and rules following to ensure safe practice.

High reliability theory also suggests that double checking to avoid errors may undermine mindfulness of risk (Tamuz & Harrison 2006) due to its repetitive nature. Reason (1990) and ISMP (2003) also noted that effectiveness may be reduced in double checking as people hear and see what they expect to see. Sagan (2004) suggests that when people are aware that others are replicating their activity it may disperse responsibility and lead individuals to overlook safety checks. The current theory differs in this as it suggests when habitual checking is carried out through mutual watching mindfulness is potentially increased. Tamuz & Harrison (2006) suggest that the application of high reliability theory frames impact on patient safety as it aim to reduce error. Similarly anticipatory vigilance has the potential to impact on patient safety by increasing awareness and understanding of the role of perioperative nurses. Finally high reliability theory is fundamentally a theory of the culture of the organisation as it looks at how the organisational structures help to prevent error, however it overestimates the extent to which organisational cultures can be changed from the top management down to lower management (Cook 2009). The theory of anticipatory vigilance differs from high reliability theory as within orchestrating, different ranks of staff such as CNM3, CNM2, CNM1. Staff nurses are all given responsibility to undertake a task or action whereby any of the roles within macro orchestrating, locational orchestrating and situational orchestrating can be carried out by all levels. It also adds the dimension of momentary adapting where people take responsibility due to their skill and expertise rather than their status.

The grid-group cultural theory acknowledges that organisation culture can be changed from the top down. It was developed by anthropologist Mary Douglas (1992). Cook (2009) suggests that the grid-group cultural theory states that the culture of an organisation or social group reflects important dimensions of its make-up. Key areas of social life are promoted as having influence on the culture of an institution which are the terms grid and group. The term grid used within the cultural theory identifies the level of hierarchy and structure within the organisation or social groups that provides an explanation about the allocation of power and resources. Grid is expressed through the different statuses, rules, procedures, organisational structures and role differentiation (Cook 2009). The term group within the theory identifies the level of social cohesion within an organisation or social group including the strength of group boundaries, which is expressed through shared

rituals, symbols and values. Within the grid-group cultural theory the terms grid and group interact to create four stable cultural biases which are termed isolation /fragmented, markets, bureaucracy and command, which identify where different levels of grid and group interaction are required (Cook 2009). The theory of anticipatory vigilance differs from the grid-group cultural theory as it was generated within the culture of the perioperative setting identifying the patterns of behaviour of nurses who work there when they are minimising risk as opposed to looking at the culture of the organisation in general. According to Douglas (1992), blaming and perceptions of risk are key within social groups and how they articulate their world view. Cultural biases may act as 'blinders', which conceal some risks from view (Appendix XX1). The four cultural types identify risk in different places and subscribe to different theories about the causation of risk (Appendix XXII). The grid-group cultural theory identifies that political considerations can distort the perception and management of risk. An open and just organisational culture minimises the blame and is concerned more with primary safety (Power 2004). The theory of anticipatory vigilance differed, as the blame culture did not feature within the theory as it did not expand to explain what occurred within the clinical setting once an unexpected event had been dealt with. The key aim of the grid-group cultural theory is that culture matters and explains how people perceive and act upon the world around them (Cook 2009). The theory of anticipatory vigilance has similarities to aspects of the grid group cultural theory whereby hierarchy and structure within organisations are expressed through status, rules, procedures, structures and role differentiation through the strategy of orchestrating (where the structure of organisational management are explained) and through routinisation where adherence to rule following is undertaken. However fundamentally the theory of anticipatory vigilance differs in its ethos to the grid-group cultural theory as its central focus is based on how perioperative nurses resolve their main concern of minimising risk.

Despins *et al* (2010) considered the patient risk detection theory, which synthesized concepts of signal detection theory and high reliability theory. Signal detection theory considers the decision-making processes of nurses as they look and check to distinguish signals of potential patient harm. High reliability theory considers nurses' signal detection capacities are facilitated when healthcare settings operate as high reliability organisations.

The risk detection theory assists the understanding of the individual and organisational factors that help nurses detect risk in the hospital environment. While concepts of high reliability theory were similar to the theory of anticipatory vigilance as already discussed the signal detection did not feature. However the signal detection theory could modify the theory of anticipatory vigilance by looking at how decisions are made. The theory of anticipatory vigilance was generated in the high risk perioperative setting where staff are normally highly skilled to events that occur rapidy and where decisions are made quickly and smoothly without question during an unexpected event but it did not explain how decesions were made.

The current theory adds to existing risk theories by offering an explanation of patterns of behaviour in minimising risk. Anticipatory vigilance encapsulates and offers a fundamental starting point in divising polices and procedures in minising risk. Explaining the theory of anticipatory vigilance provides practitioners with a structure in how to minimise risk in the perioperative setting connecting the complexities within risk and vigilance in perioperative nursing. The literature will now be considered in relation to the concepts that emerged within the theory of anticipatory vigilance, commencing with trusting relations.

6.5 Trusting Relations

Trusting relations emerged as an essential thread linking all the strategies of orchestrating, routinising and momentary adapting, underpinning the theory of anticipatory vigilance. Trusting relations are a prerequisite required for anticipatory vigilance to be carried out smoothly and effectively.

Within the literature trusting relations are generally discussed under the term trust. Trust is an essential characteristic of human interaction as generally people trust one another and only withdraw that trust in circumstances where they have reason to be mistrustful. Hwang & Burger (1997) suggest that trust is an important condition for cooperation when working

with others. This is similar to the theory of anticipatory vigilance where trusting relations underpin all concepts. Philosophers from Thomas Reid to Tyler Burge, Ruth Millikan, and Daniel Gilbert, suggest that people are basically trustful, if not gullible (Sperber *et al*. **2010).**

Trust is associated with levels of effectiveness. DinÇ & Gastmans (2012) suggest that professional trust is directed at meeting needs and solving problems and professionals must be trustworthy and competent. Surgical teams need to also have mutual respect for one another and where this is missing the team may breakdown (Feldman 2006). Effective relations between team members involve trust, respect, and collaboration (O'Daniel & Rosenstein 2008). Feldman (2006) suggests that for teams to function successfully they must have a measure of mutual respect for one another. This respect permits them to correct one another and provide support and advice thus optimising patient care. Trust, respect and collaboration assist in forming effective relations between team members (O'Daniel & Rosenstein 2008). Trust and respect within the surgical team offers a support structure for one another and allows for a person to provide advice and direction when required (Feldman 2006). There should be a mutual understanding and trust among the team to undertake the task of patient care and all are responsible and accountable for the uncomplicated surgical outcome (Corbett 2009). This is consistent with trusting relations in the current theory where its importance is explained when people work together effectively as a team in the perioperative setting. Trusting relations is indicated by listening, abiding by requests made by others and joint decision making. Building trusting relations takes time and involves interaction where rapport is built through working together, while recognising the strengths and weakness of colleagues. Chadwick (2010) suggests that trust between team members is based on respect for one another's opinion and being willing to listen and share viewpoints openly resulting in a stronger team and improved patient outcomes.

Trusting relations are essential when working in teams and they underpin the process of anticipatory vigilance. Teamwork is essential in the perioperative setting as the safety of the surgical patient is a priority for all staff (Association of Operating Room Nurses 2006)

and is a key component of safe practice for all effectively functioning systems involving numerous people (World Health Organisation 2008a). Surgical multidisciplinary teams are required to be supportive and have open relationships where credibility and attentiveness are essential (Association of Operating Room Nurses 2006). This support structure relates to the concept of trusting relations and how these are maintained. The current theory suggests that establishing trusting relation takes time and involves interaction where rapport is built through working together and through recognising strengths and weaknesses of colleagues. The theory of anticipatory vigilance adds to the understanding of trusting relations as it explains what they are and how they can be achieved. Trusting relations is an underpinning concept that support staff in operationalising systems standards and procedures in minising risk, thereby promoting quality care and patient safety.

6.6 Orchestrating

Orchestrating is a strategy employed by nurses in managing people and workloads in the perioperative setting ensuring the safe management of the department. Organisational managing and leading in a perioperative departments is not a simple task of providing safe care and reducing risk. Provision of a safe environment requires co-ordinating the diverse skill mix of numerous personnel (Pfiedler Enterprises 2011). This is discussed in the literature as organisational management. Sullivan & Garland (2010) suggest that Henry Fayol in 1916 identified the functions of organisational management as planning organising, directing and controlling.

Macro orchestrating is consistent with effective and efficient planning, delegating, co-ordinating and communicating. Similarly Pfiedler Enterprises (2011) suggests that managers need to focus on frontline performance, when planning, delegating, organising and scheduling workloads and identifying staff in maintaining order and productivity and maximizing operational efficiency. Sullivan & Decker (2009) suggests that planning is required at both an organisational and personal level that answers the questions of what, why, where, when, how and by whom.

Organising is the method of coordinating the work to be undertaken (Sullivan & Decker 2009, Sullivan & Garland 2010). It incorporates "identifying the work of the organisation, dividing the labour, developing the chain of command and assigning authority" (Sullivan & Decker 2009, p. 56). Directing is the method for guiding the work to be done within the workplace through instruction and coordinating activities (Sullivan & Garland 2010). Planning, organising and directing are an active approach to organisational management (Sullivan & Decker 2009). Planning, organising and directorship are addressed within orchestrating by the person who undertakes the role of macro orchestrating and locational orchestrating.

Leadership play a vital role at each level of effective management (Sullivan & Decker 2009, Sullivand & Garland 2010). Effective management spans across diverse groups from team leaders, middle managers (e.g. heads of clinical units) to top-level managers (e.g. healthcare organisation senior managers/chief executive officers) at a strategic level (World Health Organisation 2009b, 2009c). Strong leadership is recognised as a necessity in building a culture of safety (NPSA 2004). The theory of anticipatory vigilance identifies a similar span across all levels of management. This is consistent with the key roles within macro orchestrating, locational orchestrating and situational orchestration within the theory of anticipatory vigilance. Within orchestratin,g perioperative nurses were found to have different managerial roles such as Clinical Nurse Managers (CNM) 3 roles within macro orchestrating and CNM2 and CNM1 within locational orchestrating where safe tasks were delegated and overseen in order to minimise risk. This approach is based on effective management within orchestrating, however there may be consequences if poorly executed resulting in increased risk of error. Being able to influence a team is a key leadership skill (Cameron 2011). Silén-Lipponen *et al*. (2005) highlight that management improved safety by assigning experienced staff to each team. This is undertaken within the current theory through macro orchestrating and locational orchestrating

One trend in risk management in identifying and minimising risk is the undertaking of audits. This did not emerge within the current theory. Since much is written in the literature in this area, it may offer comparative data for the modification of the theory of

anticipatory vigilance should formal theory be considered. The Department of Health and Children's (2008) suggests that nurse managers need to be involved in systematic clinical audits to record and prevent errors in setting standards and measure performance against international standards. Health Information and Quality Authority (2009b) recognised the key role that clinical audit plays in promoting quality care and safer practice. However there is no single means of measuring patient safety, but through reporting patient safety incidences, healthcare workers can learn from errors that occurred in the past and thus prevent reoccurrence of unsafe practice (National Patient Safety Agency 2004). Again the reporting of errors did not emerge or earn its way into the data within this study. However, this literature may offer comparative data for the modification of anticipatory vigilance, should formal theory be considered, in that it may offer or potentially lead to another category within the theory of anticipatory vigilance of what occurs after an unexpected event has been dealt with by staff.

Vigilant management and vigilant communication are necessary dimensions to protect the organisation (Shearer 2002). This finding differs from the theory of anticipatory vigilance, which is associated with minimising risk as opposed to protecting the organisation. Howard *et al*. (2003) in their quantitative study on sleep deprivation on psychomotor and clinical performance of anaesthetic residents conceptualised vigilance as a task performance whereas the current theory expand on this to consider and explain anticipatory vigilance as a behaviour that occurs constantly within the perioperative setting. In the current theory tasks are delegated and undertaken through macro orchestration with the purpose of maintaining safety. Shearer (2002) associates responsibility, controlling, regulating and guarding as dimensions of vigilant management alongside seeking information, persuading and altering perceptions. A structured environment within the perioperative setting enables a vigilant culture. This is similar to orchestrating as people engage in structures and systems in managing and organising work within the operating room. They also engage to maintain structures and systems.

Macro orchestrating, locational orchestrating and situational orchestrating within the theory of anticipatory vigilance are consistent with the identification of different levels of

management such as top, middle and lower management (Sullivan & Garland 2010). Macro orchestrating is consistent with top management, which is a daily activity that ensures the smooth and safe management of the department, which endeavours to maintain structural safety. It involves the leading, managing and co-ordinating of staff. Locational orchestrating consistent with middle management emphasises the smooth and safe management of a specific operating room, and situational orchestrating is consistent with lower management, which ensures the responsiblity of the individuals and co-workers in minimising risk. World Health Organisation (2011) recommended that efficient and effective leaders co-ordinate and facilitate teamwork by: delegating tasks, conducting briefs and debriefs, resolving conflict, empowering team members, incorporating training for staff and balancing the workloads of staff. These recommendations are conceptualised within the current theory within orchestrating.

Delegating of workloads and task is explained by macro orchestrating where team members are empowered through locational orchestrating whereby responsibility is shared. However, conducting briefs and resolving conflict did not feature within the theory. A leadership role is identified as a position of power and authority (Jooste 2004) and is described as leading others by offering direction and coaching whilst understanding and considering the roles and needs of others (Mitchell *et al*. 2011). Typically the perioperative unit is lead at Clinical Nurse Manager (CNM) 3 level and individual operating rooms are managed by a lead nurse at CNM2 level. Nurse Managers within the perioperative setting manage and coordinate multiple, complex situations (Hussey *et al*. 2011). The key roles of the CNM3 include staff rostering, coordinating patient throughput, scheduling procedures and resources, as well as monitoring performance of nurses and workload in the operating room (Marjamaa & Kirvela 2007). Similarly, these lead roles emerged within the theory of anticipatory vigilance through macro orchestrating, locational orchestrating, situational orchestrating and being in the know in managing and leading people and activities in minimising risk. Orchestrating ensures that anticipatory vigilance occurs by coordinating all activities and tasks within the workplace. Successful orchestration gives responsibility to different nurses across different levels to deal with events as they arise and promotes good team work

Also within orchestrating an aspect of communication is conceptualised as being in the know which is fundamental in minimising risk. Power and leadership styles are interrelated when directing workloads. Communication and delegating are fundamental to the leadership roles (Sullivan & Decker 2009, Sullivan & Garland 2010). Being informed is vital to enable the smooth organisational management of the perioperative setting. This is conceptualised in the current theory as being in the know. It emphasises being informed of what is happening within the setting, which enables the nurse to be acquainted with and to understand what is occurring. This ensures that nurses understand what is happening in the operating room and is dependent on appropriate and timely communication. Perioperative nurses need to engage in communication among team members for the coordination of activities through clearly explaining what they require, maintaining eye contact and listening to what is being requested of them (Rothrock 2010). Communication that is timely, accurate, complete, explicit and understood, reduces error thus improving patient safety (Amato-Vealey *et al*. 2008). Good communication enables efficient perioperative practice as staff are kept informed of what is occurring and what has occurred. The theory suggests that being in the know makes staff more aware of their surroundings and more responsive to what is going on through verbal and non-verbal communication. Being in the know is maintained and enhanced through trusting relations amongst colleagues. Being in the know adds to the current literature as it goes beyond communication to the constancy of being informed through being in the know. Poor communication may result in error. Greenberg *et al*. (2007) studied the entire spectrum of surgical care identifying communication breakdowns as a major cause of error resulting from a failure of verbal communication during surgeon communication with other caregivers being ambiguous about responsibilities. They recommend interventions to prevent breakdowns in communication as defined triggers that mandate communication with an attending surgeon; structured handoffs and transfer protocols; and standard use of read-backs, which could prevent forty five per cent to seventy three per cent of communication breakdowns. Being in the know adds to the current literature as it explains its cruciality in linking all aspects of orchestrating together in minimising risk.

Where poor communications result in error the perioperative practitioner may be made accountable for either their actions or lack of action by law (Smith & Jones 2009).

Gawande *et al*. (2003b) identified failures in communication and vigilant behaviour as playing a role in making adverse events more likely to occur. Similarly, being in the know suggests that effective communication is essential for staff to be kept well informed and updated of situations that are unfolding so that good quality care is given.

Humans are known for their cognitive abilities, which rely on a broad diversity of information communicated by other people (Sperber *et al*. 2010). Mill *et al*. (2008) found that nurses and anaesthetists have reduced positive perceptions of the effectiveness of their own communication within healthcare in comparison to their surgical colleagues (surgeons). Nurse - doctor communication in the operating room and on ward rounds have sometimes appeared to be verbally inactive as staff are not empowered to communicate with one another (Lingard *et al*. 2004, Manias & Street 2001). This differs from the patterns of behaviour which emerged as being in the know and identified that communication was a collaborative and mutually informative process between nurses therefore having the potential to inform interprofessional communication.

Being in the know results from good collaborative communication which ensures that information has been processed. The literature is consistent with this and identifies that communication is generally carried out intentionally and overtly whereby information is intentionally conveyed to another (Hargie 2011). For effective communication to occur both the communicator and the addressee must work together by performing the communication and interpreting the information given (Sperber *et al*. 2010). Interpersonal interaction is traditionally known as collaboration (Van EssCoeling & Cukr 2000). It occurs between nurses and doctors in a spirit of trust (Stein-Parbury & Liaschenko 2007). This takes time and involves interaction where rapport is built through working together, while recognising strengths and weakness of colleagues. This is emphased in the current theory as trusting relations.

Being in the know provides information to people about what they are dealing with at a given time. This is supported by Brizon & Wybo (2006) who describe three rules within

organisational management to support vigilance within an organisation. The first rule ensures people are informed about potential risks such as medical allergies and patients with similar names. This is done through systematic checking, which is similar to the concept of habitual checking within the current theory and is a key component in ensuring that anticipatory vigilance is sustained.

The second rule seeks out information from all the system's members, as they are the individual observers of danger precursor signals. Within the perioperative setting patient information and sequencing of the surgical list is shared within the surgical team between nurses, anaesthetist's, surgical doctors and surgeons. This is critical to being in the know where the importance of communication and receiving information were identified as being essential in minimising risk and maintaining safety. Observations of danger signals and nurses watching each other was conceptualised as mutual watching, which minimises risk while promoting and maintaining safety.

The third rule states that cause must be processed before consequences. In the current theory this is dealt with through professional knowing where people must know what they are doing and the consequences that occur if there is a deviation from best practice. This understanding from the theory is evident in the literature where the World Health Organisation Check list promotes being in the know, which leads to the reduction of error (World Health Organisation 2009a). Implementation of The World Health Organisation "safe surgery saves lives" checklist (World Health Organisation 2008a) is valuable in promoting communication between interdisciplinary teams and is fundamental to providing information. The use of this checklist encourages information exchange and team unity (Lingard *et al*. 2005). The current theory suggest that checklists promote safe practice and habitual checking involves two or more people coming together looking, inspecting, counting and sharing this information in order to minimise risk. Team briefings also improve communication between team members (McCulloch *et al*. 2009, Catchpole *et al*. 2008, Mishra *et al*. 2008). The theory of anticipatory vigilance adds to the understanding of being in the know as it explains why and how it is done.

Orchestrating adds knowledge to the existing literature by explaining how risk is minimised through effective management, which is interrelated with being in the know. The theory of anticipatory vigilance links all aspects of organisational management in minimising risk thus promoting and maintaining safety within the perioperative area. It also explains the importance of trusting relations in carring out orchestrating.

6.7 Routinising

Routinising is the usual pattern of how work or activities are carried out to minimise and manage risk. Routinising consists of habitual checking, rule following, mutual watching and mutual dependency. Routinising provides structure for organising, planning and implementing activities within the setting. The operating room is a controlled environment where many routine practices take place during the organisation and management of surgical procedures (Rothrock 2010).

Habitual checking is undertaken continuously in the operating room and helps to minimise risk. Nurses continually check to confirm, validate and report concerns regarding patient safety in their work practice (Van de Castle *et al*. 2004). This is similar within the theory of anticipatory vigilance where habitual checking validates and documents the majority of routines that are carried out such as counts, patient check lists, consent forms, instruments. Kerr (2009) suggests that double checking itself could lead to deferring responsibility to others. However in the current theory habitual checking is not enacted in isolation and is just one way that risk is reduced.

Aspects of the theory of anticipatory vigilance involve tasks performance which includes habitual checking. Vigilance is identified as a task performance (Howard *et al*. 2003, Mahoney *et al*. 2003) and the habitual checking of devices is discussed within the literature (Carthey & Clarke 2011). They identify the human factors model of the Swiss Cheese Model of organisational accidents (Reason 1990), which suggests that in any system there

are different levels of defence such as checking of drugs before administration, a preoperative checklist or marking a surgical site before an operation. Checklists are an integral part of all the perioperative settings and have become routines practice (Carthey & Clarke 2011). The World Health Organisation developed surgical guidelines for safe surgery to reduce deaths and complications during the surgical experience (Gawande 2007, World Health Organisation 2008a). These were introduced world-wide to reduce the number of errors and complications in surgery by enhancing team communication and awareness in the perioperative setting in 2009, which sought to improve the safety in the operating room (Hurlbert & Garrett 2009, National Health Service Nation Patient Safety Agency 2009) and could be viewed as a vehicle to encourage participation from team members in reducing errors (Mitchell 2010). The introduction of the checklist has increased team communication and reduced morbidity and mortality globally as a result of error (Haynes 2009). Silén-Lipponen *et al*. (2005) propose that safety is controlled and errors are prevented by carrying out routines and double checking at a team level. However, they also suggest that rechecking or having rules are not sufficient to reduce error as a human effort is also involved. Davis *et al*. (1997) cautions people on ritualistic checking, which may result in a sense of security (Cooper 1995). Kooken (2008) suggests that routines are developed in order to promote vigilance and found that routines enhance vigilance by providing a purposeful structure for nurses and patients within cancer nursing. The current theory differs in that it suggests that routinising is one strategy for reducing the uncertaintly of missing or forgetting a vital component of a task and ensures safety by minimising risk through the systematic way work is undertaken. Furthermore it suggests that people engage in structures created by orchestrating through routinising.

The importance of checking has received attention in the perioperative setting with the surgical checklist. It is now one of the many new routines carried out in the perioperative setting (Association of periOperative Registered Nurses 2012). This is an example of one of the many checklists that is completed during habitual checking and one strategy for undertaking this is mutual watching which involves watching other team members when carrying out care or checking aspects of care together. The checklist has provided the opportunity, for both time and verbal communication between the surgical team to consider and discuss the patient in their care from a safety perspective (World Health

Organisation 2009a, Hughes 2008). There is evidence that engaging in habitual checking is effective in reducing risk. Haynes *et al*. (2009) found that deaths reduced from one point five per cent before the surgical checklist was introduced to nought point eight per cent, which was a statistically significant reduction. Inpatient complications following surgery reduced from eleven per cent to seven per cent again a statistically significant reduction. These results are in keeping with de Vries *et al*. (2010) findings that after implementation of the checklist there was a decrease in number of complications from twenty seven point three per cent to sixteen point seven per cent, resulting in an absolute risk reduction of ten point six per cent. Furthermore they found that the number of surgical patients with one or more complications reduced from fifteen point four per cent to ten point six per cent, which reached statistical significance and in-hospital mortality reduced from one point five per cent to nought point eight per cent.

McConnell *et al*. (2012) support the reduction of errors since the implementation of the surgical checklist and also highlighted new figures from The Netherlands where a more comprehensive checklist was utilised in Dutch Hospitals, which extended from admission to discharge (de Vries *et al*. 2009, de Vries *et al*. 2010) and found similar results. These findings are consistent with reduction in error even though they were carried out two years apart in different countries. Haynes *et al*. (2011) also found that improvements in postoperative outcomes correlated with an increased awareness of teamwork and the creation of a safety climate, which they believed may have been due to the introduction and use of the checklist. Furthermore this checklist has been used successfully in the United States since 2004 and it is now a mandatory element of surgery (World Health Organisation 2008a, 2008b). Implementation of the surgical checklist (Haynes *et al*. 2009, de Vries *et al*. 2010). Haynes *et al*. (2009) and de Vries (2010) found that implementation of the surgical checklist has been been associated with a decrease in surgical complications and mortality among surgical patitents in the hospital setting. McConnell *et al*. (2012) supports these findings. Similarly within the current theory the use of checklists is addressed within the concept of habitual checking. However habitual checking goes beyond the checklist as even though it is primarily a safety check with many different presentations such as automatic, visible, mandatory or consequential it also has the potiential to increases competency levels.

Rule following, aims to ensure that policies and guidelines are followed in minimising risk and is similar to the findings in the literature which discusses the use of rules, regulations, and policies. Rules, regulations and policies prescribe evidence based practices, tasks, prerequisites and the sequence of how activities should be performed therefore supporting, protecting and benefiting both nurses and patients (Association of periOperative Registered Nurses 2012). Health care facilities and hospitals report that they have been able to develop and adopt safe protocols and procedures to effectively reduce medical errors. This is conceptualised in the present study as routinising as it comprises of habitual checking and rule following. Rule following suggests that by adhering to policies risk is minimised during surgical procedures. Chappy (2006) found in her perioperative study on reported incidents of error that seven per cent of participants did not follow policies and procedures. She also found that nineteen per cent were involved in the lack of preoperative skin preparation and laboratory work and sixteen per cent were involved in the non-adherence of protocols with patients who had reported allergies to latex and/or iodine. Furthermore fourteen per cent reported other incidents involving specimen mishandling and thirteen per cent were involved in improper sharps disposal practices. There were seven cases (eleven per cent) in which intraoperative protocols were not followed (such as, not applying sequential compression devices, using the wrong irrigation solution). Another incident highlighted five surgeons operating without a qualified assistant which was directly violating hospital policy. Therefore this study shows that not following the rules result in increased safety issues.

Adhering to policies and rule following is undertaken by nurses to protect themselves and their patients against error and mistakes. Perioperative nurses meet significant challenges in maintaining patient safety in the perioperative environment (Fairchild 1996), so the use of guidelines and policies when caring for surgical patients help to promote safety (Dunn 2003). Policies are provided by local management within the different perioperative settings and should be based on the association of operating room best practice guidelines (Association of periOperative Registered Nurses 2012). These recommended practices provided for perioperative nurses, managers and educators, offer standards and information for providing a safe environment of care across the wide spectrum of safety practices required in the perioperative setting (Association of periOperative Registered Nurses 2010,

2012). These practices define the scope of responsibility to ensure safety and are published and updated yearly, providing updated rationales, justification and recommendations for all elements of practice (Association of periOperative Registered Nurses 2012). These recommended practices are generally followed or used as a baseline for all local policies and procedures in perioperative departments in Ireland and beyond. The concept of rule following emerged as nurses were seen to follow rules and procedures in maintaining anticipatory vigilance in minimising risk. This is consistent with the literature that suggests that recommended practices and guidelines promote safety and should be adhered to (Clarke & Jones 1998, Rothrock 2010). Standardisation of clinical practices through the use of recommended practices and guidelines is intended to ensure transparency and better patient outcomes (Association of periOperative Registered Nurses 2012). However, Mulloy & Hughes (2008) suggest there were no evidence to support that universal protocols are effective in relation to wrong site surgery following the Joint Commission's Universal Protocol (Joint Commission 2009a, 2009b) or other standardised process, or with the effectiveness of the surgical team in communicating with each other**.** The current theory adds to our understanding of rule following as it suggests that it does not occur in isolation, but instead is interlinked with mutual watching which encourages mindfulness when undertaking any task or activity.

Mutual watching of actions and performance ensures that staff observe if something untoward occurs and that rule following and the initiation of the appropriate procedure is adhered to in maintaining safety. Watching something or somebody means to look closely and attentively during the observation of an event. Meyers *et al*. (2007) associate professional vigilance, with the art of watching out. This act of watching out is linked with assessment in the case of nursing diagnosis. The element of watching out within anticipatory vigilance was conceptualised as mutual watching. It is fundamental in observing the behaviour of others and predicting new events occurring, as otherwise indications of errors go unnoticed leading to greater risk and grim consequences. Berch & Kanter (1984) looked unsuccessfully to find one major predictor of watchfulness in relation to psychological traits and monitoring performance. Nurses facilitate mutual watching by being alert and by having an understanding and knowledge of the surgical environment. If people do not engage in mutual watching errors may occu,r as cues,

signals or essential tasks may be missed resulting in increased risk. Mutual watching explains how staff must remain alert, attentive, focused, and watchful, paying attention to detail at all times by constantly observing, watching, listening and tuning in to the action of others in supporting one another during surgical procedures therefore risk is more likely to be noticed and addressed and safer practices are ensured.

Being vigilant involves paying attention to all different types of parameters: health, security and quality in order to reduce risk (Hughes 2008). Helton *et al*. (2005) suggest that vigilance tasks need people to observe and monitor displays over time and to utilise overt detection responses to the low critical signals. Similarly the literature discusses the significance of attention in identifying potential risk. Attention is the ability to concentrate and stay orientated on particular features within the environment (Hughes 2008). Stay attentive and being focused on a given task are essential when being involved in mutual watching within the theory of anticipatory vigilance. Mutual watching involves nurses staying attentive and focused in checking that rule-following is undertaken and that nothing is missed. It also involves noting and watching what is going on at all times with colleagues in supporting one another. This enablesr nurses to inform one another and change what they are doing in response to what they observe. Myers (2008) suggests that attention can be selective when a person focuses their conscious awareness on a specific stimulus. Attention is looked at within the literature under selective attention, divided attention, sustained attention (vigilance) and control of attention (Ward, 2004). This contrasts with the concept of mutual watching within the theory of anticipatory vigilanc,e which does not break down the different types of attention as it is interlinked, but with further research may have the potential to expand this element of the theory. Mutual watching also identifies the need to be alert at all times. Similarly the literature discusses the significance of alertness in identifying potential risk, which is in keeping with mutual watching. The American Nurses Association (American Nurses Association 2001) Code suggests that nurses must be alert to and take appropriate action at all times in promoting safety. Perioperative nurses have ethical responsibility to ensure optimal patient outcomes and minimising their risk (Voight 2009). Mutual watching is one strategy used in achieving this.

Watchfulness and surveillance have been explored separately in the literature (Berch & Kanter 1984, Kelly &Vincent 2011). Yet both allude to their necessity of observing events and identify threats to patient health. This contrasts with the theory of anticipatory vigilance,. which does not separate watchfullness and surveillance as the whole theory incorporates surveillance and watching others. Kelly & Vincent (2011 p 658) identify nursing surveillance as the way to initially recognise threats to patients health and safety through the use of "purposeful on-going acquisition, interpretation and synthesis of patient data for clinical decision-making".

Furthermore they identify nursing surveillance as a key role for nurses in the acute setting and is essential for patient safety and outcomes. The importance of surveillance in risk management is identified (Dart 2009). Current literature associates insufficient surveillance with failure-to-rescue (Clarke & Aiken 2003, Clarke 2004, Institute of Medicine 2004, Manoijlovich & Talsma 2007, Kutney-Lee *et al*. 2009, Kelly & Vincent 2011). Failure to rescue is discussed within the literature (Clarke & Aiken 2003, Clarke 2004, Manojlovich & Talsma 2007), which alludes to the clinician's inability to save a patient's life during a medical complication. In rescuing the patient, the nurse is required to anticipate events by observing and being aware of complications and pick up on cues. Within the theory of anticipatory vigilance nurses are always alert and mindful of predicting behaviours in minimising risk with the aim of ensuring that failure to rescue does not occur. Negatu *et al*. (2007) suggests that adaptive behaviour is an element of intelligence that is improved through anticipatory activities. The current theory suggests that anticipatory behaviour is associated with the pre-empting of actions of colleagues, co-workers and others through the use of their senses, which ensures that people are constantly alert, therefore early and responsive decision making is utilised leading to a positive outcome. This emerged within mutual watching where nurses observe what is happening and are able to react quickly through momentary adapting when an unexpected event occurs. Mutual watching is influenced by mutual dependency.

Mutual dependency both creates and is a basis for team working. Healey *et al*. (2006), Coe & Gould (2008), Catchpole *et al*. (2008) suggest that teamwork has been identified as the

cornerstone of efficient practices in the operating room and as a key determinant of good surgical outcomes essential for safe working in complex, high risk clinical areas. Current organisational structures rely heavily on teamwork and are dependent on building a good working relationship with colleagues at all levels (Cameron 2011). Highly experienced teams are required, given the rising complexity of surgery in the perioperative setting (Feldman 2006). Mazzocco *et al*. (2009) found reduced teamwork behaviours increased the risk for complications and death for patients. Mutual dependency occurs within teams where people work collaboratively in achieving shared goals. Alfredsdottir & Bjornsdottir (2008) suggest that perioperative nurses identify securing patient safety as a key nursing intervention. This is enhanced by a culture of prevention, protection and teamwork. Haynes *et al*. (2009) agree that teamwork is linked to improving surgical outcomes, with high functioning teams achieving significantly reduced rates of adverse events. Simpson & Knox (1999) recognise that healthcare staff working as a team as opposed to working as individuals promotes a better performance in quality and safety suggesting that increased patient safety results if basic principles of teamwork and dependability are more widely incorporated into the current health system. All members of the perioperative team play a vital role in patient care and work in an environment that encourages compliance with practice that promotes patient safety (Seifert 2009). This discussion identifies with the importance of team work and trust which emerged with the concept of mutual dependency. Mutual dependency occurs within teamwork where two or more people are required to work collaboratively together to achieve a shared goal. An additional element within mutual dependency is the idea of co-dependency, whereby nurses depend on colleagues supporting them when carrying out their tasks contributing to a safe, responsible and accountable performance. Within the current theory mutual dependency was co-dependent on mutual watching.

The literature discusses barriers to vigilance which did not emerge with the theory of anticipatory vigilance. However positive concepts emerged that enable barriers to be overcome. Brizon & Wybo, (2006) identify three different types of barriers to vigilance which are contextual barriers, routine barriers and communication barriers. The first two barriers are individual and the third is an organisational barrier. Contextual barriers refer to what needs to be noticed within a normal or abnormal environment. Generally abnormal

signals are identified more effectively in the environment. In this instant, the person working in the area must be attentive to given signals of danger or increased risk within the professional environment. During this phase of the vigilance process a person must have the ability to detect signals of danger and increased risk such as watching a colleague respond to a drop in a patients vital signs or deal with missing instruments or swabs. Sensitivity to the environment is essential to detect abnormalities. The current theory suggests that contextual barriers are overcome through mutual watching, which involves watching people perform their tasks so that irregularities and abnormalities that occur are observed, recognised and managed by experienced nurses as a means of monitoring performance through the concept of heightened awareness to an unexpected event. Mutual watching refers to watching others and noting what is happening around them, which results in the need for a positive active response not just simply the noticing of an event. Another way of dealing with contextual barriers is through heightened awareness, which is where the experienced nurse becomes more aware of and conscious about a situation.

The barrier of routine refers to the human sensor where a person is sensitive to a sense of danger when being vigilant as a precursor of a risk or hazards. If risk insight is reduced potential risk is not identified. This barrier matches the non-awareness of potential risk or danger in a high risk setting where danger signals may be perceived but not acted on. Perceptions of danger may need to be learned and education and training may improve this, as this has helped to reduce risk in other areas such as in the aviation industry (Morey *et al*. 2002). The current theory suggests that the mundane nature of routine that can lead to reduced vigilance is overcome through mutual watching, advanced knowing and heightened awareness. Being a competent educated practitioner ensures this occurs in practice.

The communication barrier refers to the transmitter of the signal. This incorporates being listened to and understood by colleagues. This phase of the vigilance process involves information gathering which ends in communication. Simplicity of the language reduces the communication barrier. Vigilance involves listening and being listened to within teamwork. While the theory does not identify this barrier it looks at how anticipatory

vigilance can be maintained through being in the know within orchestrating. Therefore the communication barrier is potentially overcome in the current theory by being in the know where people are constantly communicated with, informed and updated on what is going on around them. The theory of anticipatory vigilance expands the understanding of routinising, explaining what it is and how it can be achieved under the concepts of habitual checking, rule following mutual watching and mutual dependency, therefore also adding to the available literature in this area. It links its role with orchestrating and momentary adapting and identifies its fundamental role in minimising risk.

6.8 Momentary Adapting

Momentary adapting is the strategy used by nurses in responding to unscheduled or unexpected events in minimising risk. The literature supports this when it mentions positive patient outcomes, as the Department of Health Government of Western Australia (2005) suggests that adapting and responding to a new situation or event endeavours to ensure that positive patient outcomes result for the surgical patient. This is done during momentary adapting through rapid responsible responding, temporary restructuring, professional knowing and heightened awareness, where the theory suggests how nurses react, respond and adapt to unexpected events to minimise risk. Ensuring positive patient outcomes is a shared responsibility in the perioperative setting. Risk sharing of either a loss or a benefit endeavours to calculate and reduce the risk for individuals (Department of Health Government of Western Australia 2005). Key elements of maintaining a culture of safety are flexibility and learning to maintain safety and minimise risk within the perioperative setting (Association of Operating Room Nurses 2006). Flexibility is emphasised within the current theory and is a property of momentary adapting where nurses must be flexible and adaptable in responding to unscheduled events. Momentary adapting adds to the current literature in identifing its role in minimising risk.

The majority of the work in the setting is routine. However, the perioperative nurse constantly has to cope with potential changes in patients' well-being and the emergency nature of some of the work (Rothrock 2010). Ebright *et al*. (2003) suggest that the

unpredictability of acute care settings, misplaced information, undertaking different or difficult skills or techniques and constant change are ever present in acute health care settings so it is necessary to have structure in place to deal with them. These are normally dealt with through the ability of the practitioner to "anticipate, react, accommodate, adapt and cope to manage complexity in the midst of a changing environment" (Ebright *et al*.,p. 631). This adaption is similar to momentary adapting within the current theory, which occurs when an unscheduled event arises as a way of managing risk. Changing a planned direction and responding rapidly with a new plan of action is essential in momentary adapting during an unplanned event such as an unexpected happening during a surgical case or an unscheduled surgical case. Simons (2010) suggests that nurses are required to be aware and supportive with regard to risk reduction and management especially when adverse events occur. It is important that all people working in the perioperative setting are aware of potential risks (Wicker & O' Neill 2010).

There is evidence that emergency surgery has an increased number of errors which identifies the need for the engagement in momentary adapting during an unexpected event. Emergency surgeries make up half of the workload in perioperative settings in the National Health Service (Behar & King 2012). Increased surgical errors and wrong site surgery are more likely to occur during emergency surgery (Gawande *et al*. 2003b). Emergency surgical patients have a greater mortality rate than elective cases due to the nature and suddenness of their physical situation, which results in many challenges for the perioperative nurse when dealing with these emergencies (Rothrock 2011). This necessitates immediate intervention to sustain life, which requires the need for increased skill, speed, and adaptability for the perioperative nurse (Rothrock 2010). Gawande *et al*. (2003b) found that surgeons reported considerably more systems failures in events involving emergency surgery other than nonemergency care. The expectation of managing both elective and emergency surgical cases together is challenging for staff faced with reduced financial budgets, waiting lists and meeting the European Working Time Directive (Behar & King, 2012). The current theory suggests that the challenge of a surgical emergency and the reaction of staff can be accomplished through momentary adapting. The response of nurses to adapt to new events as they occur is through rapid responsible

responding, temporary restructuring, advanced knowing and heightened awareness. In this way momentary adapting contributes to minimising risk.

Rapid responsible responding addresses how nurses respond to an unexpected event. Rapid responsible responding involves performing rapidly in an accountable, effective and safe manner to an unexpected event and includes the different roles of nurses in the perioperative setting. The literature identifies the need for the concept of rapid responsible responding during an unexpected event, as patients are prone to sudden changes in their condition during surgical procedures due to health state, blood loss or age (Wicker & O' Neill 2010). A readiness to detect and respond to the need of the environment has been identified by Matthews *et al*. (1997). This readiness to respond emerged within the current study as rapid responsible responding.

Temporary restructuring occurs between staff in response to an unexpected situation in the midst of planned (elective) or emergency surgery. This identifies the importance of working together as a team. The theory of anticipatory vigilance emphasises the strong link within teamwork between mutual dependency and temporary restructuring. Team approaches involves all members of the team working together towards a focused goal (Ferrell & Coyle 2006). Work teams are responsible for generating products and services (Devine 2002). Furthermore interdisciplinary team's role blending may occur as team members may take on tasks normally carried out by others (Ferrell & Coyle 2006). Teamwork is carried out through strong and effective leadership provided by nursing and medical staff. Silén-Lipponen *et al*. (2004) found that teamwork in the operating room was enhanced through good organisation and professionalism which involved technical competency and a readiness to co-operate. The importance of teamwork also emerged within the concept of temporary restructuring where people come together with the expertise and a readiness to respond. Kerr (2009) proposes that while team working prevents errors through shared learning and monitoring, she realised that teamwork did not stand alone and individual autonomy to avoid a 'team think' balance was also required. Furthermore she suggests that errors cannot be entirely prevented but can be managed when teamwork and autonomy are complementary and flexible. This spirit of team work

allows the flexibility of temporary restructuring to be enacted. The current theory identifies the use of teamwork within temporary restructuring and acknowledges that it is not a stand alone component in minimising risk. Team roles shift and change in response to an unexpected event through delegation by macro orchestrating or locational orchestrating.

Within the theory of anticipatory vigilance the need for knowledge at an advanced level was conceptualised as advanced knowing. The literature identifies and acknowledges the need for knowledge at a specialist and advanced level. Shields & Werder (2002) and Harrington (2008) suggest that perioperative nurses need theoretical knowledge as well as technical skill to deal with the advancement in care. Education and training helps in developing understanding towards becoming competent with technologies and its associated hazards in order to minimise risk (O'Reilly 2010). Postgraduate programmes in perioperative nursing (level 9) are available for all nurses working in the perioperative setting in Ireland (An Board Altranais 2012). These programmes aim to provide the tools to build competency within the specialism of perioperative nursing. The intention within these programmes is the development of a more informed workforce as more nurses become qualified within the speciality of perioperative nursing where knowledge and understanding is increased. Reeves *et al*. (2009) in their Cochrane Collaboration Review look at six different studies. Four of these studies indicated that interprofessional education generated positive outcomes in the emergency department culture, patient satisfaction, team behaviour and a decrease in clinical errosr for emergency department teams; care management of victims of domestic violence; and competencies in relation to patient care with mental health. Furthermore they found that two of the six studies had mixed outcomes (positive and neutral) and two studies found that interprofessional education interventions had no impact on either professional practice or patient care. Having the education and training underpin the ability of what nurses need to know and what to do. Even though the emphasis in these studies is interprofessional education as opposed to education in general it still identifies the importance and the need for education and training. The current theory identifies the fundamental need for skills, knowledge and experience to be developed rapidly in demanding high risk clinical environments for positive patient outcomes to occur. It also suggest the need for training in this area.

Advanced knowing is required in practice and factors affecting patient outcomes are multifaceted. Error occurrence reduce positive patient outcomes which may be as a result of any of the following: nurses education (Aiken *et al*. 2003,) staff experience (Tourangeau *et al*. 2002), nursing autonomy (Aiken *et al*. 1997,) nursing characteristics (Arnedt *et al*. 2000), patient ratios (Aiken *et al*. 2002), staffing levels (Pronovost *et al*. 1999, Aiken *et al*. 1997, Dimick *et al*. 2001), sleep defect (Arnedt *et al*. 2000), fatigue (Joint Commission's 2001) and unawareness of vigilance. Research over time has identified that errors reduce patient outcomes in terms of mortality and morbidity (Curtin 2003). These factors while individual may also be interrelated and have the potential to contribute to error and a negative patient outcome.

It is evident that advanced knowing plays a vital role in positive patient outcomes and that lack of it increases risk. The surgical patient is completely dependent on the knowledge, skill, competence and expertise of the multidisciplinary surgical team with every member playing a pivotal role in securing a positive outcome (Hughes & Mardell 2009, O'Brien 2011b). Within the current theory advanced knowing acknowledges the need to be knowledgeable and competent. Gawande *et al*. (2003b) found that the commonest factors underpinning errors were inexperience and lack of competence in a surgical task, which was associated with fifty three per cent of surgeon-described adverse events. Within the context of nursing and healthcare, Valentine (1997) looked at caring and suggests that it is a multidimensional construct that involves professional knowledge and competence, vigilance and therapeutic interactions.

While advanced knowing is a necessity during an unexpected event the literature just discusses the need for knowledge in relation to positive patient outcomes. The knowledge and skill of the nurse within the multidisciplinary surgical team affect patient outcomes (Hughes & Mardell 2009) and Schrieber & Mac Donald (2010a) support this. Keeping vigil over the patient was identified as their core concept and consisted of four categories, engaging with the patient, finessing the human-technology interface, massaging the message and foregrounding nursing. While some of the concepts concentrated on the relationship with the patient, they move their attention from conversation to the technical

aspects of practice within their concept of finessing human-technology interface. Here they discuss the skill a nurse is required to process to ensure that patients have a safe passage through surgery. Furthermore Schrieber & Mac Donald (2010a) considers the knowledge that the nurse must process in checking of equipment or to adapt or control patients responses. While their theory is based on the patient it identifies the need for understanding and advanced knowledge. This relates to the current theoy where the knowledge nurses' require was conceptualised as advanced knowing. Advanced knowing is based on the interaction of knowledge and practice experiences. This ensures that nurses are aware of the risks and consequences of not performing in a safe manner in their work practices for both themselves and the patient. The current theory adds to our understanding by suggesing that potentially advanced knowing enables safe practices to be maintained.

Advanced knowing explains the need for nurses to have the knowledge and awareness of the consequences of undertaking different tasks. Advanced knowledge informs decision making and provides an increased awareness of the consequence of their action (Cox *et al*. 2012). Brizon & Wybo (2006) support this view. They suggest that a person has to be watchful for imminent danger and be able to identify potential risk. The inference here supports the view that a person must be knowledgeable and aware of the consequences of any task being undertaken. Advanced knowledge is required for nurses in the perioperative setting in performing their role safely (Association of periOperative Registered Nurses 2012). Valentine (1997) proposes that nurses who provide holistic care must be competent, vigilant, skilful, and have professional knowledge, and be able to communicate with others when engaged in professional vigilance, which is crucial to the safety of the patient. This is consistent with the theory of anticipatory vigilance where the need for vigilance and advanced knowing is essential in minimising risk and in promoting and maintaining safety. Reason (2004) discusses the need for error wisdom in frontline medicine which he defines as:

"Rapid intuitive ordinal rations of situational aspects (of work).Together with some relatively inexpensive instruction on error provoking conditions, frontline professionals could acquire the mental skills necessary for making a rough and ready assessment of the error risk in any given situation (p. 32)".

Reason (2004) identifies informed vigilance and intelligent wariness as essential compliments to systems-based approaches to error management and stresses the importance of nurturing error wisdom. Similarly this literature supports the current theory in the need for advanced knowing and heightened awareness in minimising risk. This knowledge enables momentary adapting to occur quickly and safely.

Heightened awareness is where the nurse becomes more aware of and conscious about a situation and is discussed within the literature as anticipation. The word anticipatory has many different meanings, to act ahead of time, to foresee or to expect what is about to occur (Matthews *et al*. 2000). Knowing what is about to occur enables a person to be prepared. Meyer & Lavin (2005) suggest that anticipating what might be or what might happen is an element of professional vigilance. Professional vigilance is fundamental in ensuring the care and safety of patients in promoting their recovery to wellness in the healthcare setting (Meyer & Lavin 2005). Similar explanations of anticipation emerged in the theory of anticipatory vigilance with regard to the concept of heightened awareness,s which involves predicting or anticipating what is about to happen through advanced knowledge and experience in minimising risk. While the theory of professional vigilance is concerned with maintaining wellness in healthcare the theory of anticipatory vigilance is concerned with minimising risk so both these aims support positive patient outcomes. Heightened awareness is also explained as an intuitive sense of knowing that a situation is about to change or occur. Butz *et al*. (2003, p. 3) define anticipatory behaviour as

"a process or behaviour that does not only depend on the past and present but also on predictions, expectations or beliefs about the future".

The World Health Organisation (2009c) suggests that surgeons place a great deal of emphasis on anticipation, which they suggest is advanced thinking on an action that may be required. This thinking ahead has relevance in the way people work together during a surgical procedure where they anticipate and predict the future action of a colleague. Rew & Barrow (2007) in a systematic review of nursing literature confirms that intuition is significant in expertise within clinical practice and increases with experience and expertise

which informs their judgements and decisions. This intuition helps people to think ahead of an action. Intuition is implicit in the current theory within the concept of heightened awareness which is an intuitive sense of knowing that a situation is about to change thus it has the potential to inform decision making. This intuitive knowledge builds on competence and ability to draw upon learning from experience and enables decision making. Decision making is mentioned many times within the theory of anticipatory vigilance as being part of the patterns of behaviour. Decision making is a component of how and what is anticipated. Bennet & Bennet (2008) suggest that decisions are just presumptions about the future, therefore decision makers rely on their intuitions and judgements. Decision making is classified as a non-technical skill which entails choosing a course of action which is important in healthcare (Thompson *et al*. 2004, Yule *et al*. 2006, Undre *et al.* 2009, Jacklin *et al*. 2009) and these decisions can be made as a response to heightened awareness.

Sayegh *et al.* (2004) has suggested that the role of emotion in intuitive decision making process using tacit knowledge under emergency conditions is important to note as in the past there was an assumption that decisions were made with the rational mind. This relates to the concept of heightened awareness, which explains that nurses are constantly anticipating, watching, planning, making decisions and solving issues. Heightened awareness is influenced by the level of knowledge, experience and skill of the nurse and consists of an increased sense of cautious alertness and watchfulness. Heightened awareness may contribute to a speedy responsive behaviour, which may reduce negative consequences leading poor patient outcomes. People must have an understanding and heightened awareness of a situation in which they are involved in order to predict and understanding what may occur. The current theory expands current understanding of the use of heightened awareness in minimising risk as it explains that it is the intuitive bringing together of advanced knowledge, skills and attitudes that informs nurses

The theory of anticipatory vigilance expands our understanding of momentary adapting as it explains what it is and how it can be achieved under the concepts of rapid responsible

responding, temporary restructuring advanced knowledge and heightened awareness. Therefore the theory of anticipatory vigilance adds to the available literature in this area.

6.8.1 Training in Anticipatory Vigilance

The theory of anticipatory vigilance explains an interrelationship between human performance and detecting and responding to potential risks. It follows therefore that attention to training of staff is essential in promoting safety. Detecting or noticing what is happening is an essential component of action in minimising risk or in the discovery of errors. Anticipatory Vigilance is a factor preventing and minimising risk. Suggestions to increase vigilance without training of personnel is of little value. To date there is little evidence on how to train people to be vigilant. Training people to be vigilant would help to minimise risk thus reducing errors. The National Health Service Institute for Innovation & Improvement (2010) looked at reducing errors through human factor training, which they discuss under personal level human factors and system level human factors. The personal level human factors consider the skills that allow people to apply their medical expertise to do their job efficiently, effectively and safely. They identify these skills as communication, decision making, awareness of risks, working as a team member and look at how people need to manage stress and fatigue. System-level human factors considers the management of people within the healthcare system to include investigation of the incident, assessment of new procedures, designing equipment, and keeping records of human-related risks and how they are managed within the organisation. These skills are centred on identifying errors or risk and finding the underpinning reason of why they occur. The theory of anticipatory vigilance has the potential to be used as the basis for future training in minimising risk, explaining how nurses currently behave in minimising risk in the perioperative setting provides an opportunity to consider the categories within the theory making sense of practice. Engaging in such an activity informs individuals personal and professional development.

Akins & Cole (2005) and Forster *et al.* (2006) suggest that there is little documented evidence of how errors are prevented or minimised or evidence based research on how

individual errors are managed within the health care system. However this trend is changing as reporting errors becomes a normal activity within an non blame cultures (Kerr 2009, Despins *et al.* 2010). Gregory *et al*. (2006) promote education and training as increasing the knowledge base of caregivers. They suggest that this should reduce the cognitive failures that contribute to human errors. As vigilance is a human behaviour it impacts on human performance, which involves human factors within the hospital setting (Ebright *et al*. 2006, Rogerson & Tremethick 2004, Biebuyck *et al*. 1990). Vigilance is required to create an increased awareness so that errors and risks are acknowledged and discussed. Similarly people who participate in anticipatory vigilance have an increased awareness around the area of risk and errors, which explains the importance of awareness in relation to minimising risk in promoting and maintaining safety. Furthermore, Ebright *et al*. (2006) and Rogerson & Tremethick (2004) suggest that in carrying out the majority of tasks and providing care safely, one needs to be mindful of extrinsic factors such as noise, tiredness that may affect attention, thus reducing vigilance. Noise, and tiredness did not feature in the theory of anticipatory vigilance, however this could offer comparative data for the modification of anticipatory vigilance, should formal theory be considered.

Some proposals to improve vigilance in the literature are consistent with the theory of anticipatory vigilance and include being able to recognize signals, threats or complications, focusing on the job, knowing and having an understanding of what vigilance involves and that human performance factors such as fatigue impinge on vigilance (West *et al*. 2009, Hughes 2004). This has training implications for vigilance and identifies the need for training with regard to the theory of anticipatory vigilance, which will be further discussed in the implications chapter. Continuous training and educating health care staff, linked with reporting of adverse events and also increased government intervention may provide a movement towards improved patient care and safer practice (Milligan 2007). The theory of anticipatory vigilance highlights the importance of overall training and education of nurses however reporting did not feature within the theory, which may be because the nurses were engaged in a pattern of behaviour of minimising risk rather than dealing with an error after it occurs.

6.9 Summary

To-date vigilance is still not fully understood or utilised to its full potential despite what has been written. Further clarification of the concept of vigilance is required which is pertinent to all healthcare workers and perioperative environments. In industry and defence literature vigilance has been identified as physiological responses to signals and has been researched quantitatively with a tendency to investigate response times to signals. Historical underpinnings have influenced some of the views of vigilance in healthcare, but understanding needs to be advanced further. Such a focus on vigilance may be problematic in understanding and promoting vigilance in the healthcare setting. Vigilance as examined within this current theory within the perioperative setting had not been considered or examined. The theory of anticipatory vigilance aims to address this absence in the body of knowledge from a nursing perspective while acknowledging the task aspect within its strategies. The current theory identifies leadership, organisational management and communication dimensions within orchestrating.

Vigilance is the key process that people engage in to ensure a safe environment is maintained regardless of the setting. Vigilance is carried out by individuals but is not a stand-alone activity and needs to be organised. A risk awareness culture requires good leadership, involvement of all stakeholders in their understanding and awareness of risk, training. Furthermore these stakeholders require knowledge within the context of the environment in which they work and need to be accountable for their action and the use of effective communication. Employing a nursing workforce that is knowledgeable, capable, aware and competent is vital to prevent errors and maintain safety. Given the current high demands of modern healthcare nurses need to be ever vigilant in reducing and managing risk in ensuring and optimising positive patient outcomes during hospitalisation. Perioperative nurses need to demonstrate commitment to practicing anticipatory vigilance so that the theory can guide them in developing practice and minimising risk. An appreciation of the unique linkages within the theory of anticipatory vigilance will inform and lead perioperative nurses towards taking a pivotal role in advancing a safe patient culture by engaging and owning the theory.

The perioperative setting is a highly technical and task focused area. Perioperative nurses have a duty of care to surgical patients worldwide. The theory suggests that having competent, professional perioperative nurses who undertake anticipatory vigilance is key to minimising risk in the high risk setting and suggest what they can do to reduce risk. The constant challenge of minimising risk in providing safe surgery for patients through anticipatory vigilance is a global healthcare concern. The theory of anticipatory vigilance is a theory of minimising risk so therefore adds further explanation and understanding to current discussions within the literature. The theory was generated in the substantive area of the perioperative setting. Therefore, it is more beneficial to perioperative staff, as it identifies with their situation and identifies with organisational management, undertaking routine practices and adapting to unexpected events. It provides a resolution for nurses working in the perioperative setting whose main concern is minimising risk through anticipatory vigilance. However as it is a multivariate theory it has potential general implications in other areas such as critical care nursing, aviation industry, the military, law enforcement and crèches.

There is a dearth of research within the substantive area of perioperative nursing in relation to vigilance, perioperative nursing and risk reduction. The existing literature does not generate theory, which explains the phenomena of minimising risk and is relevant and usefulness for people working in the substantive area. In this study, nurses in the perioperative setting identified minimising risk as their main concern in maintaining safety. Anticipatory vigilance is the main resolution of this concern. Generally previous findings have not considered the application to minimising risk within the perioperative setting. Conceptualisation of the emerging data in this study allowed a multivariate theory to emerge.

Currently safety in the perioperative setting is dealt with through checking devices such as checklists. Anticipatory vigilance has not been a term utilised as a fundamental concept for minimising risk within the literature. The managing of risk in the perioperative setting is vital as we progress into the 21st Century and the theory of anticipatory vigilance will help to achieve this.

The current theory expands current understanding of the use of anticipatory vigilance in minimising risk and promoting safety, detailing and explaining the concepts which explain behaviours involved in minimising risk. The theory of anticipatory vigilance will have great significance for nurses working in the perioperative setting. Extant theories have focused on more task and routine checklist approaches to vigilance and risk. The current theory goes beyond this compartmental thinking, highlighting the complexity of human behaviour in minimising risk. In so doing the current theory provides an explanation and understanding of nurses patterns of behaviour in minimising risk. The current theory inform risk reducing behaviours by paying attention to habitual checking, rule following and mutual watching as an integrated mindful practice. Anticipatory vigilance encapsulates and offers a fundamental starting point in divising polices, proceedures in minimising risk, drawing attention to the irreducible nature of human performance within a highly technical and high risk setting. The theory of anticipatory vigilance differs from other theories as it doesn't consider vigilance to be a task, but rather as an integrated behaviour a way of doing. It suggests that human behaviour is a major contributor in minimising risk in promoting and maintaining safety. The theory of anticipatory vigilance contributes new knowledge as a behavioural theory focusing on the behaviours of nurses rather than considering a reductionist experimental approach to human activities. Such a conceptualised explanation informs nurses, managers and organisations in developing best practice in minimising risk and promoting safety.

7 Chapter Seven: Implications

Chapter six discussed the theory of anticipatory vigilance within the current literature which contributed to new knowledge to the current understanding of minising risk. This chapter will consider the implications of the substantive theory of anticipatory vigilance from a practice, educational and research perspective and will identify and discuss its strengths and limitations. Generally it is concluded that the theory of anticipatory vigilance offers a range of valuable possibilities for understanding the situations and actions of nurses working in the perioperative setting and beyond, allowing for further research and theory development. Anticipatory vigilance as a theory has the potential to inform practice development and contribute to policies and standard development.

7.1 Implications of the Theory of Anticipatory Vigilance

The emergent theory of anticipatory vigilance has many implications that will now be discussed under practice implications, educational implications, research implications and general implications.

7.1.1 Implications for Practice

This grounded theory study offers an explanation as to how perioperative nurses are constantly in a state of 'anticipatory vigilance' throughout their working day in order to minimise risk in the perioperative setting. Identifying this theory endeavours to promote quality care in the perioperative setting, which has the potential to lead to positive patient outcomes.

7.1.1.1 Providing Insight Understanding and Awareness

This substantive theory on anticipatory vigilance has given valuable insight into what is happening and what is required to happen in a high risk setting when minising risk through preventing healthcare errors and maintaining safety. Anticipatory vigilance is not something that naturally occurs but is something that is tangible and people must be constantly aware to partake in minimise risk.

This current theory has the potential to influence awareness regarding risk reduction and management and a culture of safety within the perioperative setting. Perioperative nurses need to become more aware of the importance of the actual work they do and the role of anticipatory vigilance within this. It is important that people are actively aware of the need to engage in anticipatory vigilance. This new heightened awareness by nurses of the complexity of what is required in minimising risk within their working environment has the potential to lead to the utilisation of the theory of anticipatory vigilance. The current theory explains the complex nature of the role of the perioperative nurse and places the minimising of risk at its core when caring for the surgical patient. Anticipatory vigilance needs to become more explicit in clinical practice as being a fundamental aspect of the role in reducing the incidence of error and increasing positive patient outcomes. This theory needs to be published and shared with perioperative nurses locally, nationally and globally for it to have future impact on minimising risk in the highly structured high risk setting.

Anticipatory vigilance is not just undertaking a task or responding to a stimulus but also involves observations and interaction of competent people with professional knowledge. Nurses need to have an in-depth understanding of the area they work in to understand the complexities of what may occur and to create a culture of safety. While it is accepted that nurses participate in anticipatory vigilance, this may sometimes be hidden, but is an invaluable aspect of their roles. This theory has the potential to strengthen the ability of perioperative nurses to undertake anticipatory vigilance through the understanding and awareness of the complexity of their work, thus influencing patient outcomes. Employing a nursing workforce that is knowledgeable and capable is important in preventing errors

and maintaining safety (Institute of Medicine (IOM) 2004). Having a knowledgeable and capable workforce is a critical requirement for undertaking activities in the process of anticipatory vigilance. With continuing shortages of healthcare professionals around the world, anticipatory vigilance has the potential to have an even greater significance for nurses working in the perioperative setting in the future. The components of this current theory has the potential to lead to redefining and increase understanding of the role of the perioperative nurse as having the characteristics and ability to partake in minimising risk in clinical practice, thus influencing patient outcomes.

The discovery that perioperative nurses roles while appearing robotic are in fact far more complex necessitating the need for knowledge, skill, awareness, understanding and a more focused rapid response to unexpected events as they occur. This theory provides a detailed explanatory account of nurse's patterns of behaviour within the perioperative setting leading to identifying a theory on anticipatory vigilance. Perioperative nurses need to be involved in dialogue about their experiences and reflect upon their practice thus ensuring that nurses make good informed decisions. This theory has the potential to help nurses articulate their role more clearly. It could be used to justify the continued employment of nurses in the perioperative setting. This dialoguing and shared learning of their experiences has the potential to impact positively on their practice. Kerr (2009) supports this concept and proposes that being able to reflect and discuss is a characteristic of professional thinking. These are essential to the effective management of risk and the reduction of error and suggest that error wisdom is valued and nurtured. Guided reflective practice sessions could be utilised to support this.

The theory offers awareness of the work that perioperative nurses and nurse managers undertake, enabling understanding from an outsider perspective (service users) of the complexities of their role and the structures in which they perform their daily duties and role. The theoretical explanation of the strategies of anticipatory vigilance has the potential to help both the novice and experienced perioperative nurse to be aware, to understand and guide their practice in how to maintain a safe environment. Knowing how to participate in rule following, mutual watching and habitual checking is also relevant to minimise risk.

Anticipatory vigilance can be improved through informed management. Training may be needed to highlight anticipatory vigilance to identify and understand how nurses minimise risk in maintaining safety. Communication in the perioperative setting was found to have improved using the crew resource management model for training medical staff which resulted in maintaining a safer environment resulting in fewer adverse events (Awad *et al*. 2005). Nurse managers/leaders need to support perioperative nurses by providing adequate resources, supporting a learning environment and by understanding and realising the job they undertake.

Anticipatory vigilance is important in preventing errors and is fundamental for positive patient outcomes, which is fundamental in the perioperative setting. This expands and adds understanding to the current literature on risk reduction.

The findings of this study have the potential to be of interest to nurses working in the perioperative setting and may transcend to the wider population within the hospital setting and beyond. It is imperative that the organisation recognises that anticipatory vigilance is occurring continuously in the workplace. To-date this has not always been recognised or acknowledged.

7.1.1.2 Informing Policy

The theory also has the potential to impact on the use of current rules and regulations through justifying recommended practices, adhering to guidelines and current policies. It is anticipated that the theory has the potential to inform and contribute to guideline and policy development and formation within perioperative nursing that require a high level of vigilance in the day to day activities. The utilisation of the theory has the potential to inform policy on patient protection and enhancing quality measures with regard to the number of staff working in the perioperative setting and on professional education and training. It is anticipated that the findings may contribute to local, regional and national

public policy formation and development within perioperative nursing. To date policies and guidelines are generally based on the literature rather than theory.

7.1.1.3 Support Systems for Recognition of Anticipatory Vigilance

The theory of anticipatory vigilance contributes to the discussion surrounding the role and responsibilities of the nurse within the perioperative setting. It highlights the varying levels of competence required within the setting for the provision of a quality safe care experience for patients. Such knowledge has the potential to contribute to any discussion within the reform of health care. Risk awareness and reduction must continue to be given a high priority by nursing management.

This theory has the potential to assist in highlighting and forming strategies to further support nurses in protecting patients and enhance the quality of care in this rapidly changing dynamic technological advancing environment. Such strategies in supporting perioperative nurses has the potential to assist in benefiting and enhancing the quality of the patient's experience by minimising risk within the setting.

7.1.1.4 Adding to the Body of Knowledge

The generation of this theory has the potential to add to the already existing information on risk reduction, management of risk and the role of the perioperative nurses in minimising risk. This will potentially lead to greater awareness of the reality and the consequences of safety in the workplace. The role of the nurse as a competent practitioner and the minimising of risks for patients in the perioperative setting are inextricably linked.

The theory has the potential to contribute to dialogue regarding risk reduction, management and overall safety. It is anticipated that this original research has the potential

to contribute to the body of knowledge in relation to minimising risk among perioperative nurses. This may enhance the way nurses do their jobs in the perioperative setting and how they deal with and manage their work environment. The theory of anticipatory vigilance will add to the body of knowledge as it links vigilance, risk and nursing.

7.1.2 Implications for Education

Given that anticipatory vigilance is essential in minimising risk logic dictates that primary care professionals will require a discrete set of skills and a specialist approach in how to tackle risk in the workplace i.e. education and training to all staff i.e. trained facilitators. Anticipatory vigilance is nebulous concept and requires serious consideration in how it may be shared and promoted with novice nurses and more expert nurses. It is affected by lack of knowledge, training and competence. It is challenged when no one person leads the situation when an emergency or an adverse event occurs. Anticipatory vigilance is intensified when there is a clear indication that a difficulty is going to arise or there is lack of trust. This theory has the potential to inform national debate on the importance of teaching and training to all health care workers relating the importance of vigilance and anticipatory vigilance in healthcare. This theory identifies the need for nurse's in the perioperative setting to have the knowledge and training to understand the necessity for anticipatory vigilance to minimise risk

Nurses in the perioperative setting need to be taught formally how to practice anticipatory vigilance as currently this is done informally. There is a need for training and acquisition of knowledge to understand the concepts of practices within a safety culture. Being aware and able to recognise what is happening and what needs to happen next is all important in minimising risk. Training nurses in anticipatory vigilance would involve raising awareness of cognitive and social skills, performance and competency training. It would also need to teach people to identify problem/errors, understanding why they occur and how to choose the steps of action needed to minimise risks. This could be undertaken through simulation and role play. Teaching people what to observe and how to practice anticipatory vigilance should be a fundamental part of training of all nurses working in the perioperative setting

as knowing what is effective practice is vital. Training would also need to consider how to be an effective team member where the importance of communication and trust are fundamental to good teamwork. The aims of the training in anticipatory vigilance are:

- Raise awareness of cognitive and social skills required for anticipatory vigilance
- Teach nurses how to identify the potential of risk and how to minimise risk
- Support nurses safety education
- Ensure that nurses who work in high risk areas have access to training
- Raise awareness and engage commitment of the need for patient safety teaching and learning
- Empower health-care schools to build capacity in teaching patient safety

Nurses need to have suitable education, skills and experience when working in high risk settings such as the perioperative area. They need to constantly update themselves with relative training, reading professional journals and specialising in the area of perioperative nursing if they have not done so. Training people in anticipatory vigilance has the potential to help to minimise risk thus reducing the consequences of error occurrence. The theory of anticipatory vigilance can be used as a framework tool to educate healthcare staff about minimising risk. It can be utilised in preparing education programs for perioperative staff. The terms of attention, alertness, anticipating and watchfulness emerged as necessary properties within the theory of anticipatory vigilance. The need for focusing**,** being assertive and being confident also emerged within the categories of orchestrating, routinizing and momentary adapting. Nurses need to understand and be mindful of all these skills as they are all relevant concepts utilised in minimising risk and need to be included in the syllabus for any training programme.

7.1.3 Implications for Research

This theory of anticipatory vigilance has the potential to contribute to the research on risk management as it endeavours to support patient safety and the provisions of quality care

that patients receive in the perioperative setting. However, more focused research is required to consider the theory of anticipatory vigilance especially on the area of awareness of staff and the understanding of their roles in anticipatory vigilance. More focused research is also required to look at how organisations deal with risk on a daily basis and consider what support systems they have put in place

7.1.3.1 Plan for Future Research in the area of anticipatory vigilance

There are many different pathways for future research in the area of anticipatory vigilance. Based on the finding of this study they centre on undertaking quantitative research or undertaking formal theory.

Quantitative research may be undertaken as there is a potential opportunity to expand and develop the theory further through a quantitative descriptive approach. For example: developing a tool to investigate the use of anticipatory vigilance in the perioperative setting using the current concepts of the theory. There is a potential opportunity for further elaboration of the theory of anticipatory vigilance through undertaking a formal theory. This would utilise the core concept of anticipatory vigilance expanding it beyond the discipline of nursing in the perioperative setting. This may include other health care professions i.e. intensive care unit nurses, neo-natal intensive care nursing, surgeons etc. Formal theory could be considered beyond the discipline by theoretical sampling i.e. pilots, train drivers, police etc. in order to further elaborate the theory.

The author has a great interest and appreciation for the perioperative setting and the many factors that influence the nurses that work there. There is a critical need for research in this area, uncovering evidence to inform practice. The researcher believes that this study has the potential to augment existing knowledge specific to the area, (vis-a-vis minimising risk through anticipatory vigilance) by creating new in-depth, original knowledge thus making a meaningful contribution to maintaining safety.

This doctoral study offers a unique perspective from an Irish context, which fits with keep policy perspective of the Irish Government in particular the realisation of the vision articulated by the commission on Patient Safety and Quality Assurance with the Department of Health and Children.

A one page synopsis on the findings of my Doctorial study on Anticipatory Vigilance: A Classic Grounded Theory of Risk Reduction and Management in the Perioperative Setting will be sent to the

- Commission on Patient Safety and Quality Assurance (Department of Health and Children) Ireland.
- Association of periOperative Registered Nurses USA.
- World Health Organisation (patient safety).

7.1.4 General Implications

The implications of the study of the theory of anticipatory vigilance are relevant to other areas and professionals. Even though the theory of anticipatory vigilance explains how risk is minimised within the perioperative environment it could also be used in other areas, which may share similar conditions in the working area. Classic grounded theory allows this to occur due to the conceptualising and generic nature of the concepts and their properties. Other contexst that require people to have, 1) A heightened awareness of anticipatory vigilance, 2) Become structurally consumed by its routine, 3) Manage and organise their work and 4) Adapt to situational needs will now be considered.

7.1.4.1 Other Acute Hospital Settings

The theory of anticipatory vigilance has the potential for application and relevance in informing nurses working in the perioperative setting and beyond. The theory of anticipatory vigilance has the potential to be of value in all hospital settings for:

- Other nurses working in high risk settings such as intensive care
- Other members of the multidisciplinary team working in the perioperative setting such as doctors and perfusionists

It is timely in nursing to ensure that our nursing terminology embody both our awareness and capacity to constantly undertake anticipatory vigilance.

7.1.4.2 Other Environments

Other environments where the theory of anticipatory vigilance may be of value could be within the aviation industry. Aviation pilots engage in anticipatory vigilance when landing aircrafts. While the physical environment is different the same attention to detail and anticipation and vigilance is required. Also air traffic controllers engage in anticipatory vigilance in their daily work. Again the same rules apply regarding minimising risk in promoting and maintaining safety.

Law enforcement agencies such as the police may also engage in anticipatory vigilance. While their physical environment is different the same attention to detail, anticipation and vigilance is required for police men or women on stake out or on the beat. This theory also has the potential for use by the military service persons on active duty.

Child minders working in crèches need to be constantly aware, alert and watchful of the children in their care. The environment is similar to the perioperative setting with its structure, routine and the need for good management.

In each of these situations where a person's undertake anticipatory vigilance they must also find a strategy to maintain its constancy. While anticipatory vigilance may be similar for all staff in high risk settings in the health service, it may change for the differing situations.

The conditions that affect, complicate and intensify anticipatory vigilance potentially are: environment, experience, competence and state of awareness.

There is no single simple solution that will minimise risk and improve and maintain safety for the surgical patient. This study clearly identifies the role nurses play in minimising risk within the perioperative setting. While this study was undertaken with perioperative nurses the whole multidisciplinary team of health-care professionals i.e. surgeon, anaesthetist, porter need to be in involved in anticipatory vigilance. Once published this theory may also be used by other researchers to extend or initiate new research in this area. It may not be possible to meet all the recommendations put forward by this researcher, but acknowledgement and recognition of their importance will help develop a better understanding of the how risk is minimised within the perioperative setting through anticipatory vigilance.

7.1.5 Strengths of the Study

The strengths of the study will now be considered and can be summarised as follows:

- All the participants were working in a high risk perioperative setting.
- The research generated rich, detailed data and the theory was allowed to emerge.
- Theoretical saturation was reached following thirty seven formal interviews, ten informal interviews and thirty three hours of observations, therefore ensuring that all properties of the theory were developed.
- The research rigorously followed the principals of classic grounded theory, thus the use of such principals supported the fit, relevance, workability and modifiability of the theory.
- The generation of a coherent theory of anticipatory vigilance
- The substantive theory of anticipatory vigilance has the potential to add to the body of knowledge on minimising risk in a high risk setting.

- The discovery of the theory of anticipatory vigilance has the potential to encourage awareness by the organisation of the responsibility of the work undertaken by perioperative nurses.
- The participants practiced in a variety of settings across wide geographical areas that includes rural and urban settings.
- It is acknowledged that participants described their work challenges at a single point in time, therefore the opportunity to undertake non participant observation strengthened the information received and confirmed the coherence between what participants said during interviews and their observed patterns of behaviour.
- There is no parallel existing theory to compare the theory with that connects vigilance, risk and nursing together.
- This theory has general implications for other nurses and other professionals outside nursing.

The limitations of this study will now be considered

7.1.6 Limitations of the Study

The limitations of the study will now be considered and can be summarised as follows:

- The study focused on a relatively homogeneous group of nurses working in the perioperative setting.
- Initially the research study was limited by the lack of the researcher's expertise in the classic grounded theory process.
- The aim of this study was not to achieve full and accurate description, statistical validation or broad generalisations of minimising risk.
- This doctoral study offers a unique perspective from an Irish context, which fits with keep policy perspective of the Irish Government in particular the realisation of the vision articulated by the commission on Patient Safety and Quality Assurance with the Department of Health and Children.

- Write a one page synopsis on the findings of my Doctorial study on Anticipatory Vigilance: A Classic Grounded Theory of Risk Reduction and Management in the Perioperative Setting to the World Health.
- Write a one page synopsis on the findings of my Doctorial study on Anticipatory Vigilance: A Classic Grounded Theory of Risk Reduction and Management in the Perioperative Setting to the commission on Patient Safety and Quality Assurance (Department of Health and Children).
- Write a one page synopsis on the findings of my Doctorial study on Anticipatory Vigilance: A Classic Grounded Theory of Risk Reduction and Management in the Perioperative Setting to the Association of periOperative Registered Nurses.

7.2 Conclusion

Anticipatory vigilance characterises the first classic grounded theory, describing, theorising and explaining the strategies of minimising risk in a high risk, highly structured setting. Much has been written in the healthcare literature with a mention of the term vigilance however, not in connection to vigilance, risk and perioperative nursing. Earlier work undertaken in industry considered vigilance as just a task performance, failing to identify the complexity of the attributes of vigilance in the current modern working environment. Many journal articles utilise vigilance in their titles as a means of watching over or auditing the profession (Meyer 2002, Meyer & Lavin 2005, Martyr 2010). Others, articles discuss vigilance as an essential element in speciality areas within nursing (Balas 2007). Some studies have qualitatively examined vigilance experiences of patients (Meyer 2002), their family members (Mahoney *et al*. 2003), parents (Dugley & Carr 2004) or nurses (Cooke 2006, Schrieber & Mac Donald 2010a, Schrieber & Mac Donald 2010b). While Meyer & Lavin (2005) and Scott *et al*. (2006) have written on nurses and vigilance and Moore & Duffy (2007) have written on patients, there appears to be no shared understanding or agreement as to what vigilance is. All studies undertaken in these areas appear to find aspects of data that could fit with some categories or their properties within the theory of anticipatory vigilance. Due to the nature of these professions all partake in

routinising and need to have the ability to partake in momentary adapting in order to minimise risk.

The theory of anticipatory vigilance is a first step in adding to the body of knowledge on vigilance and risk within the substantive complex setting of the perioperative area. The theory is potentially central to nursing practice and adds to the existing body of knowledge available by explaining how risk can be minimised and managed in a high risk setting. The utilisation of the methodology of classic grounded theory made what was invisible, visible, in a time of financial constraints, staff reduction and technological advancement. This theory identifies the role of efficiencies and effectiveness in minimising risk, thus maintaining safety and ensuring good quality care is given, resulting in positive patient outcomes. Nurses in the perioperative setting continuously utilise anticipatory vigilance in all aspects of their work and this was clearly evident during the observational phase of the study. It is imperative that this high quality control strategy mechanism is in place in a high risk setting.

Anticipatory vigilance is undertaken by using methods of perception or the use of the senses such as sight and hearing. They utilise these senses by being alert, attentive, focused and watchful. It is the combination of the use of several senses and the ability to be vigilant that ensure that good quality service is maintained and risk is minimised in promoting and maintaining safety. Specifically this research has attempted to draw together literature, theory and data to illustrate nurse's experience in the perioperative setting when minimising risk through the theory of anticipatory vigilance. The research was undertaken rigorously in keeping with the classic grounded theory methodology and is transparent and apparent on how the theory of anticipatory vigilance emerged. It has resonance and relevance for perioperative nurses. This new theory encompasses risk reduction, based on the experiences of perioperative nurses. Anticipatory vigilance is potentially an influential new theory that has fit, work, and reliability, and is easily modifiable. It transcends, manages and combines the existing literature on safety, risk and vigilance. It proposes implications for perioperative nursing practice such as the need for education and training. This theory of anticipatory vigilance while it is a simple concept, it

is complex and multifaceted. For this theory to have future impact on minimising risk in the highly structured high risk setting it will require to be widely shared within the perioperative population globally.

Anticipatory vigilance highlights the strategies perioperative nurses utilise during the process of minimising risk in order to maintain safety. Firstly this study provides an insight into how risk is minimised within the perioperative setting. Secondly it highlights the importance of anticipatory vigilance within the role of the nurse working in an acute setting. Thirdly it analyses and discusses the findings from the research, identified implications, contributions and made recommendations for the theory of anticipatory vigilance. Fourthly it offers a comprehensive explanation of minimising risk within the high risk setting of the perioperative area and conceptualises the patterns of behaviour that were relevant in the theory.

This theory provides evidence to suggest that anticipatory vigilance minimises risk, which has not been a term utilised to date as a fundamental concept for minimising risk within the literature. It adds to the body of knowledge available in this area and is new to perioperative nurses. Nurses working in the perioperative setting face the challenge of minimising risk in their daily work and the theory of anticipatory vigilance resolves this. Anticipatory vigilance fosters improved patient surgical safety by reducing errors, adverse events, near misses, complications and deaths during surgery. The managing of risk in the perioperative setting is vital as we progress into the 21st Century and the theory of anticipatory vigilance will help to achieve this by minimising risk. The theory of anticipatory vigilance will have great significance for nurses working in the perioperative setting and beyond. The theory has attempted to show this by providing an explanation as to how it minimises risk. This classic grounded theory research offers the theory of anticipatory vigilance.

The following quote by a German born American Physicist Albert Einstein (1879-1955 - who developed the specialist and general theories of relativity) summaries the researchers PhD journey travelled during the past five years.

"Creating a new theory is not like destroying an old barn and erecting a skyscraper in its place. It is rather like climbing a mountain, gaining new and wider views, discovering unexpected connections between our starting points and its rich environment. But the point from which we started out still exists and can be seen, although it appears smaller and forms a tiny part of our broad view gained by the mastery of the obstacles on our adventurous way up".

(Albert Einstein 1921)

8 Reference List

Agency for Healthcare Research and Quality (2001). *Making Health Care Safer II: An Updated Critical Analysis of the Evidence for Patient Safety Practices*. Retrieved fromhttp://www.ahrq.gov/research/findings/evidencebasedreports/makinghcsafer.html on 1 October 2010.

Aiken L.H., Sochalski J. & Lake E.T. (1997) Studying outcomes of organizational change in health services. *Medical Care* **35**(11), 6-18.

Aiken L.H., Clarke S.P., Sloane D.M., Sochalski J. & Silber J.H. (2002) Hospital nurse staffing and patient mortality, nurse burnout and job dissatisfaction. *Journal of the American Medical Association* **288**(16), 1987-1993.

Aiken L.H., Clarke S.P., Cheung R.B., Sloane D.M. & Silber J.H. (2003) Educational levels of hospital nurses and surgical patient mortality. *Journal of the American Medical Association* **290**(12), 1617.

Aikins R.B. & Cole B.R. (2005) Barriers to implementation of patient safety systems in healthcare institutions: leadership and policy implications. *Journal of Patient Safety* **1**(1), 9-16.

Alfredsdottir H. & Bjornsdottir K. (2008) Nursing and patient safety in the operating room. *Journal of Advanced Nursing* **61**(1), 29-37.

Amato-Vealey E.J., Barba M.P. & Vealey R.J. (2008) Hand-off communication: a requisite for perioperative patient safety. *Association of Operating Room Nurses Journal* **88**(5), 763-774.

American Nurses Association (ANA) (2001*) Code of Ethics for Nurses with Interpretive Statements*. American Nurses Association. Nursesbooks.org, Silver Spring, MD.

An Bord Altranais (2000) *Code of Professional Conduct*. An Bord Altranais, Dublin.

An Bord Altranais (2007) Guidance to Nurses and Midwives Regarding Ethical Conduct of Nursing and Midwifery Research. An Bord Altranais, Dublin. Retrieved from www.nursingboard.ie on 10 May 2012.

An Bord Altranais (2007) *Nursing/Midwifery: A career for you*. An Bord Altranais, Nursing Careers Centre, Dublin.

An Bord Altranais (2012) *Nursing/Midwifery Career Development Post Registration Courses*. An Bord Altranais, Dublin. Retrieved from www.nursingboard.ie on 10 May 2012.

Andrews T. (2006) The literature review in grounded theory: a response to McCallin (2003). *The Grounded Theory Review: An International Journal* **5**(2/3), 29-34.

Andrews T (2007) Visualising Worsening Conditions. In *The Grounded Theory.*

Andrews T (2012) What is social constructionism. *Grounded Theory Review: An International Journal*. **1**(11), 39-46. Retrieved http://groundedtheory review.com /2012/06/01/what-is-social-constructionism/ on 17 April 2013.

Annells M (1996) Grounded theory method: philosophical perspectives, paradigm 1 of inquiry, and postmodernism. *Qualitative Health Research* **6**(3), 379-385.

Annells M. (1997a) Grounded theory method, part I: Within the first five moments of qualitative research. *Nursing Inquiry* **4**(2), 120-129.

Annells M. (1997b) Options for users of the grounded theory method. *Nursing Inquiry* **4**(170-180), 93.

Arnedt J.T., Wilde G.J., Munt P.W. & MacLean A.W. (2000) How do prolonged wakefulness and alcohol compare in the decrements they produce on a simulated driving task? *Accident, Analysis, and Prevention* **33**(3), 337-344.

Association of Operating Room Nurses (2006) Association of operating room nurses guidance statement: creating a patient safety culture. *Association of Operating Room Nurses Journal* **83**(4), 936-942.

Association of periOperative Registered Nurses (2007) *Association of Operating Room Nurses Journal.* Retrieved from http://www.aorn.org/about/default.htm on 10 May 2007.

Association of periOperative Registered Nurses (2010) *AORN (*Association of Operating Room Nurses*), Perioperative Standards and Recommended Practices.* Association of Operating Room Nurses Inc., Denver.

Association of periOperative Registered Nurses (2011) *Association of Operating Room Nurses Journal.* Retrieved from http://www.aorn.org/about/default.htm on 10 May 2007.

Association of periOperative Registered Nurses (2012) *Association of Operating Room Nurses, Perioperative Standards and Recommended Practices*. Association of Operating Room Nurses Inc., Denver.

Association for Perioperative Practice (AfPP) (2011) *Association for Perioperative Practice Website.* Retrieved from http://www.afpp.org.uk/home on 20 November 2011.

Aviation Safety Reporting Systems (2002). *ASRS: The Case for Confidential Incident Reporting Systems.* Retrieved from http://asrs.arc.nasa.gov/docs/rs/60 Case forConfidentialIncidentReporting.pdf on 10 April 2012.

Awad S.S., Fagan S.P., Bellows C., Albo D., Green-Rashad B., De L Garza M & Berger D.H. (2005) Bridging the communication gap in the operating room with medical team training. *The American Journal of Surgery* **190**(5), 770-774.

Ayyub B.M., Prassinos P.G. & Etherton J. (2010) Risk-Informed decision making. *Mechanical Engineering* **132**(1), 28-33.

Baker G.R., Norton P.G., Flintoft V., Blais R., Brown A., Cox J., Etchells E., Ghali W.A., Hébert P., Majumdar S.R., O'Beirne M., Palacios-Derflingher L., Reid R.J., Sheps S. & Tamblyn R. (2004) The Canadian adverse events study: the incidence of adverse events among hospital patients in Canada. *Canadian Medical Association Journal* **170**(11), 1678-1686.

Balas M., Casey C., Scott L. & Rodgers A. (2007) Maintain vigilance in the ICU. *Nursing Critical Care* **2**(4), 38-44.

Barach P. & Small S.D. (2000) Reporting and preventing medical mishaps: lessons from non-medical near miss reporting systems. *British Medical Journal (International Edition)* **320**(7237), 759-763.

Battles J.B. & Lilford R.J. (2003) Organizing patient safety research to identify risks and hazards. *Quality and Safety Health Care* **12**(2), 2-7.

Beauchamp T.L., Walters L., Le R.K. & Mastroianni A. (2008) *Contemporary Issues in Bioethics,* Wadsworth Thomson, United States of America.

Behar N. & King D. (2012) *Proposal for a new specialty: emergency general surgery*. Retrieved from http://careers.bmj.com/careers/advice/view-article.html?id=20007882 on 26 September 2012.

Belmont Report (1978) *Ethical Principles and Guidelines for the protection of human subjects of research.* National Institutes of Health (NIH): Office of Human Subjects Research (OHSR).

Benner P., Sheets V., Uris P., Malloch K., Schwed K. & Jamison D. (2002) Individual, practice and system causes of errors in nursing. *Journal of Nursing Administration* **32**(10), 509–523.

Bennet A. & Bennet D. (2008) The Decision-Making Process for Complex Situations in a Complex Environment. In *Handbook on Decision Support Systems.* (Burstein F. & Holsapple C.W., eds.) Springer-Verlag, New York, pp.1-14.

Berch D. & Kanter D. (1984) Individual Difference. In *Sustained Attention in Human Performance* (J.S Warm, ed), Chichester, Wiley, pp.143-178.

Berger P. & Luckmann T. (1966) *The Social Construction of Reality,* Allan Lane, London.

Biebuyck J.F., Weinger M.B. & Englund C.E. (1990) Ergonomic and human factors affecting anaesthetic vigilance and monitoring performance in the operating room environment. *The Journal of American Society of Anaesthesiology* **73**(5), 995-1021.

Birks M & Mills J (2011) *Grounded Theory: A Practical Guide*. Sage Publications, London.

Bitz K., Goettsche V. & Benner P. (2009) Practice breakdown: attentiveness surveillance. In *Nursing Pathways for Patient Safety* (Benner P.E.,Malloch K. & Sheets V., eds), Mosby Elsevier, St Louis, MO, pp. 58-75.

Blackburn S. (2008) *Oxford Dictionary of Philosophy.* Oxford University Press, New York.

Blumer H. (1969) *Symbolic Interactionism: Perspective and method.* University of California Press, California.

Boakes E. (2009) Using foresight in safe nursing care *Journal of Nursing Management* **17**(2), 212-217

Bonnefond A., Doignon-Camus N., Touzalin-Chretien P. & Dufour A. (2010) Vigilance and intrinsic maintenance of alert state: an ERP study. *Behavioural Brain Research* **211**(2), 185-190.

Botella J., Contreras M., Shih P., & Rubio V. (2001) Two short tests fail to detect vigilance decrements. *European Journal of Psychological Assessment,* **17**(1), 48-55.

Breckenridge J.P., Jones D. & Elliott I. (2012) Choosing a methodological path: reflections on the constructivist turn. *Grounded Theory Review: An International Journal* **1**(11), 64-71. Retrieved from http://groundedtheoryreview .com/2012/06/01 /choosing-a-methodological-path-reflections-on-the-cons tructivist-turn/ on September 27 2013.

Brennan T.A., Leape L.L., Laird N.M., Hebert L., Localio A.R., Lawthers A.G., Newhouse J.P., Weiler P.C. & Hiatt H.H. (2004) Incidence of adverse events and negligence in hospitalized patients: results of the Harvard medical practice study I. *Quality and Safety Health Care* **13**(2), 145-151.

Brewerton P. & Millward L. (2003) *Organizational Research Methods*. Sage Publications, Thousand Oaks, California.

Brizon A. & Wybo J. (2006) Vigilance: a process contributing to the resilience of organizations. Retrieved from http://www.resilience-engineering.org/REPapers/Brizon_Wybo.pdf on 26 January 2011.

Broadbent D.E. (1971) *Decision and Stress.* Academic Press, New York.

Bryant A & Charmaz K (2008) *The Sage Handbook of Grounded Theory.* Sage Publications, London.

Buchanan D., Boddy D. & Mc Calman J. (1988) Getting In, Getting On, Getting Out and Getting Back, In *Doing Research in Organisations* (Bryman A. ed), Routledge, London, pp. 53-67.

Buckner D. & McGrath J. (1963) *Vigilance: a symposium.* McGraw-Hill Book Company, Inc., New York.

Burns N & Grove S. (2003) *Understanding Nursing Research*. 3rd edn. Saunders, St Louis.

Burns N & Grove S.K (2005) *The Practice of Nursing Research: Conduct, Critique and Utilisation*. 5th edn, (Saunders W.B., ed), Saunders, Philadelphia.

Butz M., Sigaud O. & Gérard P. (2003) Anticipatory Behaviour: Exploiting Knowledge about the Future to Improve Current Behaviour. In *Anticipatory Behaviour in Adaptive Learning Systems LNCS (LANI),* Vol. 2684 (Butz M., Sigaud O. & Gérard P., eds.), Springer, Berlin, pp. 1-10.

Cameron S. (2011) *The MBA Handbook: Academic and Professional Skills for Mastering Management*. Prentice Hall, Essex, England.

Carr J. & Clarke P. (1997) Development of the concept of family vigilance. *Western Journal of Nursing Research* **19**(6), 726-739.

Carr J. & Fogarty J (1999) Families at the Bedside: An Ethnographic Study of Vigilance. *The Journal of Family Practice* **48**(6), 433-438.

Carthey J. & Clarke J. (2011) Patient Safety First. Implementing Human Factors inHealthcare – How to Guide. Retrieved from http://www.patientsafetyfirstnhs.uk/ashx/Asset.ashx?path=/Interventionsupport/Human%20Factors%20How-t %20Guide%20v1.2.pdf on 29 September 2011.

Casillas J & Ganz P (2009) Physical late effects of cancer: Implications for care. In *Handbook of Cancer Control and Behavioural Science: A Resource for Researchers, Practitioners and Policy Makers*. (Miller S.M., Bowen D.J., Croyle R.T. & Rowland J.H., eds), American Psychological Association, Washington D.C., United States. pp. 431-488.

Catalano K. (2008) Knowledge is power: averting safety-compromising events in the OR. *Association of Operating Room Nurses Journal* **88**(6), 987-995.

Catchpole K., Mishra A., Handa A. & McCulloch P. (2008) Teamwork and error in the operating room: analysis of skills and roles. *Annals of Surgery* **247**(4), 699-706.

Chadwick M.M. (2010) Creating order out of chaos: a leadership approach. *Association of Operating Room Nurses Journal* **91**(1), 154-70.

Chappy S. (2006) Perioperative Patient Safety: A multisite qualitative analysis. *Association of Operating Room Nurses Journal* **53**(4), 871-872. Retrieved from http://www.sciencedirect. com.proxy.lib.ul. ie/science /article/pii/S0001209206600082 on 10 June 2013.

Chard R. (2010) How perioperative nurses define, attribute causes of, and react to intraoperative nursing errors. *Association of Operating Room Nurses Journal* **91**(1), 132-145.

Charmaz K. (1994) The Grounded Theory Method: An Explication and Interpretation. In *More Grounded Theory Methodology: A Reader* (Glaser B.G., ed.), Sociology Press, Mill Valley, 95-115.

Charmaz K. (2000) Grounded Theory: Objectivist and Constructivist Methods. In: *Handbook of Qualitative Research* (Denzin N.K. & Lincoln Y.S., eds.), Sage, Thousand Oaks, California, pp. 509-535.

Charmaz K. (2003) Grounded Theory: Objectivist and Constructivist Methods. In *Strategies of Qualitative Research* (Denzin N. K. & Lincoln Y. S., eds.), Sage Publications, Thousand Oaks, pp. 249-291.

Charmaz K. (2006) *Constructing Grounded Theory: A Practical Guide Through Qualitative Analysis,* SAGE, London.

Charmaz K. (2009) Shifting the grounds: Constructivist grounded theory methods. In: *Developing Grounded Theory: The Second Generation* (Morse J. M., Stern P.N., Corbin J.M., Bowers B. & Clarke A.E., eds.), University of Arizona Press, Walnut Creek, CA, pp. 127-154.

Clarke S. (1999) Perceptions of organizational safety: implications for the development of safety culture. *Journal of Organizational Behaviour* **20**(2), 185–198.

Clarke S.P. (2004) Failure to rescue: lessons from missed opportunities in care. *Nursing Inquiry* **11**(2), 67-71.

Clarke A.E. (2005) *Situational Analysis: Grounded Theory After the Postmodern Turn*. Sage Publications, Thousand Oaks.

Clarke S. (2006) Organizational climate and culture factors. *Annual Review of Nursing Research* **24**(1), 255–272.

Clarke J, Johnson J & Finley E. (2007) Getting surgery right. *Annals of Surgery* **246**(3), 395-405. Retrieved from http://www.ncbi.nlm.nih.gov/pmc/articles/pmc1959354/ on 10 July 2012.

Clarke S.P. & Aiken L.H. (2003) Failure to rescue: needless deaths are prime examples of the need for more nurses at the bedside. *American Journal of Nursing* **103**(1), 42-47.

Clarke P. & Jones J., (Eds), (1998) *Brigden's Operating Department Practice.* Edinburgh: Churchill Livingston.

Coe R. & Gould D. (2008) Disagreement and aggression in the operating theatre. *Journal of Advanced Nursing* **61**(6), 609-618.

Coll R.K. & Chapman R. (2000) Choices of methodology for cooperative education researchers. *Asia-Pacific Journal of Cooperative Education* **1**(1), 1-8.

Cook H. (2009) Theories of risk and safety: what is their relevance to nursing? *Journal of Nursing Management* **17**(2), 256-264.

Cooke H. (2006) The surveillance of nursing standards: an organisational case study. *International Journal of Nursing Studies* **43**(8), 975-984.

Cooper C.L. & Smith M. J. (1985) *Job Stress and Blue Collar Work*. John Wiley, New York.

Cooper M. (1995) Can a zero defects philosophy be applied to drug errors? *Journal of Advanced Nursing* **21**(3), 487–491.

Cooper M. (2000) Towards a model of safety culture. *Safety Science* **36**(2),111-136.

Corbett S. (2009) Teamwork: how does this relate to the operating room practitioner? *Journal of Perioperative Practice* **19**(9), 278-281.

Corbin J.A. & Strauss A. (2008) *Basics of qualitative research.* Sage, Thousand Oaks, California.

Corcoran D., Mullin J, Rainey T. & Frith J. (1977) The effects of raised signal and noise amplitude during the course of vigilance tasks. In *Vigilance: theory, operational performance and physiological correlates* (Mackie R.R., ed), Plenum Press, New York, pp. 645-663.

Cousins C. (2002) Getting to the "Truth": Issues in Contemporary Qualitative Research. *Australian Journal of Adult Learning* **42**(2), 192-204.

Cox C.L., Hill M.C. & Lack V.M. (2012) *Advanced Practice in Healthcare*. Routledge, Abingdon.

Coyne I.T. (1997) Sampling in qualitative research. Purposeful & theoretical sampling merging or clear boundaries? *Journal of Advanced Nursing* **26**(3), 623-630.

Craig A. (1976) Signal recognition and the probability-matching decision rule. *Perception & Psychophysics* **20**(3), 157-162.

Craig A. (1978) Is the vigilance decrement simply a response adjustment towards probability matching? *Human Factors* **20**(4), 441-446.

Cresswell J. (1994) *Research Design: Qualitative and Quantitative Approaches.* Sage London.

Creswell J.W. (2003) *Research Design*. Sage Publications, Thousand Oaks, California.

Cresswell J. (2009) *Research Design: Qualitative and Quantitative and Mixed Methods Approaches.* Sage, London.

Curtin L.L. (2003) An integrated analysis of nurse staffing and related variables: effects on patient outcomes. *Online Journal of Issues in Nursing* **8**(3), pp. 9. Retrieved

from http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/Columns/KeynotesofNote/StaffingandVariablesAnalysis.html on 10 October 2010.

Daly B.J. & Wilson C.A. (1993) The effect of fatigue on the vigilance of nurses monitoring electrocardiograms. *Heart & Lung: The Journal Of Critical Care* **12**(4), 384-388.

Dart R. (2009) Monitoring risk: Post marketing surveillance and signal detection. *Drug and Alcohol Dependence* **105**(1), 26-32.

Davies D.R. & Parasuraman R. (1982) *The Psychology of Vigilance.* Academic Press, London.

Davies D. & Tune G. (1969) *Human Vigilance Performance.* Staples Press, London.

Davis L. & Drogasch M. (1997) Triple check procedure prevents chemotherapy errors. *Oncology Nursing Forum* **24** (4), 641– 642.

Davis P., Lay-Yee R., Briant R., AliW., Scott A. & Schug S. (2003) Adverse events in New Zealand public hospitals II: preventability and clinical context. *The New Zealand Medical Journal* **116**(1183), U624.

Deaton J.E. & Parasuraman R. (1993) Sensory and cognitive vigilance: effects of age on performance and subjective workload. *Human Performance* **6**(1), 71.

Dember W.N. & Warm J.S. (1979) *Psychology of Perception.* Holt, Rinehart & Winston, New York.

Denzin N.K. & Lincoln, Y.S. (2005) *The SAGE Handbook of Qualitative Research.* Sage Publications Ltd, Thousand Oaks.

Denzin N.K. & Lincoln, Y.S. (2011) *The SAGE Handbook of Qualitative Research.* Sage Publications Ltd, London.

Denzin N.K. & Lincoln, Y.S. (2012) *The SAGE Handbook of Qualitative Research, 4th edn,* Sage Publications Ltd, Los Angelus.

Department of Health Government of Western Australia (2005) *Toolkit for Managing Risk in Health Care: Pocket Guide to Clinical Risk Management*. Department of Health Government, Western Australia.

Department of Health and Children (2008) *Building a Culture of Patient Safety - Report of the Commission on Patient Safety and Quality Assurance.* Government Stationery Office, Dublin.

Despins L.A., Scott-Cawiezell J. & Rouder J.N. (2010) Detection of patient risk by nurses: a theoretical framework. *Journal of Advanced Nursing* **66**(2), 465-474.

Devine, D. J. (2002). A review and integration of classification systems relevant to teams in organizations. *Group Dynamics:Theory, Research, and Practice* **6**(4), 291–310.

de Vries E.N., Hollmann M.W., Smorenburg S.M., Gouma D.J. & Boermeester M.A. (2009) Development and validation of the surgical patient safety system (SURPASS) checklist. *Quality and Safety Health Care* **18**(2), 121-126.

de Vries E.N., Dijkstra L., Smorenburg S.M., Meijer R.P. & Boermeester M.A. (2010a) The surgical patient safety system (SURPASS) checklist optimizes timing of antibiotic prophylaxis. *Patient Safety in Surgery* **4**(6), 6-11.

de Vries E.N., Prins H.A., Crolla R.M., den Outer A.J., van Andel G., van Helden S.H., Schlack W.S., van Putten M.A., Gouma D.J., Dijkgraaf M.G., Smorenburg S.M. & Boermeester M.A. (2010b) Effect of a comprehensive surgical safety system on patient outcomes. *New England Journal of Medicine* **363**(20), 1928-1937.

Dimick J.B., Swoboda S.M., Pronovost P.J. & Lipsett P.A. (2001) Effect of nurse-to-patient ratio in the intensive care unit on pulmonary complications and resource use after hepatectomy. *American Journal Of Critical Care: An Official Publication, American Association Of Critical-Care Nurses* **10**(6), 376-382.

Dinç L. & Gastmans C. (2012) Trust and trustworthiness in nursing: an argument-based literature review. *Nursing Inquiry* **19**(3), 223-237.

Donahue M. (1985) *Nursing: The finest Art.* Mosby, St. Louis.

Dorrian J., Roach G.D., Fletcher A. & Dawson D. (2007) Simulated train driving: fatigue, self-awareness and cognitive disengagement. *Applied Ergonomics* **38**(2), 155-166.

Drumm, B. (2006) *Corporate Safety Statement*. Retrieved from http://www.hse .ie/eng /services/Publications/corporate/HSECorporateSafetyPolicyandCorporateSafety Statement.PDF on 1 September 2009.

Dudley S.K. & Carr J.M. (2004) Vigilance: the experience of parents staying at the bedside of hospitalized children. *Journal of Paediatric Nursing* **19**(4), 267-275.

Dunn D. (2003) Help incident reports-correcting processes and reducing errors. *Association of Operating Room Nurses Journal* **78**(2), 211-233.

Dunne C.T., Skrypek M.M., Powers A.L.R. & Laguna T.A. (2011) The need for vigilance: the case of a false-negative new-born screen for cystic fibrosis. *Paediatrics* **128**(2), 446-449.

Ebright P.R., Patterson E.S., Chalko B.A. & Render M.L. (2003) Understanding the complexity of registered nurse work in acute care settings. *Journal of Nursing Administration* **33**(12), 630-638.

Ebright P.R. (2004) Understanding nurse work. *Clinical Nurse Specialist* **18**(4),168-170.

Ebright P., Kooken W., Moody R. & AL-Ishaq M. (2006) *Mindful attention to complexity: Implications for teaching and learning patient safety in nursing.* Springer Publishing Company, New York.

Einstein A. (1921) Nobel Prize Winner for Physics in 1921. Retrieved from http://thinkexist.com/quotes/albert_einstein/4.html on 10 October 2010.

Elliot N (2010) Mutual Intacting: a grounded theory study of clinical judgement. *Journal of Advanced Nursing* **66**(12), 2711-2712.

Elliott N. and Higgins A. (2012) Surviving grounded theory research method in an academic world: proposal writing and theoretical frameworks. *Grounded Theory Review: An International Journal* **2**(11), pp. 1-12. Retrieved from http://groundedt heoryreview.com/2012/12/07/surviving-grounded-theory-research-method-in-an-academic-world-proposal-writing-and-theoretical-frameworks/ on 17 March, 2013.

Engel N., Patey R.E., Ross S. & Wisley L. (2008) Non-technical skills. *Student British Medical Journal* **16**(1), 444-445.

European Operating Nurses Association, (EORNA) (1997) *European Common Core. Curriculum for Operating Department Nursing.* EORNA, Belgium.

European Operating Nurses Association, (EORNA)(2012) *EORNA at a glance*.?? Retrieved from http://www.eorna.eu/EORNA-at-a-glance_a10.html on 10 March 2012.

Eysenck H. & Eysenck M. (1985) *Personality and Individual Differences: A natural science approach.* Plenum Press, New York.

Fairchild S.S. (1996) *Perioperative Nursing: Principles and Practice.* Little Brown & Co, Boston.

Feldman D. (2006) Mutual Respect: A Key to Reducing Risk in the Operating Room. In *The Doctor's Advocate | Fourth Quarter*. Retrieved from http://www.thedoctors.com/KnowledgeCenter/Publications/TheDoctorsAdvocate/CON_ID_000549 on 10 October 2010.

Feng X., Bobay K. & Weiss M. (2008) Patient safety culture in nursing: a dimensional concept analysis. *Journal of Advanced Nursing* **63**(3), 310-319.

Ferrell, B. & Coyle, N. (2006). *Textbook of Palliative Nursing* (2 ed.). Oxford University Press US.

Flin R. & Yule S. (2003) Leadership for safety: industrial experience. *Quality and Safety Health Care* **13**(2), 45–51.

Flin R., O'Connor P. & Crichton M. (2008) *Safety at the Sharp End: A Guide to Non-Technical Skills*. Ashgate Publishing, Aldershot.

Florin T.A., Brent R.L. & Weitzman M. (2005) The need for vigilance: the persistence of lead poisoning in children. *Paediatrics* **115**(6), 1767-1768.

Forster A.J., Fung I., Caughey S., Oppenheimer L., Beach C., Shojania K.G. & van Walraven C. (2006) Adverse events detected by clinical surveillance on an obstetric service. *Obstetrics and Gynaecology* **108**(5), 1073-1083.

France D.J., Leming-Lee S., Jackson T., Feistritzer N.R., & Higgins M.S. (2008) An observational analysis of surgical team compliance with perioperative safety practices after crew resource management training. *The American Journal of Surgery* **195**(4), 546–553.

Frankmann J.P & Adams J.A (1962) Theories of Vigilance. *Psychological Bulletin* **59**(4),257-272.

Gall M.D., Gall J.P, & Borg W.R. (2007) *Educational Research: An Introduction*. 8th edn. Pearson MA, Boston.

Gallagher F. & Mason H.J. (2004) Carbon monoxide poisoning in two workers using an LPG forklift truck within a cold store. *Occupational Medicine* **54**(7), 483 488.

Ganz P.A. (2001) Late effects of cancer and its treatment. *Seminars in Oncology Nursing* **17**(4), 241-248.

Gardezi F., Lingard L., Espin S., Whyte S., Orser B. & Baker G. (2009) Silence, power and communication in the operating room. *Journal of Advanced Nursing* **65**(7), 1390-1399.

Gawande A.A., Thomas E.J., Zinner M.J. & Brennan T.A. (1999) The incidence and nature of surgical adverse events in Colorado and Utah in 1992. *Surgery* **126**(1), 66-75.

Gawande A.A., Studdert D.M., Orav E.J., Brennan T.A. & Zinner M.J. (2003a) Risk factors for retained instruments and sponges after surgery. *The New England Journal of Medicine* **348**(3), 229-235.

Gawande A.A., Zinner M.J., Studdert D.M. & Brennan T.A. (2003b) Analysis of errors reported by surgeons at three teaching hospitals. *Surgery* **133**(6), 614-621.

Gawande A. (2007) The Checklist. The New Yorker, 10 December 2007. Retrieved from http://www.newyotker.com/reporting//2007/12/10/071210fa factgwande on 12February 2011.

Gawande A. (2011) *The Checklist*. Retrieved from http://www.newyorker.com/re porting //2007/12/10/071210fa_fact_gwande on 12 February 2011.

Geiger S. & Turley D. (2003) Grounded theory in sales research: an investigation of salespeople's client relationships. *Journal of Business & Industrial Marketing* **18**(6/7), 580-594.

Gill G. (1996) Vigilance in cytoscreening: looking without seeing. *Advance for Medical Laboratory Professionals* **8**(15), 14-15.

Gibson, B & Hartman, J. 2014. *Rediscovering Grounded Theory*. Sage publications Ltd, Thousand Oakes, California.

Glaser B. (1978) *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory.* Sociology Press, Mill Valley, CA.

Glaser B.G. (1991) In honour of Anselm Strauss: Collaboration. In *Social Organisation and Social Process: Essays in Honour of Anselm Strauss* (Maines D.R. ed.), Aldine de Gruyter, New York.

Glaser B. (1992) *Emergence vs forcing: Basics of grounded theory analysis,* Sociology Press, Mill Valley CA.

Glaser B. (1996) *Gerund Grounded Theory: The Basic Social Process Dissertation,* Sociology Press. Mill Valley. CA.

Glaser B. (1998) *Doing Grounded Theory: Issues and Discussions.* Sociology Press, Mill Valley, CA.

Glaser B. (2001) *The Grounded Theory Perspective: Conceptualization Contrasted with Description.* Sociology Press, Mill Valley, California.

Glaser B. (2002) Constructivist Grounded Theory. *Forum Qualitative Social Research* **3**(3), Article 12. Retrieved from http://nbnresolving.de/urn:n bn:de:0114-fqs0203125 on 10 April 2013.

Glaser B. (2003) *The grounded theory perspective II: Description's remodelling of grounded theory methodology,* Sociology Press, Mill Valley, California.

Glaser B.G. (2004) Naturalist Inquiry and Grounded Theory. *Forum: Qualitative Social Research*. **5**(1). Retrieved from http://www.qualitative-research.net/index.php/fqs/article/view/652/1412 on 10 April 2010.

Glaser B.G. (2005) *The Grounded Theory Perspective III: Theoretical Coding.* Sociology Press, Mill Valley, California.

Glaser B. (2010) The future of grounded theory. *Grounded Theory Review* **9**(2), 1-14.

Glaser B. (2012a) No preconception: the dictum. *Grounded Theory Review: An International Journal* **11**(2), 3-9.

Glaser B. (2012b) Constructivist grounded theory. *The Grounded Theory Review: An International Journal* **11**(1), 28-38.

Glaser B. & Strauss A. (1967) *The Discovery of Grounded Theory: Strategies for Qualitative Research.* De Gruyter, New York.

Glaser B. & Holton J. (2004) Remodelling grounded theory. *The Grounded Theory Review* **4**(1), 1-24.

Glendon A.I. & Stanton N.A (2000) Perspectives on safety culture. *Safety Science* **34**(1-3), 193-214.

Government of Ireland (1998) *Report of the Commission on Nursing. A blueprint for the future*. Government Publications Office, Dublin.

Grbich C. (1999) *Qualitative Research in Health: An Introduction*. Sage Publications, London.

Greenberg C., Caprice C., Emilie M., Roth E.M., Sheridan T.B., Thomas B., Gandhi T.K., Tejal K., Gustafson M.L., Michael L.,Zinner M Michael J., Meghan M & Dierks M. (2006) Making the operating room of the future safer. *The American Surgeon* **72**(11), 1102-1108.

Greenberg C.C., Regenbogen S.E., Studdert D.M., Lipsitz S.R., Rogers S.O., Zinner M.J., Gawande A.A. (2007) Patterns of communication breakdowns resulting in injury to surgical patients. *Journal of American College of Surgeons* **204**(4), 533– 540.

Green D. & Swets J. (1966) *Signal Detection Theory and Psychophysics.* Wiley, New York.

Green D. & Swets J. (1973) *Signal Detection Theory and Psychophysics.* Robert Krieger Publishing Co, New York.

Gregory N., Stock G.N., McFadden K.L. & Gowen C.R. (2006) Organizational culture, critical success factors and the reduction of hospital errors. *International Journal of Production Economics* **106**(2), 368–392.

Groah L. & Nicolette L. (1996) *Perioperative Nursing.* Appleton & Lange. London.

Grounded Theory Online; supporting GT researchers (2013) Retrieved from http://www.groundedtheoryonline.com/getting-started/evaluating-a-gtstudy on 13 February 2013.

Gruendemann B. & Fernsebner B. (1995) *Comprehensive Perioperative Nursing.* Jones & Bartlett, London.

Guba E. & Lincoln Y. (1994) Competing paradigms in qualitative research. In *Handbook of Qualitative Research* (Denzin, N. K. & Lincoln Y.S.,eds), Sage, Thousand Oaks, California, pp. 105-117.

Guba E.G., & Lincoln Y.S., (2005) "Paradigmatic Controversies, Contradictions and

Emerging Influences", (3rd edn), In *The Sage Handbook of Qualitative Research* (Denzin N.K & Lincoln Y.S., eds), Sage Publications, pp. 191-215.

Hall H., Griffiths D, McKenna L. (2013) From Darwin to constructivism: the evolution of grounded theory. *Nurse Researcher* **20**(3), 17-21.

Hamer B. & Henderson V. (1939) *Textbook of the Principles of Nursing*. 4th edn. The Macmillan Company, New York.

Hammersley M. (1989) *The Dilemma of Qualitative Method: Herbert Blumer and the Chicago Tradition.* Routledge, London.

Hancock P. & Hart G. (2002) Defeating terrorism: What can human factors/ergonomics offer? *Ergonomics in Design* **10**(1), 6-16.

Hargie O. (2011) *Skilled Interpersonal Communication: Research, Theory and Practice*. 5th edn. Routletge, Sussex, England.

Harrington S., Simmons K., Thomas C. & Scully S. (2008) Paediatric Laparoscopy, *Association of Operating Room Nurses Journal* **88**(2), 211-236.

Hartley L., Arnold P., Kobryn H., & Macleod C. (1989) Vigilance, visual search and attention in an agricultural task. *Applied Ergonomics* **20**(1), 9-16.

Haynes A., Weiser T., Berry W., Lipsitz S.A.B., Patchen Dellinger E., Herbosa T., Joseph S., Kibatala P., Lapitan M., Merry A., Moorthy K., Reznick R., Taylor B. & Gawande A. (2009) A Surgical Safety Checklist to Reduce Morbidity and Mortality in a Global Population. *New England Journal of Medicine* **360**(5), 491-499.

Haynes A.B., Weiser T.G., Berry W.R., Lipsitz S.R., Breizat A.H.,Dellinger E.P., Dziekan G., Herbosa T., Kibatala P.L., Merry A.F., Reznick R.K., Taylor B., Vats A. & Gawande A.A. (2011) Changes in safety attitude and relationship to decreased postoperative morbidity and mortality following implementation of a checklist-based surgical safety intervention. *British Medical Journal Quality & Safety* **20**(1), 102-107.

Healey A., Undre S. & Vincent C. (2006) Defining the technical skills of teamwork in surgery. *Quality and Safety Health Care* **15**(4), 231-4.

Health Information and Quality Authority (HIQA) (2009a) *Patient Safety- Driving a Culture of Safety*. Retrieved from www.hiqa.ie/patient_safety.asp on 9 September 2009.

Health Information and Quality Authority (HIQA) (2009b) *Submission to the Commission on Patient safety and Quality Assurance.*Retrieved from www.hiqa.ie/Commission_on_patient_safety.asp on 9 September 2009.

Health Service Executive (2009) Integrated Risk Management Policy. Retrieved from www.hse.ie/eng/about/Who/qualityandpatientsafety/resourcesintelligence/QualityandPatientSafetyDocuments/riskmgmt.pdf on 10 April 2012.

Helmreich R. & Schaefer H.(1994) Team performance in the operating room. In *Human Error in Medicine* (Bogner M.S., ed.), Lawerence Eribraum Associates, Hillsdayle, New Jersey, pp. 225-253.

Helmreich R.L., Musson D.M. & Sexton J.B. (2001) Applying aviation safety initiatives to medicine. *Focus on Patient Safety* **4**(1), 1-2.

Helton W., Hollander T., Warm J., Matthews G., Dember W., Wallaart M., Beauchamp G., Parasuraman R. & Hancock P. (2005) Signal regularity and the mindlessness model of vigilance. *British Journal of Psychology* **96**(2), 249-61.

Hemman E. (2002) Creating healthcare cultures of patient safety. *Journal of Nursing Administration* **32**(7/8), 419-427.

Herdman T., Burgess L., Ebright P., Paulson S., Powell-Cope G., Hancock H., Wada E. & Cadman E. (2009) Impact of continuous vigilance monitoring on nursing workflow. *Journal of Nursing Administration* **39**(3), 123-129.

Hernandez C. (2009) Theoretical coding in grounded theory methodology**.** *Grounded Theory Review: An International Study* **8**(3), 51-66. Retrieved fromhttp://groundedtheoryrev iew.com/2009 /11/30/theoretical-coding-in-grounded-theory-methodology/ on 9 June 2013.

Hernandez C. & Andrews T. (2012) Commentary on 'constructing new theory' for identifying students with emotional disturbance. *Grounded Theory Review: An International Study* **11**(1), 39-46. Retrieved from http://groundedtheoryreview.com/2012/06/01 /commentary-on-constructing-new-theory-for-identifying-students-with-emotional-disturbance/ on 9 June 2013.

Hess J. (2009) Sleepiness and vigilance tests. *Swiss Medical Weekly* **139**(15-16), 214-219.

Hewison A. (1996) Organizational culture: a useful concept for nurse managers? *Journal of Nursing Management* **4**(1), 3-9.

Higgins A. (2007) Veiling Sexuality: The development of a grounded theory in the area of sexuality and psychiatric/mental health. In *The Grounded Theory Seminar Reader.* (Glaser B. & Holton J., eds), Sociology Press, Mill Valley, California. pp. 301-320.

Higgs J. (2001) Charting Standpoints in Qualitative Research. (Byrne-Armstrong H., Higgs J. & Horsfall D., eds), In *Critical Moments in Qualitative Research*, Oxford, Butterworth Heinemann. pp. 44-68.

Hirter J. & Van Nest R. (1995) Vigilance: a concept and a reality. *CRNA: The Clinical Forum for Nurse Anaesthetists* **6**(2), 96-98.

Holder V. (2003a) From hand maiden to right hand - the civil war. *Association of Operating Room Nurses Journal* **78**(3), 448-464.

Holder V. (2003b) From hand maiden to right hand—the birth of nursing in America. *Association of Operating Room Nurses Journal* **78**(4), 618-632.

Holder V. (2004a) From handmaiden to right hand—the beginning of world war I. *Association of Operating Room Nurses Journal* **80**(3), 527-543.

Holder V. (2004b) From handmaiden to right hand—the infancy of nursing. *Association of Operating Room Nurses Journal* **79**(2), 374-390.

Holder V. (2004c) From hand maiden to right hand—world war I and advancements in medicine. *Association of Operating Room Nurses Journal* **80**(5), 911-923.

Holder V. (2004d) From handmaiden to right hand—world war I—The mud and the blood. *Association of Operating Room Nurses Journal* **80**(4), 652-665.

Holloway I. & Wheeler S. (2009) *Qualitative Research in Nursing and Healthcare*. Wiley-Blackwell, Oxford.

Holton, J. (2007) *The Coding Process and Its Challenges.* In *The Sage Handbook of Grounded Theory* (Bryant T. & Charmaz K. , Eds), Sage Publications, London, pp. 265-289.

Holton J. (2009) Qualitative tussles in undertaking grounded theory study. *Grounded Theory Review: An International Study* **8**(3), 37-50. Retrieved from http://groundedtheoryrev iew.com/2009/11/30/808/ on 9 June 2013.

Holton J. (2010) From the editor. *Grounded Theory Review,* **9**(2), 1-4.

Holton J. (2011) Classical Grounded Theory Methodology. In *Grounded Theory Trouble Shooting Seminar,* Malmo, Sweden.

Hopkins P. (2010) *Fundamentals of Risk Management: Understanding Evaluating and Implementing Effective Risk Management,* Kogan Page Ltd, London.

Houser J. (2008) *Nursing Research: Reading, Using and Creating Evidence*. Jones & Barlett Publishers, London.

Howard S., Gaba D., Smith B., Weinger M., Herndon C., Keshavacharya S. & Rosekind M. (2003) Simulation study of rested versus sleep-deprived anaesthesiologists. *Anaesthesiology* **98**(6), 1345-1355.

Hudson P. (2003) Applying the lessons of high risk industries to health care. *Quality and Safety Health Care* **12**(1), 7-12.

Hughes R.G. (2004) First, do no harm. Avoiding the near misses: taking into account one ever-present factor: human fallibility. *American Journal of Nursing* **104**(5), 81.

Hughes R.G. (2008) Chapter 2.Nurses at the "Sharp End" of Patient Care. In: *Patient Safety and Quality: An Evidence-Based Handbook for Nurses* (Hughes R.G., ed), Rockville (MD) pp. 6-36. Retrieved from Agency for Healthcare Research and Quality (US); http://www.ncbi.nlm.nih.gov/books/NBK2672/ on 10 October 2011.

Hughes S. & Mardell A. (2009) *Oxford Handbook of Perioperative Practice.* Oxford University Press.

Hunter N. (2011) *HSE Won't Reveal Death Rates from Patient Harm*. Retrieved from http://www.irishhealth.com/article.html?id=19493 on 4 April 2012.

Hurlbert S. & Garrett J. (2009) *Improving Operating Room Safety. Patient Safety in Surgery*. Retrieved from www.pssjournal.com/content/3/1/25 on 3 June, 2010

Hussey M., O'Brien B. & O'Connor L. (2011) *An Investigation of the Attitudes of Perioperative Nurses Practicing in Irish Hospital Settings towards Non-Technical Skills - A Quantitative Descriptive Study.* Unpublished Thesis. University of Limerick, Limerick, Ireland.

Hwang P. & Burgers W.P. (1997) Properties of trust: an analytical view. *Organizational Behaviour & Human Decision Processes* **69**(1), 67-73.

Institute of Medicine (IOM) (2000) *To err is human: building a safer health system.* National Academy Press, Washington D.C.

Institute of Medicine (2001) *Crossing the Quality Chasm; A New Health System for the 21st Century.* National Academy Press, Washington DC.

Institute of Medicine (2004) *Keeping patients safe: transforming the work environment of nurses.* National Academy Press, Washington DC.

International Council of Nurses (ICN) (2006) *The Code of Ethics for Nurses*. International Council of Nurses, Geneva.

International Nuclear Safety Advisory Group (1988) *Basic Safety Principles for Nuclear Power Plants.* International Atomic Energy Agency, Vienna.

Irish Nurses Organisation (2007) *Nation Operating Department Nurses Section Recommended Practices in the Operating Department*. INO Professional Development Centre, Dublin.

ISMP. Medication Safety Alert (2013) *Independent Double Checks: Undervalued and Misused: Selective use of this strategy can play an important role in medication safety.* Retrieved from

http://www.ismp.org/newsletters/acutecare/showarticle.asp?id=51 on 10 August, 2013.

ISMP Medication Safety Alert! (2003) *The Virtues of Independent Double Checks—They Really Are Worth Your Time! Institute for Safe Medication Practices*. Retrieved from http://www.ismp.org/newsletters/acutecare/articles/20030306.asp on 10th August, 2013.

Jacklin R., Servadalis N., Darzi A. & Vincent C.A. (2009) Efficacy of cognitive feedback in improving operative risk estimation. *American Journal of Surgery* **197**(1), 76-81.

Janis I. (1962) *Psychological effects of warnings.* Basic Books, USA.

Jeffs L.P., Lingard L., Berta W. & Baker G.R. (2012) Catching and correcting near misses: The collective vigilance and individual accountability trade-off. *Journal of Inter-professional Care* **26**(2), 121-126.

Johl S.K. & Renganathan S. (2010) Strategies for gaining access in doing fieldwork: reflection of two researchers. *The Electronic Journal of Business Research Methods* **8** (1), 42-50.

Joint Commission on Accreditation of Healthcare Organizations (2001) *Sentinel Events Alert 2001.* Retrieved from www.jcaho.org/ptsafety_frm.html on 18 August 2003.

Joint Commission on Accreditation of Healthcare Organizations (2008) *Sentinel events statistics*. Retrieved from http://www.jointcommission.org/Sentinel Events/Statistics on 24 June 2008.

Joint Commission on Accreditation of Healthcare Organisations (2009a) *Joint Commission Fact Sheet: Facts about The Universal Protocol*. Retrieved from http://www.jointcommission.org/aboutus/fa ct_sheets/up_facts_htm. on 13 September 2009.

Joint Commission on Accreditation of Healthcare Organisations (2009b) *Updated Universal Protocol available online.* Retrieved from http://www.jointcom mission.org/patientsa fety/universalprotocol/ on 30 October 2009.

Joint Commission (2009b) *Sentinel event alert: leadership committed to safety.* Retrieved from http://www.jointcommission.org. on 15 October 2010.

Jonassen D. (1991) Objectivism versus constructivism: do we need a new philosophical paradigm? *Educational Technology Research and Development* **39**(3), 5-14.

Jones K. & Redman R. (2000) Organizational culture and work redesign: experiences in three organizations. *Journal of Nursing Administration* **30**(12), 604-610.

Jonides J. (1983) Further toward a model of the mind's eye's movement. *Bulletin of the Psychonomic Society* **21**(4), 247-250.

Jooste K. (2004) Leadership: a new perspective. *Journal of Nursing Management* **12**(3), 217-223.

Kable A.K., Gibberd R.W. & Spigelman A.D. (2002) Adverse events in surgical patients in Australia. *International Journal for Quality in Health Care* **14**(4), 269-276.

Kalisch B. & Aebersold M. (2006) Overcoming barriers to patient safety. *Nursing Economic* **24**(3), 143-149.

Kelly L. & Vincent D. (2011) The dimensions of nursing surveillance: a concept analysis. *Journal of Advanced Nursing* **67**(3), 652-661.

Kelvered M., Öhlén J. & Gustafsson B.Å. (2012) Operating theatre nurse's experience of patient-related, intraoperative nursing care. *Scandinavian Journal of Caring Sciences* **26**(3), 449-457.

Kerr A. (2009) A problem shared.? Teamwork, autonomy and error in assisted conception. *Social Science & Medicine* **69**(12), 1741–1749.

Kim J.K., Dotson B., Thomas S. & Nelson K. (2013) Standardized patient identification and specimen labelling: a retrospective analysis on improving patient safety. *Journal of American Academy Dermatology* **68**(1), 53-6.

Kontogiannis T. & Malakis S. (2009) A proactive approach to human error detection and identification in aviation and air traffic control. *Safety Science* **47**(5), 693-706.

Kooken W.C. (2008) *Vigilance Experiences. Cancer Patients, families and Nurses.* Unpublished PhD. Submitted for the degree of Doctor of Philosophy, Indiana University, Indiana.

Krauss S. (2005) Research paradigms and meaning making: a primer.. *The Qualitative Report* ***10***(4), 758-770. Retrieved from www.nova.edu/ssss /QR/QR10-4/krauss.pdf on 20 October 2012.

Krohne H. (1993) *Attention and Avoidance*. Hogrefe & Huber Publishers, Seattle Washington.

Kuhn T.S. (1970) *The Structure of Scientific Revolutions*. 2nd edn. University of Chicago Press, Chicago.

Kutney-Lee A., Lake E. & Aiken L. (2009) Development of the hospital nurse surveillance capacity profile. *Research in Nursing & Health* **32**(2), 217-228.

Kvale S. (2007) *Doing Interviews.* Sage Publications, London.

Kwaan M.R., Studdert D.M., Zinner M.J. & Gawande A.A. (2006) Incidence, patterns, and prevention of wrong-site surgery. *Archives of Surgery (Chicago, Ill.: 1960)* **141**(4), 353-357.

Lavie N., Hirst A., de Fockert J. & Viding E. (2004) Load theory of selective attention and cognitive control. *Journal of Experimental Psychology: General* **133**(3), 339-354.

Lazarus R. (1966) *Psychological Stress and the Coping Process.* McGraw-Hill Book Company, New York.

Lazarus R. & Folkman S. (1984) S*tress, Appraisal, and Coping.* Springer Publishing Company, New York.

Leonard M., Graham S. & Bonacum D. (2004) The human factor: the critical importance of effective teamwork and communication in providing safe care. *Quality and Safety Health Care* **13**(1), 85-90.

Lewis G.H., Vaithianathan R., Hockey P.M., Hirst G. & Bagian J.P. (2011) Counter heroism, common knowledge, and ergonomics: concepts from aviation that could improve patient safety. *Milbank Quarterly* **89**(1), 4-38

Lincoln Y. & Guba E. (2000) Paradigmatic Controversies, Contradictions and Emerging Confluences. In: *Handbook of Qualitative Research*. (Denzin N. & Lincoln Y., eds). 2nd edn. Sage Publications Inc, Thousand Oaks, California, pp163-189.

Lincoln Y. & Guba E. (2011).The Constructivist Credo. Left Coast Press Inc, California.

Lindblad B., Chilcott J. & Rolls L. (2004) Mary Lanning memorial hospital: communication is key. *Joint Commission Journal on Quality & Safety* **30**(10), 551-558.

Lingard L., Garwood S. & Poenaru D. (2004) Tensions influencing operating room team function: does institutional context make a difference? *Medical Education* **38**(7), 691–699.

Lingard L., Espin S., Rubin B., Whyte S., Colmenares M., Baker G.R., Doran D., Grober E., Orser B., Bohnen J. & Reznick R. (2005) Getting teams to talk: development and pilot implementation of a checklist to promote inter-professional communication in the OR. *Quality and Safety Health Care* **14**(5), 340-346.

LoBiondo-Wood G. & Harber J. (2006) *Nursing Research: Methods and Critical Appraisal for Evidence Based Practice.* Mosby Elsevier, St Louis.

Loeb R. (1994) Monitor surveillance and vigilance of anaesthesia residents. *Anaesthesiology* **80**(3), 527-533.

Loeb M. & Alluisi E. (1984) Theories of vigilance. In: *Sustained Attention in Human Performance* (Warm J.S., ed.), John Wiley & Sons, New York, pp. 179-205.

Mackworth N. (1950) Researches in the measurement of human performance. In *Personality and individual Differences: A natural science approach* (Eysenck H.J. & Eysenck M. W., eds.), Plenum Press, New York.

Mackworth J. (1969) *Vigilance and Habituation: A Neuropsychological Approach,* Penguin, Harmondsworth, Middlesex, England.

Mackworth J. (1970) *Vigilance and Attention: A Signal Detection Approach.* Penguin, Harmondsworth, Middlesex, England.

Mahoney D., Jones R., Coon D., Mendelsohn A., Gitlin L. & Ory M. (2003) Caregiver vigilance scale: application and validation in the resources for enhancing alzheimer's caregiver health (REACH) project. *American Journal of Alzheimer's Disease & Other Dementias* **18**(1), 39-48.

Makary M.A., Sexton J.B., Freischlag J.A., Holzmueller C.G., Millman E.A., Rowen L. & Pronovost P.J. (2006) Operating room teamwork among physicians and nurses: teamwork in the eye of the beholder. *Journal of the American College of Surgeons* **202**(5), 746-752.

Manias E. & Street A. (2001) Nurse-doctor interactions during critical care ward rounds. *Journal of Clinical Nursing* **10**(4), 442-450.

Manojlovich M. & Talsma A. (2007) Identifying nursing processes to reduce failure to rescue. *Journal of Nursing Administration* **37**(11), 504-509.

Marjamaa R. & Kirvelä O. (2007) Who is responsible for operating room management and how do we measure how well we do it? *Acta Anaesthesiologica Scandinavica* **51**(7), 809-814.

Marriner-Tomey A. & Raile Alligood M. (2006) *Nursing Theorists and their work.* Mosby Elsevier, St Louis Missouri.

Martyr P. (2010) A lesson in vigilance? mental health nursing training in western Australia, 1903-1958. *Issues in Mental Health Nursing* **31**(11), 723-730.

Matthews B., Weinger M. & Smith M. (1997) *Vigilance, Alarms, and Integrated Monitoring Systems*. Retrieved from http://www.mc.vanderbilt.edu/cprq/publications/Vigilance%20%26%20Alarms.pdf on 15 February 2011.

Matthews G., Davis D., Westerman S. & Stammers R. (2000) *Human Performance: Cognition, Stress and Individual Differences.* Psychology Press, Sussex England.

McBride S., Merullo D., Johnson R., Banderet L. & Robinson R. (2007) Performance during a 3-hour simulated sentry duty task under varied work rates and secondary task demands. *Military Psychology* **19**(2), 103-117.

McCallin A.M. (2003a). Designing a grounded theory study: some practicalities. *Nursing Critical Care* **8**(5), 203-208.

McCallin A.M. (2003b). Grappling with the literature in a grounded theory study. *Contemporary Nurse* **15**(1-2),61–69.

McCallin A. (2006) Grappling with the literature in a grounded theory study. *The Grounded Theory Review: An international Journal* **5** (2/3), 11-28.

McCallin A. (2009) Which Grounded Theory. Retrieved from http://www.groundedtheoryonline.com/what-is-grounded-theory/classic-grounded-theory on 2 January 2011.

McClain M.E. (1950) *Scientific principles in nursing*. St Louis, Mosby.

McConnell D.J., Fargen K.M. & Mocco J. (2012) Surgical checklists: a detailed review of their emergence, development, and relevance to neurosurgical practice. *Surgical Neurology International* **3**(1), 6-14.

McCulloch P., Mishra A., Handa A., Dale T., Hirst G. & Catchpole K. (2009) The effects of aviation-style non-technical skills training on technical performance and outcome in the operating theatre. *Quality and Safety Health Care* **18**(2), 109-115.

McDonald R., Waring J. & Harrison S. (2006) Rules, safety and the narrativisation of identity: a hospital operating theatre case study. *Sociology of Health & Illness* ***28****(2), 178–202.*

McDonald G., Vickers M.H., Mohan S., Wilkes L. & Jackson D. (2010) Workplace conversations: Building and maintaining collaborative capital. *Contemporary Nurse: A Journal for the Australian Nursing Profession* **36**(1/2), 96-105.

McGarvey H., Chambers M. & Boore J. (2000) Development and definition of the role of the operating department nurse: a review. *Journal of Advanced Nursing* **32**(5), 1092-1100.

McGarvey H.E., Chambers M.G.A. & Boore R.P. (2004) The influence of context on role - behaviours of perioperative nurses. *Association of Operating Room Nurses Journal* **80**(6), 1103-112.

McGee P & Castledine G. (2003) *Advanced Nursing Practice*. (2nd edn), Blackwell publishing Ltd, Oxford, England.

McIntyre R., Konarski J., Misener V. & Kennedy S. (2005) Bipolar disorder and diabetes mellitus: epidemiology, etiology, and treatment implications. *Annals of Clinical Psychiatry: Official Journal of the American Academy Of Clinical Psychiatrists* **17**(2), 83-93.

Melloni C. (2007) Anaesthesia and sedation outside the operating room: how to prevent risk and maintain good quality. *Current Opinion in Anaesthesiology* **20**(6), 513-519.

Mesmer-Magnus J.R. & De Church L.A. (2009) Information sharing and team performance: a meta-analysis. *Journal of Applied Psychology* **94**(2), 535–546.

Meyer G. (2002) The art of watching out: vigilance in women who have migraine headaches. *Qualitative Health Research* **12**(9), 1220-1234.

Meyer G. & Lavin M. (2005) Vigilance: the essence of nursing. *Nursing* **10**(3), 8.

Meyer G., Lavin M. & Perry A. (2007) Is it time for a new category of nursing diagnosis? *International Journal of Nursing Terminologies & Classifications* **18**(2), 45-50.

Milligan F.J. (2007) Establishing a culture for patient safety – the role of education. *Nurse Education Today* **27**(2),95-102.

Mills J., Chapman Y., Bonner A. & Francis K. (2007) Grounded theory: a methodological spiral from positivism to postmodernism. *Journal of Advanced Nursing* **58** (1), 72-79.

Mills P., Neily J. & Dunn E. (2008) Teamwork and communication in surgical teams: implications for patient safety. *Journal of the American College of Surgeons* **206**(1), 107-112.

Miltner W., Krieschel S., Hecht H., Trippe R. & Weiss T. (2004) Eye movements and behavioural responses to threatening and non threatening stimuli during visual search in phobic and non-phobic subjects. *Emotion* **4**(4), 323-339.

Mishra A., Catchpoole K. & McCulloch P. (2008) "The Oxford NOTECHS System: reliability and validity of a tool measuring teamwork behaviour in the operating theatre". *Quality and Safety in Health Care* **18**(2),104-108.

Mitchell L. (2010) Is it time to integrate non-technical skills and other human factors into perioperative training programmes? *Journal of Perioperative Practice* **20**(9), 314.

Mitchell L., Flin R.., Yule S., Mitchell J., Coutts K. & Youngson G. (2011) Thinking ahead of the surgeon. An interview study to identify scrub nurses' non-technical skills. *International Journal of Nursing Studies* **48**(7), 818-828.

Moghaddam A. (2006) Coding issues in grounded theory. *Issues in Educational Research* **16**(1), 52-66.

Molloy R. & Parasuraman R. (1996) Monitoring an automated system for a single failure: vigilance and task complexity effects. *Human Factors* **38**(2), 311-322.

Moore S. & Duffy E. (2007) Maintaining vigilance to promote best outcomes for hospitalized elders. *Critical Care Nursing Clinics of North America* **19**(3), 313-319.

Morello R., Lowthian J., Barker A., McGinnes R., Dunt D. & Brand C. (2013) Strategies for improving patient safety culture in hospitals: a systematic review. *British medical Journal Quality Safety* **22**(1), 1-18**.** Retrieved from

http://qualitysafety.bmj.com.proxy.lib.ul.ie/content/22 /1/ 11.full.pdf+html on 7 May 2013

Morey J.C., Simon R.D., Jay G., Wears R.L., Salisbury M., Dukes K.A. & Berns S.D. (2002). Error reduction and performance improvement in the emergency department through formal teamwork training: evaluation results of the med teams project. *Health Services Research* **37**(6), 1553-1581. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/1475-6773.01104/abstract;jsessionid=1BCDF5E8ACF61C2A68356614CFEE505C.d02t03?deniedAccessCustomisedMessage=&userIsAuthenticated=false on 15 June, 2013.

Morse J.M. (2008) *Developing Grounded Theory: The Second Generation.* Left Coast Press, Walnut Creek.

Morse J. & Field P. (2002) *Nursing Research: The Application of Qualitative Approaches.* Nelson Thornes Ltd, United Kingdom.

Morse J., Stern P., Corbin J., Bowers B. & Clarke A. (2009) *Developing Grounded Theory: The Second Generation.* University of Arizona Press, Walnut Creek, California.

Mullin J. & Corcoran D. (1977) Interaction of task amplitude with circadian variation in auditory vigilance performance. *Ergonomics* **20**(2), 193-200.

Mulloy D.F. & Hughes R.G. (2008) Chapter 36**.**Wrong-site surgery: a preventable medical error. In *Patient Safety and Quality: An Evidence-Based Handbook for Nurses* (Hughes R.G. ed), Agency for Healthcare Research and Quality. Rockville USA.

Murphy E., Dingwall R., Greatbatch D., Parker S. & Watson P. (1998) Qualitative research methods in health technology assessment: a review of the literature. *Health Technology Assessment* **2**(16), 1-276.

Mustard L. (2002) The culture of patient safety. *Journal of Nursing Administration, Healthcare Law, Ethics & Regulation* **4**(4), 111-115.

Myers D. *(2008) Social Psychology.* McGraw-Hill, Boston.

Nathaniel A. (2011) An integrated philosophical framework that fits grounded theory. In *Grounded Theory: The Philosophy, Method and Work of Barney Glaser* (Martin V.B. & Gynnild A., eds.), Walker Press, Florida, USA, 187-200.

National Health Service, Nation Patient Safety Agency (2009) *National Reporting and Learning Service 2009 Alert: NPSA/2009/PSA002/U1 – World Health Organisation Safety Checklist.* Retrieved from http://www.nrls.npsa.nhs.uk/alerts/?entryid45=59860 on 16 March 2011.

National Health Service. Institute for Innovation and Improvement (2010) *Human Factor Training in the National Health Service: A Scoping Study.* Retrieved from http://www.institute.nhs.uk/images/documents/SaferCare/Human%20Factors%

20Scoping%20Study%20FINAL%20REPORT%20FOR%20DISTRIBUTION%2006-10%20%28exc%20provider%20details%29.pdf on 29 September 2011.

National Health Service, Education for Scotland Patient Safety (2011a) *Evidence into Practice: Improving Healthcare Quality in Scotland: Patient Safety.* Retrieved from http://www.evid enceintopractice.scot.nhs.uk/patient-safety.aspx on 27 September 2011.

National Initiative for Children Health Care Quality Project Advisory Committee (2001) Principles of patient's safety in paediatrics. *Paediatrics* **107**(6), 1473-1475.

National Patient Safety Agency.(2004) *Seven Steps to Patient Safety*. *National Patient Safety Agency. Policy for correct Site surgery* (2010) – ISA HSE Mid-West Acute Services, London.

Needleman J. (2001) *Nurse Staffing and patient outcomes in hospital*. Harvard School of Public Health, Boston, MA.

Negatu A., Mello S. & Franklin S. (2007) *Cognitively Inspired Anticipatory Adaption and Associated Learning Mechanism for Autonomous Agents.* Retrieved on http://link. springer.com/chapter/10.1007/978-3-540-74262-3_7#page-1 on 10 October 2012.

Nickerson R. (1992) *Looking ahead: Human factors challenges in a changing world.* Erlbaum Associates Inc., New Jersey.

Nightingale F. (1992) *Notes on nursing: What it is, and what it is not.* Lippincott Williams & Wilkins, Philadelphia, USA.

Nunn Warburton R. (2005) Patient safety – how much is enough? *Health Policy* **71**(2), 223-232.

O' Brien B. (2011a) What is the perioperative nurses main challenge when caring for the surgical patient? *The Boolean: Snapshots of Doctoral Research at University College Cork*. University College Cork, The Boolean: Snapshots of Doctoral Research at University College Cork.

O'Brien B. (2011b) Cultural Safety in the Perioperative Setting. In *2nd European Transcultural Nursing Association (ETNA),*University of Limerick, Ireland.

O' Byrne P. (2008) The dissection of risk: a conceptual analysis. *Nursing Inquiry* **15**(1), 30-39.

O' Daniel M. & Rosenstein A.H. (2008) Chapter 33.Professional Communication and Team Collaboration. *In Patient Safety and Quality: An Evidence-Based Handbook for Nurses* (Hughes R.G., ed.). Agency for Healthcare Research and Quality, Rockville, USA. Retrieved from www.ahrq.gov/qual/nurseshdbk/nurseshdbk.pdf on 15 May 2012.

Oken B., Salinsky M. & Elsas S. (2006) Vigilance, alertness, or sustained attention: physiological basis and measurement. *Clinical Neurophysiology* **117**(9), 1885-1901.

Opdenakker R. (2006) Advantages and disadvantages of four interview techniques in qualitative research. Forum: *Qualitative Social Research* **7**(4), 1-10. Retrieved from http://www .qualitative-research.net/index.php/fqs/article/view/175/392 on14 August 2013.

O' Reilly M. (2010) *Electro surgery in perioperative practice.* Retrieved from http://findarticles.com/p/articles/mi_m0748/is_9_20/ai_n56307466/? on 12 December 2010.

Pape T.M. (2003) Applying airline safety practices to medication administration. *Medical Surgical Nursing,* **12**(2), 77-94.

Parahoo K. (2006) *Nursing Research Principles, Process and Issues.* Macmillan Press, London.

Parasuraman R. (1984) Psychobiology of Sustained Attention. In: *Sustained Attention in Human Performance (*Warm J.S., ed), Wiley, Chichester, pp. 1-10.

Parasuraman R. (1986) Vigilance, Monitoring and Search. In: *Handbook of Perception and Human Performance. Cognitive Processes and Performance*, **(**Boff K.R., Kaufman L. & Thomas J.P., eds.), Wiley-Interscience, New York, pp. 41.1 – 41.49.

Parasuraman R. & Davies D. (1977) A taxonomic analysis of vigilance. In: *Vigilance: Theory, Operational Performance and Physiological Correlates* (Mackie R.R., ed), Plenum, New York, pp. 559-574.

Parasuraman R..& Giambra L. (1991) Skill development in vigilance: effects of event rate and age. *Psychology and Aging* **6**(2), 155-169.

Parker D., Lawrie M. & Hudson P. (2006) "A framework for understanding the development of organizational safety culture". *Safety Science* **44**(6), 551-562.

Paterson R, Neufeld R. (1987) Clear danger: situational determinants of the appraisal of threat. *Psychological Bulletin*, **101**(3), 404-416.

Patton M.Q. (2002) *Qualitative Research and Evaluation Methods.* Sage Publications, Thousand Oaks, California.

Pattyn N., Neyt X., Henderickx D. & Soetens E. (2008) Psychophysiological investigation of vigilance decrement: boredom or cognitive fatigue? *Physiology & Behaviour* **93**(1-2), 369-378.

Perrow C. (1984) *Normal Accidents: Living with High Risk Technologies*. Basic Books, New York.

Pfiedler Enterprises (2011) *Leadership & Communication in the Perioperative Setting: The Impact on Patient Safety* (A Continuing Self-Study Activity). Pfiedler Enterprises, Aurora. Retrieved from http:www.pfiedler.com/cne/1143/1143.pdf on 26 September 2012.

Pidduck D. (2003) 'The theatre nurse role': A review of the literature. *British Journal of Perioperative Nursing* **13**(9) 374-379.

Polit D. & Beck C. (2006) *Essentials of Nursing: Methods, Appraisal and Utilisation.* Lippincott, Philadelphia.

Polit D & Beck C. (2009) *Essentials of Nursing Research: Appraising Evidence for Nursing Practice*. 7th edn. Lippincott Williams and Wilkins, Philadelphia.

Polit D & Beck C. (2013) *Essentials of Nursing Research: Appraising Evidence for Nursing Practice.* 8th edn. Lippincott Williams and Wilkins, Philadelphia.

Polit D., Beck C & Hungler B (2001) *Essentials of Nursing Research: Methods, Appraisal and Utilization*. 5th edn. Lippincott Williams and Wilkins, London.

Pope A. & Maxwell A. (1911) Practical Nurses: *A Text Book for Nurses and a Handbook for all Who Care for the Sick*. G.P Putman, New York.

Posner M. & Boies S. (1971) Components of attention. *Psychological Review*. **78**(5), 391-408. Retrieved from htttp://pitagoras.usach.cl/~eflores/Tesis2010/Posner1971.pdf on 11 November 2011.

Powell-Cope G., Nelson A.L. & Patterson E.S. (2008) Chapter 5. Patient care technology and safety. In *Patient Safety and Quality: An Evidence-Based Handbook for Nurses*. (Hughes R.G., ed), Rockville (MD). Retrieved from Agency for Healthcare Research and Quality (US);http://www.ncbi.nlm.nih.gov/books/NBK2686/ on 29 July 2013.

Power M. (2004) *The Risk Management of Everything*. Demos, London.

Pronovost P., Jenckes M., Dorman T., Garrett E., Breslow M., Rosenfeld B., Lipsett P. & Bass E. (1999) Organizational characteristics of intensive care units related to outcomes of abdominal aortic surgery. *Journal of the American Medical Association* **281**(14), 1310-1317.

Radford M., County B. & Oakley M. (2004) *Advancing Perioperative Nursing.* Nelson Thornes, London.

Ramanujam R. (2003) The effects of disconuous change on latent errors in organizations: the moderating role of risk. *Academy of Management Journal* **46**(5), 608-617.

Ramanujam R. & Goodman P. (2003) Latent errors and adverse organizational consequences: a conceptualization. *Journal of Organizational Behaviour* **24**(7, Special Issue), 815-836.

Rasmussen J. (1983) Skills, rules, and knowledge; signals, signs, and symbols, and other distinctions in human performance models. *IEEE Transactions on Systems, Man, & Cybernetics,* SMC-**13**(3), 257-266.

Reason J. (1990) *Human Error.* Cambridge University Press, New York, NY US.

Reason J. (1997) *Managing the Risks of Organizational Accidents.* Burlington Ashgate Publising Ltd. Vermont.

Reason J. (2004). Beyond the organisational accident: the need for ''error wisdom'' on the frontline. *Quality and Safety in Health Care* **13**(2), 28–33.

Reeves S., Zwarenstein M., Goldman J., Barr H., Freeth D., Hammick M. & Koppel I. (2009) *Inter- professional education: Effects on Professional Practice and Healthcare outcomes (Review)*. Retrieved from http://acmd615.pbworks.com/w/file/fetch/ 47834116 /ip_education_cochrane.pdf on 19 July 2013.

Rew L. & Barrow E. (2007) State of the science intuition in nursing, a generation of studying the phenomenon. *Advances in Nursing Science* **30**(1), 15–25.

Rijpma J. 2003. From deadlock to dead end: The normal accidents-high reliability debate revisited. *Journal of Contingencies and Crisis Management* **11**(1), 37-44.

Riley R. & Manias E. (2006) Governance in operating room nursing: nurses' knowledge of individual surgeons. *Social Science & Medicine* **62**(6), 1541-51.

Rogerson W. & Tremethick M. (2004) Turning the tide on medical errors in intensive care units: a human factors approach. *Dimensions of Critical Care Nursing* **23**(4), 169-175.

Rothrock J. (2003) *Alexanders Care of the Patient in Surgery.* CV Mosby and Co, Mississouri.

Rothrock J. (2010) *Alexander's Care of the Patient in Surgery.* Mosby and Co, Mississouri.

Rothrock J. (2011) *Alexanders Care of the Patient in Surgery.* Mosby and Co, Mississouri.

Royal College of Nursing (RCN) (2003a) *Research Methodology Study Guide Notes, Part 1, Unit 2: Conducting Research-the Researchers Role and Related Issues*. RCN, London.

Rowen, D., Carne, C.A. Sonnex, C and Cooper, P. (1991) Increased incidence of cervical cytological abnormalities in women with genital warts or contact with genital warts: a need for increased vigilance? *Genitourin Medicine* **67**(6): 460–463.

Royal College of Nursing (RCN) (2003b) *The Future Nurse: The RCN Vision,* Royal College of Nursing, London.

Saalmann G. (2007) Arguments Opposing the Radicalism of Radical Constructivism, *Constructivist Foundations* **3**(1), 16–18.

Sagan S.D. (2004b) The problem of redundancy problem: why more nuclear security forces may produce less nuclear security. *Risk Analysis* **24**(4), 935–46.

Saks M. & Allsop J. (2007) *Researching Health - Qualitative, Quantitative and Mixed Methods,* Sage publications, California.

Sammer C., Lykens K., Singh P., Mains D. & Lackan N. (2010) What is patient safety culture? A review of the literature. *Clinical Scholarship* **42**(2), 156-165.

Sangren A. (2010) *Deciphering Unwritten Rules: Patients, Relatives and Nurses in Palliative Cancer Care.* Linnaeus University Press, Gottenburg, Sweden.

Saral Y., Coskun B., Ozturk P., Bulut Y. & Çobanoglu B. (2005) Multiple metastatic tuberculosis abscesses in a patient with Pott disease and lung tuberculosis: a case report, *Journal of Cutaneous Pathology,* **32**(9), 629-633.

Satchell P. (1993) *Cockpit Monitoring and Alerting Systems.* Avebury Technical Publishers Ltd., London.

Savin-Baden M. & Howell-Major C. (2013) *Qualitative Research: The Essential Guide to Theory and Practice.* Routledge Taylor & Francis Group, London.

Sayegha L., Anthony W. & Perrewé P. (2004) Managerial decision-making under crisis: the role of emotion in an intuitive decision process. *Human Resource Management Review* **14**(2), 179-200.

Scherer D & Fitzpatrick J. (2008) Perceptions of patient safety culture among physicians and RNs in the perioperative area. *Association of Operating Room Nurses Journal* **87**(1), 163-175.

Schreiber R. & MacDonald M. (2010a) Keeping vigil over the patient: a grounded theory of nurse anaesthesia practice. *Journal of Advanced Nursing* **66**(3), 552-561.

Schreiber R. & MacDonald M. (2010b) Keeping vigil over the profession: a grounded theory of the context of nurse anaesthesia practice. *Biomed Central Nursing* **9**(13), 13-21.

Schroeter K. (2000) Advocacy in perioperative nursing practice. *Association of Operating Room Nurses Journal* **71**(6), 1205-1222.

Schwandt T. (1997) *Qualitative Inquiry.* Sage Publications, Thousand Oaks, California.

Scott E. & Summerbell L. (2004) Managing risk in the perioperative environment. *Nursing Standard* **18**(30), 47.

Scott L., Rogers A., Hwang W. & Zhang Y. (2006) Effects of critical care nurses' work hours on vigilance and patients' safety. *American Journal of Critical Care* **15**(1), 30-37.

Seifert P. (2009) Checklists and safety improvements, *Association of Operating Room Nurses Journal* **89**(4), 653-657.

Shaw T., Matthews G., Warm J., Finomore V., Silverman L. & Costa P. (2010) Individual differences in vigilance: personality, ability and states of stress. *Journal of Research in Personality* **44**(3), 297-308.

Shearer J. (2002) The concept of protection: a dimensional analysis and critique of a theory of protection. *Advances in Nursing Science* **25**(1), 65-78.

Shepard S. (2012) *Teamwork in the OR*. Retrieved from http://www.thedoctors.com /KnowledgeCenter/PatientSafety/articles/CON_ID_001402 on 25 October 2012.

Shields L. & Werder H. (2002) *Perioperative Nursing.* Cambridge University Press, London.

Silén-Lipponen M., Tossavainen K., Turunen H., Smith A. & Burdett K. (2004) Teamwork in operating room nursing as experienced by Finnish, British and American nurses. *Diversity in Health & Social Care* **1**(2), 127-137.

Silén-Lipponen M., Tossavainen K., Turunen H. & Smith A. (2005) Potential errors and their prevention in operating room teamwork as experienced by Finnish, British and American nurses. *International Journal of Nursing Practice* **11**(1), 21–32. Retrieved from http://onlinelibrary.wiley.com.proxy.lib.ul.ie/doi/10.1111/j.1440-172X.2005.00494.x/pdf on 30 July 2013.

Simmons O. (2011) *Grounded Theory Institute*. Retrieved from www.groundedtheory.com/what-is-gt.aspx on 20 October 2011.

Simons S.L. (2010) When bad things happen: assisting with investigations. *New-born & Infant Nursing Reviews* **10**(3), 143-150.

Simpson K.R. & Knox G.E. (1999) Strategies for developing an evidence-based approach to perinatal care. *The American Journal of Maternal Child Nursing* **24**(3), 122-131.

Slagle J. & Weinger M. (2009) Effects of intraoperative reading on vigilance and workload during anaesthesia care in an academic medical centre. *.Anaesthesiology* **110**(2), 275-283.

Smith C. (2009) Developing simulation scenarios for perioperative nursing core competencies and patient safety. *Perioperative Nursing Clinics* **4**(2), 157-165.

Smith B. & Jones C. (2009) Perioperative communication. *Journal of Perioperative Practice* **19**(8), 248.

Sperber D., ClÉMent F., Heintz C., Mascaro O., Mercier H., Origgi G. & Wilson D. (2010) Epistemic vigilance. *Mind & Language* **25**(4), 359-393.

Spry C. (2005) *Essentials of Perioperative Nursing.* Jones & Bartlett Learning, London.

Starsweb 2010.Statistics. (2010**)** Retrieved from http://www.stateclaims.ie/ClinicalIndemnityScheme/starswebStats.html on 10 April 2012.

Steelman V. (2013) Priority patient safety issues identified by perioperative nurses, .*Association of Operating Room Nurses Journal* **97**(4), 402-418.

Stein-Parbury J. & Liaschenko J. (2007) Understanding collaboration between nurses and physicians as knowledge at work. *American Journal of Critical Care* **16**(5), 470-478.

Stern P. (1994) Eroding grounded theory. In *Critical Issues in Qualitative Research Methods* (Morse J.,ed.), Sage Publications, Thousand Oaks, pp. 212-223.

Strauss A. (1987) *Qualitative Analysis for Social Scientists.* Cambridge University Press, New York.

Strauss A. & Corbin J. (1990) *Basics of Qualitative Research: Grounded Theory Procedures and Techniques.* Sage, Newbury Park, USA.

Strauss A. & Corbin J. (1994) Grounded theory methodology: an overview. In: *Handbook of Qualitative Research* (Denzin N. & Lincoln Y., eds), Sage, London, pp. 273-285.

Strauss A. & Corbin J. (1998) *Basics of Qualitative Research: Techniques and Procedures for Developing Grounded Theory.* Sage Publications, Thousand Oaks, California.

Stroh C. (1971) *Vigilance: The Problem of Sustained Attention.* Pergamon Press, Oxford.

Sullivan E. & Decker P. (2009) *Effective Leadership and Management in Nursing.* Pearson Prentice Hall, New Jersey.

Sullivan E.J.& Garland G. (2010) *Practical Leadership and Management in Nursing.* Pearson Prentice Hall, England.

Sutcliffe K., Lewton E. & Rosenthal M. (2004) Communication failures: an insidious contributor to medical mishaps. *Academic Medicine* **79**(2), 186-194.

Tamuz M. & Harrison M. (2006) Improving patient safety in hospitals: contributions of high reliability theory and normal accident theory. *Health Services Research* **41**(4 part II), 1654–1676.

Tanner C.A. (2006) Thinking like a nurse: a research-based model of clinical judgement in nursing. *Journal of Nursing Education* **45**(6), 204-211. Retrieved from http://jxzy.smu.edu.cn/jkpg/UploadFiles/file/TF_0692810354_thinking%20like%20a%20nurse.pdf on 28 July 2013.

Thomas E.J., Studdert D.M., Burstin H.R., Orav E.J., Zeena T., Williams E.J., Howard K.M., Weiler P.C. & Brennan T.A. (2000) Incidence and types of adverse events and negligent care in Utah and Colorado. *Medical Care* **38**(3), 261-271.

Thomas E.J., Sexton J.B.,Lasky, R.E., Helmreich, R.L., Crandell, D.S., Tyson, J. 2006. Teamwork and quality during neonatal care in the delivery room. *Journal of Perinatology* **26**(3), 163–169.

Thompson E. (2011) *Defining a Safety Culture*. Retrieved from http://journals.lww.com/ornursejournal/Fulltext/2011/01000/Defining_a_culture_of_safety.1.aspx on 2 June 2011.

Thompson C., Cullum N., McCaughan D., Sheldon T. & Raynor P. (2004) Nurses, information use, and clinical decision making -- the real world potential for evidence-based decisions in nursing. *Evidence Based Nursing* **7**(3), 68-72.

Tourangeau A., Giovannetti P., Tu J. & Wood M. (2002) Nursing-related determinants of 30-day mortality for hospitalized patients. *Canadian Journal of Nursing Research* **33**(4), 71-88.

Trochim W. (2000) *The Research Methods Knowledge Base.* Atomic Dog Publishing, Cincinnati, OH.

Undre S., Aora S. & Sevdalis N. (2009) Surgical performance, human error, and patient safety in urological surgery. *British Journal of Medical and Surgical Urology* **2**(1), 2-10.

Valentine K. (1997) Exploration of the relationship between caring and cost. *Holistic Nursing Practice* **11**(4), 71-81.

Van de Castle B., Kim J., Pedreira M., Paiva A., Goossen W. & Bates D. (2004) Information technology and patient safety in nursing practice: an international perspective. *International Journal of Medical Informatics* **73**(7/8), 607-614.

Van Ess Coeling H., & Cukr P.L. (2000) Communication styles that promote perceptions of collaboration, quality and nurse satisfaction. *Journal of Nursing Care Quality* **14**(2), 63-74.

Viele C. (2003) Diagnosis, treatment, and nursing care of acute leukemia. *Seminars in Oncology Nursing* **19**(2), 98-108.

Vincent C. (1997) Risk, safety, and the dark side of quality. *British Medical Journal* **314**(7097), 1775-1776.

Vincent C., Moorthy K., Sarker S., Chang A. & Darzi A. (2004) Systems approaches to surgical quality and safety: from concept to measurement. *Annals Of Surgery* **239**(4), 475-482.

Voight P. (2009) Using safety tools to prevent system-related errors. *Association of Operating Room Nurses Journal* **89**(6), 969-970.

Warburton R. (2009) Improving patient safety: an economic perspective on the role of nurses. *Journal of Nursing Management* **17**(2), 223-229.

Ward A. (2004) *Attention: A Cognitive Neuropsychological Approach (Psychology Focus),* Psychology Press, United Kingdom.

Warm J. (1984) An introduction to vigilance. In: *Sustained Attention in Human Performance,* (Warm J.S., ed.), Wiley, Chichester, pp. 1-10.

Warm J. Dember W. Murphy A. & Dittmar M. (1992) Sensing and decision-making components of the signal-regularity effect in vigilance performance. *Bulletin of the Psychonomic Society,* **30**, 297-300.

Warm J. (1993) Vigilance and target detection. In: *Workload transitions: Implications for Individual and Team Performance* (Huey B. & Wicken C., ed), National Academy Press, Washington DC, pp. 139-170.

Warm J. Dember W. & Hancock P. (1996) Vigilance and Workload in Automated Systems. In *Automation and Human Performance: Theory and Applications.* (Parasuraman R. & Mouloua M., eds), Lawrence Erlbaum Associates Inc, Hillsdale, NJ England, pp. 183-200.

Warm J., Parasuraman R. & Matthews G. (2008) Vigilance requires hard mental work and is stressful. *Human Factors* **50**(3), 433-441.

Weaver K & Olson J. (2006) Understanding paradigms used for nursing research. *Journal of Advanced Nursing* **53**(4), 459–469.

Weinger M. & Englund C. (1990) Ergonomic and human factors affecting anaesthetic vigilance and monitoring performance in the operating room environment. *Anaesthesiology* **73**(5), 995-1021.

Weiser T.G., Regenbogen S.E., Thompson K.D., Haynes A.B., Lipsitz S.R., Berry W.R. & Gawande A.A. (2008) An estimation of the global volume of surgery: a modelling strategy based on available data. *Lancet* **372**(9633), 139-144.

Wellbrink J & Buss A. (2004) *Vigilance Performance Modeled as a Complex Adaptive System with Listener Event Graph Objects (LEGOS).* Proceedings of the 2004 Winter Simulation Conference. (Ingalls R .G., Rossetti M. D., Smith J. S. & Peters B. A., eds.) Retrieved from *http://freesearch.kbs.unihannover.de/freesearch/Search.action ;jse*

ssionid=54A255BD49AA7A1BCDA2427E60D19708?search=&q=author%3AJ oerg+Wellbrink on10 October 2010.

Wellbrink J., Zyda M. & Hiles J, (2004) Modelling vigilance performance as a complex adaptive system. *Journal of Defense Modeling Systems* **1**(1), 29-42.

West C.P., Tan A.D., Habermann T.M., Sloan J.A. & Shanafelt T.D. (2009) Association of resident fatigue and distress with preceived medical errors. *Journal of American Medcial Association* **302**(12), 1294-1300.

Wicker P. (1991) *Electrosurgery.* National Association of Theatre Nurses. Harrogate.

Wicker P. (2000) Electrosurgery in peri-operative practice. *British Journal of Perioperative Nursing* **10**(4), 221-226.

Wicker P. & O' Neill J. (2010) *Caring for the Perioperative Patient: Essential Clinical Skills,* 2nd edn, Wiley-Blackwell, United Kingdom.

Wiegmann D, Zhang H., von Thaden T, Sharma G & Mitchell A. (2002) *A synthesis of safety culture and safety climate research:* Technical Report prepared for FAA. (Technical Report No. ARL-02-3/FAA-02-2), Savoy, IL: Aviation Research Lab Institute of Aviation, University of Illinois at Urbana-Champaign. Retrieved from http://www. humanfactors. uiuc. edu/reportsandpaperspdfs/techreport/02-03.pdf. on 12 July 2011.

Williams T.G. (1989) The history of operating theatre rituals. *NATNews: British Journal of Theatre Nursing* **26**(12), 21-24.

Wilson R.M., Runciman W.B., Gibberd R.W., Harrison B.T. & Hamilton J.D. (1996) Quality in Australian health care study. *The Medical Journal of Australia* **164**(12), 754.

Worden F. (1966.) Attention and auditory physiology. In: *Progress in Physiological* (Stellar E. & Spague J.M., eds), Academic Press, New York, pp. 45-116.

World Health Organisation Guidelines for Safe Surgery (2008a), *World Alliance for Patient Safety.* (1st edn). Retrieved from http://gawande.com/documents/WHOGuidelinesforSafeSurgery.pdf on 18 June 2011.

World Health Organisation (2008b) *World Alliance for Patient Safety.The Second Global Patient Safety Challenge. Safe Surgery Saves Lives.* WHO Press, Switzerland. Retrieved from www.who.int/patientsafety/safesurgery/knowledge_base/SSSL_Brochure_finalJun08.pdf on 17 November 2011.

World Health Organisation (2009a) *WHO Guidelines for Safe Surgery: Safe surgery saves Lives.* World Health Organisation Press. Geneva, Switzerland.

World Health Organisation (WHO) (2009b) *Patient Safety Research.* Retrieved from http://whqlibdoc.who.int/hq/2009/WHO_IER_PSP_2009.10_eng.pdf on 29 September 2011.

World Health Organisation (WHO) (2009c) *Human Factors in Patient Safety: Review of Topics and Tools*. Retrieved from www.who.int/patientsafety/ research/methods _measures/human_factors/human_factors_review.pdf on 29 September 2011

World Health O*rganisation (2011) Patient Safety; A world Alliance for Safer Health Care. Fact Sheet: An Overview of the WHO Patient Safety Curriculum Guide: Multi-professional Edition.* Retrieved from http://www.who.int/patientsafety/ education/ curriculum/PSP_Curriculum_fact_sheet-Overview.pdf on 25 October 2011.

World Health Organisation (2013) *Exploring patient participation in reducing health-care-related safety risks.World Health Organisation*. Geneva. Retrieved from http:// www.euro.who.int/data/assets/pdf_file/0010/185779/e96814.pdf on 20 July 2013.

Yang H., & Thompson C. (2011) The effects of clinical experience on nurses' critical event risk assessment judgements in paper based and high fidelity simulated conditions: a comparative judgement analysis. *International Journal of Nursing Studies* **48**(4), 429-437.

Youngson G. & Flin R. (2010) Patient safety in surgery: non-technical aspects of safe surgical performance. *Patient Safety in Surgery* **4**(4), 4-6.

Yule S, Flin R, Paterson-Brown S, Maran N (2006a) Non-technical skills for surgeons in the operating room: a review of the literature. *Surgery* **139** (2), 140-149.

Yule S., Flin R., Maran N., Rowley D., Youngson G. & Paterson-Brown S. (2008) Surgeons non-technical skills in the operating room: reliability testing of the NOTSS behaviour rating system. *World Journal of Surgery* **32**(4), 548-556.

Zboril-Benson L.R. & Magee B. (2005) How quality improvement projects influence organizational culture. *Health Care Quarterly* **8**(1), 26-31.

Zegers M., de Bruijne M.C., de Keizer B., Merten H., Groenewegen P.P., der Wal G.V. & Wagner C. (2011) The incidence, root-causes, and outcomes of adverse events in surgical units: implication for potential prevention strategies. *Patient Safety in Surgery* **5**(1), 13-23.

9 Appendices

9.1 Appendix 1: Search Strategy

A review of relevant literature between 1950 and 2013 around perioperative nursing, risk, safety and the core concept of anticipatory vigilance was carried out through a number of methods. The literature search sought research such as primary studies and conceptual/theoretical papers through comprehensive searches of electronic databases including Academic Search Complete, Wiley Blackwell, Pubmed, Cinahl, Medline, Web of Science and Science Direct. Searches were conducted using both MeSH headings and keywords that included 'perioperative', 'nursing', 'operating room', 'vigilance', 'risk' and 'safety'. MeSH, Keyword and phrase searches were undertaken and then combined using Boolean operators through the 'track searches' feature in the selected databases. The terms combined included; ("perioperative nursing" AND risk), ("perioperative nursing" AND safety), (vigilance AND nursing), ((vigilance AND "perioperative nursing") and (vigilance AND risk AND perioperative nursing)), Grey literature judged for academic quality was sourced by accessing unpublished theses through interlibrary loan. Other academic healthcare studies, health strategies and policies were also reviewed. The references within each publication were also reviewed and retrieved where they were considered insightful.

Key international websites in the area of safety, risk, healthcare and perioperative nursing were also searched. Literature found in unrelated fields to nursing and healthcare such as aviation and Industry were also reviewed. This literature was considered for its relevance and position for increasing understanding and discussion such as vigilance in aviation and vigilance in industry. This literature enhanced the discussion and identified how the theory of anticipatory vigilance added to the body of knowledge. Further information was accessed through books held in University of Limerick, and other libraries through interlibrary loan were utilised.

Even though this subject was looked at in overall terms a particular interest in the subject with regard to nursing.

9.2 Appendix II: HIPE Discharge Figures - Table 1 (2009) and Table 2 (2010)

Table 1 2009 Figures

	2009	
Procedure Type based on AR-DRG classification	Number of Discharges with a procedure reported to HIPE 2009	Number discharges with a procedure reported and a diagnosis of *Misadventures to patients during surgical and medical care* (Y60–Y69) and/or *Medical devices associated with misadventures in diagnostic and therapeutic use* (Y70–Y82), reported to HIPE 2009
Surgical AR DRGs	248,269	234
Medical AR DRGs	749,418	65
Other AR DRGs	143,330	14

Total Discharges reported to HIPE 2009 = 1,410,394

Table 2 -2010 Figures

	2010	
Procedure Type based on AR-DRG classification	Number of Discharges with a procedure reported to HIPE 2010	Number discharges with a procedure reported and a diagnosis of *Misadventures to patients during surgical and medical care* (Y60–Y69) and/or *Medical devices associated with misadventures in diagnostic and therapeutic use* (Y70–Y82), reported to HIPE 2010
Surgical AR DRGs	255,133	197
Medical AR DRGs	779,570	56
Other AR DRGs	148,178	18

Total Discharges reported to HIPE 2010 = 1,447,295

Source: 2009 HIPE National File, 2010 National File (Version 2 January 2012), HIPE, Health Research and Information Division, ESRI. March 2012

9.3 Appendix III: Letters Granting Research Ethical Approval

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

HSE West,
Mid-Western Regional Hospital,
Dooradoyle,
Limerick, Ireland.

Tel: 00353 (0) 61 301111
Fax: 00353 (0) 61 301165
Website: www.hse.ie

28th November, 2008.

Ms. Brid O'Brien
Lecturer,
Department of Nursing & Midwifery
Faculty of Education & Health Science,
Health Science Building,
University of Limerick,
Castletroy,
LIMERICK.

Re/ Protocol Title
Occupational Stress/stressors, Job Satisfaction and Work Environment: The experience of perioperative nurses in an Irish setting.

Dear Ms. O'Brien,

The Ethics Research Committee at the Mid-Western Regional Hospital, Limerick has received a submission for ethical approval for the above study.

The following documents were reviewed and approved by the Chairperson of the Ethics Research Committee on the 19th November, 2008.

Application to the Research Ethics Committee	Approved
Appendix 1 – Letter to participant	Approved
Subject Consent form	Approved
Appendix 2 – Theoretic Sampling Strategy	Approved
Appendix 3 – Information Sheet for participants	Approved
Appendix 4 – Interview Guide	Approved
Appendix 5 – Research Proposal for Ethical Approval	Approved

This approval is valid for one year from the date(s) accepted above unless otherwise noted on this document.

From an insurance perspective, please note that cover does not extend to those parties not employed by the Health Service Executive (HSE), or non-HSE Institutions.

Yours sincerely,

Mary Donnellan O'Brien,
Business Manager,
Risk Management,
(For and on behalf of the Ethics Research Committee).

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

HSE West,
Mid-Western Regional Hospital,
Dooradoyle,
Limerick, Ireland.

Tel: 00353 (0) 61 301111
Fax: 00353 (0) 61 301165
Website: www.hse.ie

19th November, 2008.

Ms. Brid O'Brien
Lecturer
Department of Nursing & Midwifery
Faculty of Education & Health Science
Health Science Building
University of Limerick
Castletroy,
LIMERICK.

Re/ Protocol Title
Occupational Stress/stressors, Job Satisfaction and Work Environment: The experience of peri-operative nurses in an Irish setting.

Dear Ms. O'Brien,

I am in receipt of your study as above submitted for review by our Research Ethics Committee.

I wish to advise that the Chairperson has now approved your study. However, you should note that your study cannot commence until you also receive approval from the Risk Management Department. This approval will be issued to you shortly.

You are obliged to inform us as soon as your study is completed or if it terminates early for any reason.

I wish you every success in your study.

Yours sincerely,

Marie Hickey Dwyer,
Consultant Ophthalmic Surgeon,
Chairperson, Ethics Research Committee.

St. John's Hospital | Ospidéal Naomh Eoin

St. John's Square, Limerick, Ireland.
Telephone: +353-61-462222
Facsimile: +353-61-415231
Email: info@stjohnshospital.ie
Website: www.stjohnshospital.ie

Cearnóg Naomh Eoin, Luimneach, Éire.
Teileafón: +353-61-462222
Facsuimhir: +353-61-415231
Ríomhphost: info@stjohnshospital.ie
Idirlíon: www.stjohnshospital.ie

Not to be used for Prescriptions

Our Ref. JA 1/4/5

15th December 2008

Ms. Brid O'Brien
Lecturer
Dept. of Nursing & Midwifery
Faculty of Education & Health Science
Health Science Building
University of Limerick
Limerick

Re. Research Project

Dear Ms. O'Brien,

I refer to your research project on "Occupational Stress/stressors, Job Satisfaction and Working Environment: The Experience of Peri-operative Nurses in an Irish Setting".

Your application to undertake this study was in this hospital considered by St. John's Hospital's Ethics Committee at the meeting held on Tuesday last 9th December. The Committee noted that as your proposed study did not involve any interaction with patients it did not require the approval of the Ethics Committee under our Terms of Reference.

I can however confirm that St. John's Hospital no objection to you contacting the relevant nursing staff in the hospital but that it was a matter for decision by these staff whether or not they wished to participate in the study.

May I wish you every success in your studies.

Yours sincerely,

John Cummins,
Deputy Chief Executive
Secretary to the Ethics Committee
Direct Dial 061–462251
E-Mail jcummins@stjohnshospital.ie

cc. **Ms Kay Hogan, Director of Nursing,**
Ms. Kathleen Lynch, Quality Co-Ordinator/
Secretary Audit & Research Committee

UCC
Tel: + 353-21-490 1901
Fax: + 353-21-490 1919
Coláiste na hOllscoile Corcaigh, Éire
University College Cork, Ireland

COISTE EITICE UM THAIGHDE CLINICIÚIL
Clinical Research Ethics Committee
Lancaster Hall,
6 Little Hanover Street,
Cork,
Ireland.

Our Ref: ECM 4 (d) 06/10/09

1st October 2009

Dr Tom Andrews
Lecturer
School of Nursing & Midwifery
313, Brookfield Health Science Building
University College Cork

Re: Occupational Stress/Stressors, Job Satisfaction and Working Environment: The Experience of Perioperative Nurses in an Irish Setting.

Dear Dr Andrews

Expedited approval is granted to carry out the above study at the following site:

- Republic of Ireland.

The following documents were approved:

- Application Form
- Invitation Letter
- Subject Consent Form
- Subject Information Sheet
- Protocol
- Interview Schedule.

We note that the co-investigators involved in this study will be:

- Brid O'Brien and Dr Josephine Hegarty.

Yours sincerely

Dr Michael Hyland
Chairman
Clinical Research Ethics Committee
of the Cork Teaching Hospitals

9.4 Appendix: IV Letter to Gatekeeper of Potential Sites Requesting Access to Sites and Participants

Gatekeeper Name XXXX

Hospital Site

Hospital Address

Date: 22.11.2008

Re: Requesting Access for to Access Potential Participants for a Research Study in the Perioperative Setting

Dear XXXX,

My name is Brid O' Brien and I am currently undertaking my PhD under the supervision of Dr. Tom Andrews in University College Cork. My research study entails looking at the main concern of nurses working in the perioperative setting using a classic grounded theory approach.

I received ethical approval for my study from the Ethics Research Committee at the Mid-Western Regional Hospital Limerick on the 19th November 2008. The overall aim of this research is to carry out an in-depth exploration of the perioperative setting through interviews. This study will focus predominantly on nurses in the perioperative setting. In this study I wish to hear about the challenges they experience working in the perioperative setting and hope to seek a better understanding of this complex phenomena.

From a research perspective there is limited perioperative nursing research done in this area, in particular from an Irish context and I am keen to add to this knowledge. I propose to conduct individual interviews at a venue, date and time to suit each participant. All information discussed will be treated in the strictest confidence. All nurses involved in the study are free to decline to participate or withdraw at any time. Confidentiality is assured throughout the research.

With your co-operation, I now wish to request permission to access potential participants that may be interested in part taking in the study. If you could inform staff of the research study and give them an invitation letter or displaying it on your notice board, I would be very grateful. Please find letter for distribution enclosed.

If there is any further information that will assist the process, please do not hesitate to contact me: Phone No. is XXXXX and email address XXXXX. Please accept in advance my thanks for your cooperation

Yours truly,

_____

Brid O' Brien

Title XXXXX

Address XXXXX

Cc. XXXXXX CNM3 XXXXXXXXXX

9.5 Appendix V: Invitation Letter for Notice Board

Name

Address

Phone:

10.05.2008

Re : Invitation Letter for Nurses Working in the Perioperative Setting to Participate in a Research Study.

Dear Participant,

My name is Brid O' Brien and I am working as XXXXX in XXXXX and am at present undertaking my PhD with the University College Cork. As part of my PhD studies I am undertaking a classic grounded theory study current working title: **"**The Perioperative Nurses Experience of Occupational Stress/stressors in their work environment. This study is also under the supervision of two supervisors appointed by the University College of Ireland, Cork.

The overall aim of this research is to carry out an in-depth exploration of the perioperative setting through interviews.This study would focus predominantly on nurses in the perioperative setting as this would provide a unique perspective of workplace stress and the underpinning stressors. In this study I wish to hear about the challenges you have experienced working in the perioperative setting and hope to seek a better understanding of this complex phenomena. I feel your personal account would provide a unique perspective of workplace stress and the underpinning stressors encountered in the workplace setting. From a research perspective there is limited perioperative nursing research done in this area, in particular from an Irish context and I am keen to add to this knowledge.

I propose to conduct an individual interview, which will take place at a time and place to suit you. This will be taped over a thirty to sixty minute period. All information discussed will be treated in the strictest confidence. All nurses involved in the study are free to decline to participate or withdraw at any time. Confidentiality is assured throughout the research.

I wish to invite to participate in this study and if you are interested please contact me by either ringing me at my mobile number or write to me by either email or letter. I will then contact you to discuss the study further and to arrange our interview.

Please accept in advance my thanks for your cooperation.

Yours faithfully,

_____.

Brid O' Brien
Title XXXXX
Email Address: xxxxxxxxxxx
Mobile No: XXXXXXXXXXXX

9.6 Appendix VI: Information Sheet for Participants

Working Title of Project: Occupational Stress/stressors, Job Satisfaction and Working Environment: The Experience of Perioperative Nurses in an Irish Setting.

Introduction

My name is Brid O' Brien and I am working as a XXXXX in the XXXXX and am at present undertaking my PhD with the University College Cork. As part of my PhD studies I am undertaking a classic grounded theory study, current working title: "Occupational Stress/stressors, Job Satisfaction and Working Environment: The Experience of Perioperative Nurses in an Irish Setting.". This study is under joint supervision of Dr. Tom Andrews and Professor Josephine Hegarty University College Cork.

What will voluntary participation involve?

Individual interviews are audio-recorded and should last up to 60 minutes. Should you wish to pause or take a break at any time during the interview, this will be facilitated. If you wish to withdraw from the research study at any time you can do so.

Where will the Interview Occur?

At a time and venue of your choice which will be negotiated prior to the interview

What are the benefits of participating in this Study?

You will be contributing to knowledge about stress/stressors, and job satisfaction in the perioperative setting from a nurse's perspective. Furthermore this study will contribute to the development of policies and strategies within the perioperative setting

What are the risks of participating in this Study?

There are no known risks for this study. However should you feel distressed, the principal investigator will listen and provide guidance for you.

How will confidentiality be maintained?

Confidentiality is assured throughout the research**.** Pseudo names will be used to identify participants. All personal details and identifiers will be removed from the transcripts. All electronic data will be password protected and paper data stored in a locked filing cabinet in the Principal Investigators Office.

How will permission be sought for this study?

Ethical approval will be sought from the relevant Hospital Ethical Committee. Participants will give permission to be interviewed by signing the consent form.

What procedures will occur for this study?

Individual unstructured interviews will be carried out.

Interviews will be carried out at a time and venue of your choice which will be negotiated prior to the interview

What is the inclusion and exclusion criterion for this study?

Inclusion Criterion: Qualified nurses working in the perioperative setting in Ireland

Exclusion Criterion: Qualified nurses working outside of the perioperative setting

What happens to the information received?

All conversation and information provided verbally at the interview will be audio taped and transcribed. Your name and the name of your hospital or names identified during the study will be removed. All electronic data will be password protected and paper data stored in a locked filing cabinet in the Principal Investigators Office. Data is stored for 10 years and then destroyed

Is compensation offered for this study?

No financial compensation will be given for participation in this research

How can the study be stopped?

The participant can withdraw from the research at any time. During the interview the participant may stop the recording at any time.

What is the complaints procedures

Any complaint with the interview process should be directed to Dr Tom Andrews. Catherine McAuley School of Nursing and Midwifery, Brookfield Health Sciences Complex, University College Cork.

Alternative treatment

Not Relevant to this study

How do I seek further information?

Further clarification may be sought from the Principle Investigator Bridget O' Brien

What happens at the end of the study?

Theory discovery will be reported in the form of a PhD thesis. Findings will also be presented at national and international nursing conferences and published in peer reviewed journals.

9.7 Appendix VII: Letter to Assistant Directors of Nursing Requesting Access to the Perioperative Setting for Non Participant Observation

Assistant Director of Nursing

Hospital Site

Hospital Address

Date: 8.02.2010

Re: Requesting Permission for Access to the Perioperative Setting for Non Participant Observation

Dear XXXX,

My name is Brid O' Brien and I am currently undertaking my PhD under the supervision of Dr. Tom Andrews in University College Cork. My research study entails looking at the main concern of nurses working in the perioperative setting using a classic grounded theory approach.

I received ethical approval for my study from the Ethics Research Committee at the Mid-Western Regional Hospital Limerick on the 19th November 2008. Futhermore, I received an extension and further ethical approval for non-participant observations on February 4th, 2010. The addition of non-participant observations in the perioperative setting will enhance the findings of the study to date. To-date I have undertaken 24 unstructured interviews.

With your co-operation, I now wish to request permission to undertake non participant observation in the perioperative setting at the XXXXX. The scheduling and length of time, of these observation periods will be arranged with the discretion of the theatre manager Ms XXXXXX in the perioperative setting.

The principal's of confidentiality and anonymity will continue to be adhered to. If there is any further information that will assist the process, please do not hesitate to contact me. My Phone No. is XXXXXXXXX.

Yours truly,

_____

Brid O' Brien

Title XXXXXXXX

Cc. XXXX CNM3 XXXXX.

9.8 Appendix VIII: Letter Granting Access for Non Participant Observation

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

Assistant Director of
Nursing Office,
Mid-Western
Regional Hospital,
Dooradoyle, Limerick.

Tel: 061-482113

16th February 2010

Ms Brid O'Brien
Lecturer
Dept of Nursing & Midwifery
Faculty of Education & Health Science
Health Science Building
University of Limerick
Limerick

Re: Undertaking Non Participant Observations in the Perioperative Setting

Dear Brid,

Thank you for your letter dated 08/02/10. I am happy for you to proceed with your request for permission to undertake non participant observation in the perioperative setting at the MWRH.

Yours sincerely,

pp Cathy O'Brien

Mary O'Brien
Assistant Director of Nursing

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

HSE West,
Mid-Western Regional
Orthopaedic Hospital,
Croom, Co. Limerick,
Ireland.

Tel: 00353 (0)61 397276
Fax: 00353 (0)61 397392
Website: www.hse.ie

Ms. Brid O'Brien,
Lecturer,
Department of Nursing & Midwifery,
Faculty of Education & Health Science,
Health Science Building,
University of Limerick,
Limerick.

22nd February 2010.

Dear Brid,

Further to your letter dated 8th February 2010 requesting permission to undertake non participated observation in our Theatre Department in the Mid-Western Regional Orthopaedic Hospital, Croom.

I do not have any objections to your participation. You will need to contact Gerri Ryan – CNM 2 Theatre regarding times of attendance and notify me in writing re: times agreed.

Thank you.

Yours sincerely,

Kay Chawke
Asst. Director of Nursing

9.9 Appendix IX: Letter to Theatre Managers for Access for Non Participant Observations 2010

Ms XXXXXXX

Hospital XXXXX

Phone: XXXX

13.02.2010

Re: Undertaking Non Participant Observations in the Perioperative Setting

Dear XXXX,

My name is Brid O' Brien and I am currently undertaking my PhD under the supervision of Dr. Tom Andrews in University College Cork. My research study entails looking at the main concern of nurses working in the perioperative setting using a classic grounded theory approach.

I received ethical approval for my study from the Ethics Research Committee at the Mid-Western Regional Hospital Limerick on the 19th November 2008. I received an extension and further ethical approval for non-participant observations on February 4th, 2010. The addition of non-participant observations in the perioperative setting will enhance the findings of the study to date. To-date I have undertaken 24 semi structured interviews.

I have received permission from XXXXXX Assistant Director of Nursing for to contact you regarding undertaking non participant observations in the perioperative settings. I

have promised to liase with your regarding your co-operation in scheduling these. The date and length of time of these non participant observations peiods will be arranged at your convience. I will be contacting you by telephone over the next few days to discuss this.

The principal's of confidentiality and anonymity will continue to be adhered to. If there is any further information that will assist the process, please do not hesitate to contact me. My Phone No. is XXXXXXXXX.

Yours truly,

_____

Brid O' Brien

Title XXXXXXXX

Cc. XXXX Director of Nursing XXXXX.

9.10 Appendix X: Confirmation Letter to Gatekeeper for Non Participant Observation 2010

Name

Assistant Director of Nursing

Address XXXXX

Phone: XXXXX

18.03.2010

Re: Undertaking Non Participant Observations in the Perioperative Setting

Dear XXXX,

Following your letter dated 22nd of February 2010, granting me access to undertake non participant observations in the perioperative setting, I have contacted XXXXX CNM2 regarding dates and times of attendance. The initial date, time and length of the session was agreed for:

Date: 26th March 2010

Time: 9am till lunchtime

The principal's of confidentiality and anonymity will continue to be adhered to. If there is any further information that will assist the process, please do not hesitate to contact me. My Phone No. is XXXXXXXX. Thank you for facilitating me in undertaking my research.

Yours truly,

_____

Brid O' Brien

Title XXXXX

Address XXXXX

Cc. XXXXXX CNM2 Theatre

9.11 Appendix XI: Letter of Invitation to Participant 2008

Name

Address

Phone:

10.05.2008

Dear Participant,

Thank you, for showing interest in participating in my research study. As you may have seen from the notice board, my name is Brid O' Brien and I am working as XXXXX in XXXXX and am at present undertaking my PhD with the University College Cork. As part of my PhD studies I am undertaking a classic grounded theory study current working title: **"**The Perioperative Nurses Experience of Occupational Stress/stressors in their work environment. This study is also under the supervision of two supervisors appointed by the University College of Ireland, Cork.

The overall aim of this research is to carry out an in-depth exploration of the perioperative setting through interviews. This study would focus predominantly on nurses in the perioperative setting as this would provide a unique perspective of workplace stress and the underpinning stressors. In this study I wish to hear about the challenges you have experienced working in the perioperative setting and hope to seek a better understanding of this complex phenomena. I feel your personal account would provide a unique perspective of workplace stress and the underpinning stressors encountered in the workplace setting. From a research perspective there is limited perioperative nursing research done in this area, in particular from an Irish context and I am keen to add to this knowledge.

I propose to conduct individual interview, which will take place at a time and place to suit you. This will be taped over a thirty to sixty minute period. All information discussed will be treated in the strictest confidence. All nurses involved in the study are free to decline to participate or withdraw at any time. Confidentiality is assured throughout the research.

Please contact me by either ringing me at my mobile number or write to me by either email or letter. I will contact you to discuss the study further and to arrange our interview.

Please accept in advance my thanks for your cooperation.

Yours faithfully,

_____.

Brid O' Brien

Title; XXXXX

Email Address: xxxxxxxxxxx

Mobile No: XXXXXXXXXXXX

9.12 Appendix XII: Consent Form

Name of Researchers: Ms. Bridget O' Brien. University of Limerick

Dr. Tom Andrews. University College Cork

Dr. Josephine Hegarty. University College Cork

Name of Participant:

1. **I agree to participate in the proposed research**
2. **I have read and understood the subject information sheet**
3. **Participation is voluntary and therefore I can withdraw from the study at any stage should I wish to do so.**
4. **I understand that data collected will remain confidentiality**
5. **I understand that data collected will be stored securely in a locked cabinet**

Signature:_____Date:_____

9.13 Appendix XIII: General Interview Guide

Welcome and Introduction

Thank you for participating in this study and for giving your written consent for this interview. Should you wish me to pause or take a break at any time please feel free to request this? I will place the recorder within reach so that you may pause or stop it, at any time. If you wish to withdraw from this research study at any time you can do so. Confidentiality will be maintained throughout the interview and the entire research process.

Sample question for the core structure of the interview

- What is it like to work in the perioperative setting?
- What is your relationship with your colleagues? Unit manager? Multidisciplinary team?
- What do you think are the challenges in the perioperative setting?
- What are the complexities of the perioperative setting?
- What in your experience do you feel are stressors in the perioperative setting?
- Looking back, is there anything else you feel you want to tell me?
- Can you share with me what you think may help or relieve difficulties (stress) in the perioperative setting?

Examples of non-directive probes, which may be used during the interview

- You're doing fine, please continue.
- Can you elaborate…….work/home life
- Can you clarify……..
- I see.
- Mmmm.
- Nodding

End of interview

Thank you so much for your cooperation and for taking the time to participate in this study. It is hoped that the findings of this study will be presented at different hospital setting especially those where participants took part in the study and will also be presented at local, national and European conference. The findings of this study will also be published.

9.14 Appendix XIV: Field Diary

Interview (MH)

This was my first interview. I knew the participant as I had thought her during the Higher Diploma in Peri-operative Nursing. When starting off the interview, I thought I had everything in process, however that was not so. Little issues like being fully organised, and using the digital recorder became major issues.

Outcome: I felt the interview did not continue for long enough and there was a lot of silence. I also need to be more organised next time. At this stage I just need to follow where they lead as I have no idea what they are going to say.

- Date:
- Time:
- Venue:
- Gender:
- Age:
- Religion
- Nationality
- Marital State:
- Children
- Training Institute
- Years of Experience Years
- Position
- Hospital
    - Area working at present
- Perioperative Setting Mix
    - OR/Anaesthetics
    - Anaesthetics/Recovery
    - OR/ Anaesthetics/Recovery
    -
- Atmosphere:
- Interview (easy/difficult)
- Action Plan:

9.15 Appendix XV: Memo on Non Participant Observations

Memo on Observations 3rd March 2010

Going into the clinical area to do non participant observations has been an eye opener in so many ways. Looking forward to going into the perioperative setting I had thought that going in would be quiet easy (grass always looks greener from afar). While they made me feel part of the team it was different to what I had expected. I found it quiet difficult just observing. While I had known what my role was, knowing so many of the team possible made it more challenging. I so wanted to help not do the Job I was there to do. The change monitor sounds and tones brought back old memories so I found myself anticipating the response as oppose to documenting the observations as I suppose you cannot remove the perioperative nurse out of the person.

It verified for me that the anticipatory vigilance is what is so fundamental in the setting in maintaining safety in the OR. One has to be alert to what is happening around them. The level and experience of the perioperative nurse determines the knowledge base and intuitiveness of the response.

Finding it difficult to fade into the shrubbery of the OR was difficult. While explaining who I was why I was there and the process of ethic for my research and the HSE permission was all explained. The reassuring of staff that I was there for my needs for data within the perioperative setting and not to check on them was fundamental to developing a rapport and prompted and encouraged them to be vocal on their thoughts about my current research situation. They like the concept of anticipatory vigilance as they felt it gave them value and not just following procedure and being robotic or automated in there thinking and moving.

9.16 Appendix XVI: Memo's on Coding, Concepts and Categories

Memo's written that link with Orchestrating

Management and Leadership (Interview 2, 10th March 2009)

Good management and leadership roles are essential in the operating room. The operating room seems to be a much organised environment so that things work like clockwork. Being a good manager and leader is essential in ensuring that people and workloads are delegated. Being able to delegate in the operating room is necessary for the many roles in the operating room area. Know and trusting the people you work with is important. Workloads need to be fair regardless of education, experience or role. Management and leadership need to be linked with education as some people are only seeing the work that needs doing not the vision of the bigger picture**.** There appears to be a sense of control around all aspect of the work.

Team Working and Band Playing (Written 6th October, 2009)

For some reason I am associating team working in the operating room with a band or orchestra playing music. This is where everyone has a function and the band does not exist without all people. Is a person a metaphor – a violin, a piano – scrub nurse, porter, doctor? It takes all to make perfect music as it takes all the team working together in the operating room for good positive outcomes. Orchestrating the list may be a concept

Orchestrating Case Load (Interview 14, 9th October, 2009)

Rotation of caseload and the organisation of it seem to be important in the operating room. The organising or orchestrating of caseloads is vital to ensure safety and a completed list.

Some of the many elements involved in orchestrating are: Management, leadership, planning, delegation, supervision, training, risk assessment and management.

The Category of Orchestrating consists of Macro orchestrating, Locational orchestrating, Situational orchestrating and Being in the know.

Memo's Written that Link with Macro Orchestrating

Supervision and Overseeing (Interview 22, 27th January, 2010)

This comes under leading and managing the workflow and work in the setting. It is vital for smooth and flawless motion and working in the setting.

Macro Orchestrating (Interview 15, 9th October, 2009)

This involves providing structure, control and organisation around all aspect of the work to ensure risk is minimised. This ensures structure within the workplace enabling seamless workflow and is enhanced with being in the know.

Memos Written that Link with Locational Orchestrating

Skill Matching (Interview 22, 27th January, 2010)

When delegating skill matching is an essential component of orchestrating or managing.

Locational Orchestrating (Interview 26, 22nd February, 2010)

Locational orchestrating is normally carried out by people in a position of authority or those in charge of a unit where people and workloads are delegated for the setting. It involves managing people and workload within the smaller units of the department, which results in a safer environment as this type of structure give confidence to people in the perioperative setting.

Memos Written that Link with Situational Orchestrating

Self/Individualorganising (Interview 22, 27th January, 2010)

This is present when work has being allocated. It is important to organise oneself when taking responsibility for a particular job i.e. scrubbing. Even though you work as a team each has their own responsibilities. Near misses are observed and managed through this.

Empowering Staff (Interview 31, 26th February, 2010)

The empowerment of staff is essential in the setting as it allows people to take responsibility for a given situation.

Memos Written that Link with being in the know

Channelling Communication (Interview 14, 9th October, 2009)

This comes up time and time again in some format and appears to be central to people being informed. When people are informed and know what is going on they feel involved and can carry out their work effectively. It seems to be integral to all elements in the operating room as without it nothing would work. It seems to incorporate all elements the verbal, nonverbal and listening.The importance of communication is a very important component in the operating room for the list to run smoothly and safely. This may connect with habitual checking.

Being in the Know (Observations 27th February, 2010)

Being in the know involves the whole chain of the communication aspect of how work gets done in the setting. Some people talk about being in the know or having information it appears to be a vital component of teamwork. Everything from eye contact to silent manoeuvres and a trusting support system all hinges on this concepts. But what is this? I initially thought that it was channelling communication or information but now feel the heading should have more meaning and depth. It may involves intuitive knowing,self-awareness, knowledge, gut instincts and professionalism which all lead to safe holistic care.While communication covers listening, talking, documenting, eye contact, it is the trust element in the relationship that makes it unique. Essential communication keeps people feeling involved, important and motivated. Maybe there is a hypothesis here! The more important a person feels hinges of the amount of good communication given to a person; the more you get the more important you feel the less you get the less important you feel.

Connecting NonVerbally (Observations Friday 25th March, 2010)

This is something that happens constantly in the operating room as nurse wear face masks. It also occurs with patients in their care. It is the unwritten and nonverbal connection of understanding that occurs where no words are spoken or required. What is this shared moment of complete understanding? Instant messages may be transferred through eye contact, instant silent messages directing the next activity or task to be performed. This connecting ensures support, and anticipatory need of co-workers. It is part of communication – passing of information allows one to be in the know. Sharing learned information may also part of this.

Memos Written that Link with Routinising

29th April 2009 – Safety of Routine

Just wondered if this may be a conservative place to work where no one makes decisions or takes on changes. Is the structure and routine for safety reasons associated with the patient or does it all for control of the people who work there. It is important that all work gets done in a routine, timely and orderly manner to ensure safety. Unscheduled or emergency events causes challenge as routine is broken down. Routine is everything. People who work there are passionate about it. Rule adherence is essential. Keep thinking of a Military campaign, order of priority - instruments first patient second and then the legal aspect.

Automated Care - (Interview 15, 9th October, 2009)

Is the care in the operating room automated and if so why? Is everything routine? Do we think about what we do? Is everything so sequential that the nurses behave in a robotic like manner? I think not – care is always individual when safety measures are put in place like monitoring patients and documenting evidence. Routine is an essential part of the structured environment of the operating room. This is a must in the setting. Checking is all important and must be habitual to ensure safety. Safety prevents errors. Routine prevents errors. Hypothesis: errors are prevented by maintaining safety.

Eyes in the Back of your Head (Interview 26, 22nd February, 2010)

The pivotal role of anticipatory vigilance involves routinising, teams and being able to adapt, when the need arises. One cannot see all but the team watch and support one another by constantly watching, observation and monitoring. Knowing the job and knowing what their job is at a given time - Role expectancy.

The Category of Routinising consists of Habitual Checking, Rule Following, Mutual Watching and Mutual Dependency.

Memos Written that Link with Habitual Checking

Checking Habitually (Interview 5, 23rd April 2009)

Checks and double-checks are built into perioperative systems. Nurses spend a great deal of time doing checks. There are many aspects to safety checking. They consist of checking for accountability, checking for errors, anticipatory and checking. Checking lists for instrumentation, equipment, stocks, requisites for case, guidelines for blood transfusions, consent formsand check lists.

Routine Habitual Checking – 4th November 2009

Checking of machinery, lists, instruments, equipment all occur before ever a patient arrives in the operating room. When the patient comes into the theatre personal details are checked, consent, site instruments swabs etc. In conversing with the perioperative nurse to-day she suggested that checklists are an important aspect within the culture adapting them to suit the current area as they need to be user friendly. In this way the checklist will protect the systems that support both the perioperative nurses themselves and the patient.

Memos Written that Link with Rule Following

Regulations in Theatre (Interview 5, 23rd April 2009)

Regulations, policies and guidelines are essential in the operating room to ensure patients safety during their surgical procedure. They must be adhered to and updated.

Awareness of Regulation and Rule Adherence (Interview 8, 5th April 2009)

It is important that nurses working in the area are aware of the importance of regulation in the operating room. Regulation and abiding by the rules is essential in the operating room for the surgical list to run smoothly. Operating room nurses adhere to the rules to maintain safety in the operating room and to avoid unwanted or damaging consequences as the stakes are high if error occurs. Operating room nurses protect the rules by using them. The need them and abide by them as they are protected by the rules (rules protect themselves).

Memos Written that Link with Mutual Watching

Being Alert and Watching One Another (Interview 22, 27th January, 2010)

This is essential in the operating room. Being alert to sounds, attitudes, verbal words, inaccuracies and what you see is so relevant to adhering to good safety measures. One has to be alert when doing routing work, working in the team, watching their back and adapting to what every role is required for them. This awareness is undertaking by constantly mutual watching others so that change can occur when required.

Watching Out for One Another (Interview 30, February, 2010)

Keeping an eye on one another. Being a good team member and always being anticipatory vigilant exist in tits strongest form. It involves supporting one another, requesting help, instant structuring, changing roles and facilitating colleagues.

Memos Written that Link with Mutual Dependency

Relying on Others (Interview 32, 26th February, 2010

Nurses appear to rely on one another constantly. When working together the have to be focused. Being in the moment ensures that you are being vigilant and therefore others depend on you to be so.

Seamless Flow (27th February, 2010)

Seamless flow in the operating room is Poetry in motion or the music of the setting. When teamwork is at its best there is a beauty in how people work in harmony. There is a seamless flow where each is an extension of the other team members. The anticipation vigilance allows for the beautiful movement within the co-dependency on others within the setting. The trusting camaraderie and total reliance on others allows for the extension of a movement and even the finishing of sentences.

Memos Written that Link with Momentary Adapting

Theatre Training (Interview 1, 8th March 2009)

Theatre Training is essential for an efficient and safe environment as new learning and change is ever present due to the nature of the work. Nurses need to be knowledge and competence. Being flexible and adjusting and adapting to change is a necessary part of the work.They adapt and change as the need arises

Adaptability (Interview 20, 7th December, 2009)

The operating room nurse seems to be many things analytical, assertive, flexible, organised structured and need to adapt given each situation and moment**.** Being adaptable is all part of working together. The nature of the work insists that we expect the unexpected at all times, we cope with role diversity and it even transcends to who leads, who follows when we should be passive or assertive. It is this adaptability that enables the team to work together in unity and also to do the routine checking all required in the setting.The more routine one has the safer the place is. The more adaptable people are the safer the environment and the team works support one another.

Co-Ordination on the Run- 31st October, 2009)

OR nurses appear to do co-ordinate while working (in action). They are extremely flexible and constantly adapt to a given situations.

The Category of Momentary Adapting consists of Heightened Awareness Rapid Responsible Responding, Advanced knowing and Temporary Restructuring.

Memos Written that Link with Heightened Awareness

Prior knowing – Intuition (Interview 7, 29th April 2009)

An element of working long term in the perioperative setting. Is this knowledge or intuitions or just experience within the setting. It appears to be present in more experienced staff. They just seem to know what to do next.

Heightened/Increased awareness

It may occur at any time of the surgical experience. It involves predicting or foreseeing what is about to happen through knowledge and experience. It results in a state of being more aware and knowledgeable about something than one is expected to be increasing nurses sense of caution and responsibility.

Memos Written that Link with Responsible Responding

Responding to the Unexpected (Interview 7, 29th April 2009)

This seems to be stressful for most of the participants I interviewed. One has to be competent to deal with unexpected as one never know what will come through the door. It is a necessary part of working in the operating room. Drawing on experience and responding according is required when dealing with the unexpected.

Expecting the unexpected (Interview 10, 18th May 2009)

This seems like a good code as it encapsulates dealing with emergencies as one does not know what to expect coming in the doors of the operating room. Expecting the unexpected ensures one has to be very reactive and on your toes at all times. We must constantly adapt.

Memos Written that Link with Temporary Restructuring

Teams and Teamworking (Interview 2, 10th March 2009)

Working in teams seem ever prevalent in the OR. It enables work to be done by staff working together in the setting through having a trusting rapport and being ever vigilant of one another –it does set you thinking of the disaster that may occur if one is not present Consultant. CNM, Circulation, Scrub, Anaesthetics, SSD – some of the team involved. Being a team member is essential in the perioperative setting. The case list cannot run without the collaboration and team involvement of the staff that work there. You are very much a cog in the wheel, where staff are dependent on one another. Being a cog in a wheel is linked directly with team work and without all cogs the wheel does not go around. Team work is essential. There is possible a co dependency within the surgical team because of the nature of the work. Maybe even constantly working with tension because of the life and death nature of the work and the rapid, sequence, requirement of the response by staff at all times.

Instant Team Structure- 31st October, 2009

There is an instant or automated team restructuring in the operating room when something unusual or unexpected occurs as it maintains safety. This rapid response involves teams coming together for the greater good of the patient care outcome.The rest of the time the team structure occurs for each situation but it is not always instant. Collaboration of the team is essentials working together should be seamless harmonious and should form a whole.

Memos Written that Link with Advanced Knowing

Clinical Inexperience (Interview 2, 10th March 2009)

When someone does not know what they are doing it may lead to disastrous results and nobody can rely on anyone else in the area. Competent staff seems to be the back bone of the operating room. Experience seems all important. It doesn't seem enough to just have people, they need the lived experienced. Working in operating room seems to require the knowledge and skil,l not just doing the job.

Knowing and Anticipating People Needs (Interview 3, 10th March 2009)

Knowing what to do involves experience and knowledge. It is important to have the bigger picture in the vision to know what to do. "Give me what I need, not what I ask for"! operating room nurses need to be able to anticipat,e it is an important part of their role. Knowing the job is vital in the operating room setting. Picking up on things to be done is also part of this. This is linked to knowing what is to be done and it involves be knowledgeable and intuitiveness. The longer you spend in the operating room the more knowledge you have. Education and advancing practice can also improve the level of knowledge.

Memos Written that Link with Trusting Relations

Building Trust (Interview 6, 29th April 2009)

Trust seems vital in the operating room and is possibly linked to teamwork and communication for routinisating, mutual watching and momentary adapting to occur. It is essential that trust is built up between team members as this enables the work to be undertaken. This is an element of teamwork that is required between the team members in the operating room. It underpins everything in the opeating room. All the team have differing roles and we all have to rely on one another during the surgical procedure. Knowing who you work with and their capabilities are so important in this setting.

Importance of Trust - Informal Interview 11 – Croom (25th March, 2010)

Had a conversation with one of the nurses in the operating room to-day regarding the issue of trust. She said that trust was being aware of how people work or how the care. She mentioned that a person is more vigilant with inexperienced staff or staff that you don't know. Knowing a person's normal work ethics, their capabilities and that you can count on them when needed is vital. Relaxed chatting helps cultivate both relations and relationships which allows for trust to be built up which is an important part of group

dynamics while working in a team. She mentioned that trust was ageless. It may be a mixture of personality and experience together that allows trusting relations to be built up. In the opeating room nurses are constantly watching and assessing, enabling adjusting or adapting to new ways to deal with what is happening thus ensuring safety.

9.17 Appendix XVII: Memo's Concerning Minimising Risk (Main Concern)

Safety (Informal Interview 3 –12th November 2009)

One nurse spoke about the importance of maintaining a safe environment" ensuring the safety of the patient regardless how busy the operating room was. Everyone tries to maintain safety as the stakes are high if error occurs. Wondering if the main concern of staff is simply maintaining a safe structure environment for patients.

Safety in the OR Informal (Interview 4 –14th November 2009)

Having had the first conversation I had a second conversation two days later regarding Surgical Time Out (STO) with another perioperative nurse. Her main concern was about STO to ensure safety of the patient during surgery (right patient, site, consent). Everything that you do in the opeating room is concerned with safety and the structure, rules or guidelines helps one to deal or resolve the main concern.

Safety (Interview 17, 25th November, 2009)

Interview all about safety – talked about the consequences when safety failed. How the monitoring of the patient lists and staff is essential. Talked around the stress of management as the book stops with you and dealing with human resources issues and listening to people's problems is so essential. Adhering to rules and regulations and working as a team is important other duties like doing off duties ordering stores, training staff. She verified my current thinking. Safety is appearing everywhere.

Meticulous Focusing (Interview 20, 7th December, 2009 – Initial coding)

All part of working in the operating theatre when surgery is underway to ensuring safety.

Importance of Safety (Observations 5th March, 2010)

Keeping people safe, protecting them, advocating for them is all part of the role of the perioperative nurse. Looking from the outside in the people trust when going to theatre that surgery will be performed in a safe manner. While a number of people comment on the surgeons hands, once someone has experienced a visit to the operating room they realise the team involved in getting there, getting through and back the experience hinges

on whom they are met and communicated with but when you speak with patients within the perioperative setting, while they felt nervous they have great trust in the people that dealt with them. For nurses that trust placed in them is great and that is why no one takes shortcuts with safety and no matter what occurs they realise that they must be alert, vigilant and anticipate outcomes. This comes with being educated, a professional knowing what to do, intuition and being a safe practitioner.

Preparing can involve object or human, but all circle around safety, good preparation leads to a safe and correct surgery. All anticipate the next step.

9.18 Appendix XVIII: Memo's On Anticipatory Vigilance (Core Concept)

Anticipating Role - 9th October, 2009

While observing in the setting on my last interview, I noticed that all staff were rushing around the perioperative area and appeared to be extremely busy. They were constantly preparing for the next surgical case and anticipating the requirements for the differing surgeries. The importance of monitoring and observing seem to be all important. Anticipating surgeon's needs for surgery, which is done with a precision and skill that is seamless and flawless seems to be integral to the setting. Anticipation is very important in theatre as surgeons likes and dislikes must be known for the surgical case to run smoothly ensuring the patient has a positive outcome. It seems to be a very evident concept in the setting as nurses in their roles seems to be constantly aware and anticipating both their fellow nurses, doctors, and their patient needs. It would seem that this links with good teamwork.

Having Positive Outcomes - (Interview 15, 9th October, 2009)

It is important for all perioperative nurses to ensure that patients have a positive outcome which suggests that safety was maintained throughout the surgical experience. This reiterates safety and encourages staff to be aware and be involved in anticipating what is required and being constantly vigilance. Monitoring and watching is an important aspect of the work as it insures that nothing goes unnoticed

Anticipating Vigilance- 31st October, 2009

Being vigilant and aware is a main component of working in the OR. Anticipating what will occur is part of the working day. Being aware, watchful and vigilant is ever important to be able to anticipate.

Hidden World of Vigilance

In todays world people outside of the perioperative setting look in or on the setting as a closed setting. There are connotations that there is a mechanical world in the setting. Having gone into the setting with an expectation of meeting stressed individuals I now find myself in the situation that the perioperative nurse is ever vigilant and the concepts and the

concept experience by some of a mechanical world is not so – in actual fact the perioperative nurse is required more than ever before of the need to augment their interventions with the surgical intervention to achieve a positive outcome.Perioperative nurse make a difference. Their institutive role ensures risk management, normalising of what they become. Working in the area and ensuring safety of any patient coming through the doors.

Anticipatory Vigilance - (Interview 28, 22nd February, 2010)

Have changed anticipating to anticipatory as it is easier to say and I think it is an important concept pertinent to the study. This is required consistently in the OR as it is vital to ensure safety as this is fundamental. It involves being physically present, being present in the moment, being alert and detecting what is going on. Depending on the situation it may also involve documenting care or planning tasks or activities. Hypothesis: knowing what you're looking for enhances anticipatory vigilance.

Anticipatory Vigilance (Observations 27th February, 2010)

Anticipatory Vigilance is vital in so many acute settings as it is to ensure safety is maintained. This is possibley required in Crèches, Fire Brigade, Other aspects of care, Police work, Prison Watching etc. It is such an important function in what the sector does in detecting, observing and avoiding dangers and errors. The anticipatory nature of vigilance ensures that people are always operating at 110% where very little goes unnoticed. There are possible differing vigilance tasks e.g. watching, detecting, etc. It is this important pattern of behaviour that ensures safety is maintained.

Hyper Vigilance (Interview 32, 26th February, 2010)

Do we overdo vigilance. Is it possible to overdo. We can never be too vigilant in the operating room as safety is fundamental to positive outcomes. It is important to be hyper vigilant as the patient safety is paramount.

Looking In (Observations Friday 25th March, 2010)

When undertaking non participant observations I noticed the expertise and ease in how staff do their work was a pleasure to observe. Such depth of knowledge, knowing, skill, professionalism and regard for accountability that staff have ensures that patients and staff

are safe at all times. How they do their work constantly watching one another's back is by being vigilant. They check, work together and adapt to differing roles with ease by communicating and trusting one another. It is the trust element that appears to make a difference. They trust one another that they will always have support and back up. They trust in their knowledge and skill. I even found myself responding to monitors noting the observations and verbally calling them out for the staff and listening to the tone of the monitor. I was there and felt that instant restructuring of the team with the combination of being ever vigilant and anticipating the response. The unity of the department was evident where all were working together for the greater good.

Memo: Thinking Around the Core Concept (Interview 19, 4th December, 2009.)

If the main concern is centred around safety. The core concept must have an element of structure and how safety is maintained by reducing risk. At present it would appear from the concepts already present that safety/risk aspect should have a watching/observing/monitoring/surveillanceing/governing or organising aspect to it for them to be able to resolve their main concern. Codes like constantly watching, being vigilant, anticipatory watching, momentary surveying, momentary watching, momentary governing all have come from the data. Following a presentation in University College Cork where I tried to explain my research I started out by telling them what the main concern was and my thought from the data on how it might be resolved. During this session where I saw the connection between vigilance and anticipation and called the core concept anticipatory vigilance as I felt that vigilance was broader then watching and that the anticipatory nature of the work covered the preparation and pre-empting aspect of how the nurses work. I once again went back to the data to ensure that it could be the overarching concept for the different categories. It was interesting to find that in Interview 2, I had identified this as concepts but had not realised it significance.

9.19 Appendix XIX: Letters Granting Extension of Research Ethical Approval and Access for Non Participant Observations

Feidhmeannacht na Seirbhíse Sláinte
Health Service Executive

HSE West,
Mid-Western Regional Hospital,
Dooradoyle,
Limerick, Ireland.

Tel: 00353 (0) 61 301111
Fax: 00353 (0) 61 301165
Website: www.hse.ie

8th February, 2010

Ms. Brid O'Brien,
Lecturer, Department of Nursing & Midwifery,
Faculty of Education & Health Science,
Health Science Building,
University of Limerick.
LIMERICK.

Re/ Protocol Title
"Occupational Stress/Stressosrs, Job Satisfaction and Working Environment: The Experience of Perioperative Nurses in an Irish Setting"

Dear Ms. O'Brien,

I am in receipt of your study amendments submitted for review by our Research Ethics Committee. I have reviewed the contents of same.

I wish to advise that I have given your study Chairpersons ethics approval subject to the nurses being interviewed is outside working time.

You are obliged to inform us as soon as your study is completed or if it terminates early for any reason.

I wish you every success in your study.

Yours sincerely,

Marie Hickey Dwyer,
Consultant Ophthalmic Surgeon,
Chairperson, Research Ethics Committee.

9.20 Appendix XX: Vigilant Theories

Learning Models	Pavlovian and Hullian Inhibition Theory: In 1950 Mackworth developed the first systematic experiments on the increase of missed signals as a function of time where he based his findings within Hullian conditioning theory therefore attributing the observed decrement partly to response 'inhibitions', an hypothesized intervening variable creating a trend not to replicate a response. It was not clear from the findings whether the inhibition were as a result of detection responses or the observing responses (Loeb & Alluisi 1984).
	Skinnerian Theory (observing responses): A pupil of Skinner called Holland looked at vigilance through skinners principles of operant behaviour. He found that the response required for observation of the signal and non-signal stimuli such as eye movement and head movement etc., continue to happen if they are reinforced by the prevalence of detectable signals (Loeb & Alluisi 1984).
Neurological Models	Arousal Theory: Frankmann&Adams (1962) identified arousal as a explanatory method of vigilant behaviour. This theory suggests that a given stimulus may generate arousal but as the stimulus is repeated the responses habituate therefore suggesting that vigilance decrement is as a result of habituation of the arousal response. It suggests that prolonged task performance leads to a lowering of arousal (Loeb & Alluisi 1984, Matthews *et al*. 2000). Signals and non-signals are used in vigilance to maintain alertness. (Buckner & McGrath 1963, Stroh 1971, Matthews *et al*. 2000). Arousal appears to be connected with vigilance and vigilance decrement (Loeb & Alluisi 1984).
	Motivation Theory: While the majority of theory acknowledges motivation as being a vital determinant of performance none of them to date view motivation as the most important determinant. Smith's theory of motivation in 1966 highlights the individual disparities in the general level of performance involved in the differing vigilant tasks. He believed that the behaviour and motivation of the person rated higher than their personal ability (Davies & Parasuraman (1982).
	Neural Habituation Theory: Early vigilance theories considered the result of neural habituation in the context of reduced electrophysiological activity linked to vigilance decrement. Mackworth (1969) suggest that the reduction in neural responsively due to replicated stimulation is known as habituation. Worden (1966) criticises the finding of some experiment carried out on neural habituation on the basis of insufficient control over the participants within the studies. Loeb & Alluisi, (1984) suggest that it is not possible to prove the habituation hypothesis on the basis of behaviour.
Psychophysical or Information Processing Models	Filter Theory: Loeb &Alluisi (1984, p. 189) suggest that Broadbent filter theory of attention presumes that the ability of the "monitor's information-handling capacity is limited and

	information is selected by a filter biased to receive information for some sources and reject from other". Vigilance is viewed as a data-processing system. It finds that sustained attention to a set information source is predisposed to intermittent interruption because of the hypothetical filter which is subjective to new information (Matthews *et al*. 2000). Decreased human awareness capacity leads to filtered information in order to decrease awareness overload (Buckner & McGrath 1963, Stroh 1971).
	Expectancy Theory: Loeb & Alluisi (1984, p. 190) suggest that the Baker expectancy theory predicts that subjects naturally "expect temporal patterns very differently from those that they actually encounter and the discrepancy between their expectation and the schedule actually encountered is the principal cause of the results in a vigilance experiment". This theory suggests that observers keep track of past signal occurrence to predict future ones. This expectancy of future signal determines performance level (Buckner & McGrath 1963, Stroh 1971, Matthews *et al*. 2000).
	Signal Detection Theory (TSD): The signal detection theory is a mathematically based theory that looks to quantify the ability to distinguish between signals and noise (Dember & Warm 1979). It looks to search for signals. It is based on the decision theory and considers the decision routes in vigilance detection (Buckner & McGrath 1963, Stroh 1971). It provides a method of acquiring individual measures of detectability and of the decision criterion which specify response bias (Davies & Parasuraman 1982) Green & Sweets (1966, 1973) have being accredited with the formulation of the Signal Detection Theory. They looked to distinguishing detection task performance sensitivity while taking cognisance of the observer's perceptual ability and their mayingness to respond to the task. Broadbent (1971) indicates that the signal detection theory shows that vigilance decrement is not a consequence of a decrease in sensitivity over a prolonged period. The ability to detect signals decreases in correlation with weak signals being missed. This theory allows for the collection of data on false alarms and highlights that a decrease of vigilance detections correlates with a proportionate reduction in false alarms (Buckner & McGrath 1963, Stroh 1971).
	Probability Matching: Craig (1976, 1978) in his model of vigilance suggest that subjects respond at a higher rate then the signal but as time elapses the response rate and the signal rate match. This theory adds to the expectancy theory (Loeb & Alluisi 1984).
	Information theory and channel capacity: It provides a mode of description but has led to insights into how mediation of a process between stimuli and responses in perceptual experiments. This may be the basic contribution of information theory to research in perception (Dember *et al*. 1979). This is viewed a choice reaction time task with few signals (Loeb & Alluisi 1984).
	Combined effects of possible mechanisms: Lack of responce could be a result of involuntary sleep, lack of observation, or habituation below a set criterion (Mullin & Corcoran 1977, Corcoran *et al*.

	1977). These multifaceted interactions between arousal state and the propensity to shift sensitivity and criteria for reaction to time-on-task (Loeb & Alluisi 1984).
Psychomotor Performance Models	Inhibition Theory: The Inhibition Theory was the first theory of vigilance developed by Mackworth (1950) which expanded on his studies on the clock test. This was based on the pursuit-rotor performance (Eysenck & Eysenck, 1985). This theory relates to vigilance decrement which he equivocates to the extension of a conditioned response when there is no longer reinforment of the signal (Davies & Parasuraman, 1982) which can be as a result of fatigue (Kooken 2008). Signal detection is associated with "classic conditioning" (Buckner & McGrath1963, Stroh 1971). Eysenck & Eysenck (1985) discounts this theory and suggests that the theory is excessively complicated.
	Inhibition Reinforcement Theory: An inhibition reinforcement theory was later proposed by Mc Cormack in 1962 (Davies & Parasuraman1982). This theory expanded on the original theory looking at the reaction time to detection of a signal (ignited light bulb). This theory on signal frequency and vigilance decrement faces similar difficulties to the inhibition theory and even though plausible other theories frequently clarify it better (Davies & Parsuraman, 1982). Signal detection is associated to "operant conditioning" (Buckner & McGrath1963, Stroh 1971).
	Reminiscence Consolidation Theory: Eysenck & Frith proposed a reminiscence consolidation theory in 1977 as an alternative to the inhibition theory (Eysenck & Eysenck 1985). They suggest that the learning from the pursuit-rotor performance remains exposed to destruction until a consolidation period has passed. The consolidation process consists of three stages of passage, 1. The learning is not accessible for either improving performance or protecting against destruction 2. Learning advances performance 3. Learning is accessible for improving performance and is protected against destruction.

9.21 Appendix XXI: Cultural Biases

Isolation/Fragmented organisations are characterised by *high grid* and *low group*. Status hierarchies are strong but there are isolated and there are low levels of social cohesion. Individuals isolated and there are low levels of shared values.

Markets are characterised by *low grid* and *low group.* Formal hierarchy is low but so is social cohesion. Markets are distinguished by a high degree of self interested competition and a low level of shared values.

Bureaucracy is *high grid* and *high group*. It is characterised by strong hierarchies and occupational groups with strong identies and shared values such as traditional professionals.

Communal organisations are characterised by *low grid* and *high group.* Social cohesion is high and status hierachy is low. There is a high level of shared values

9.22 Appendix XXII: Causation of Risk

In **fragmented** organisations blaming tends to be unstable and the attitude to risk may be passive and fatalistic.

Market style organisations are characterised by competitive pressures which affect the perceptions of risk. Risk management may be distorted by power struggles between rival factions or schools of thought. There may also be a tendency to overvalue leadership and see it as a solution to all problems.

Bureaucracy tends to attribute risk to a failure to follow rules and to blame those lower down in the organisation. Bureaucracies are good at managing known risks but less capable of imagining future risk.

Communal ('tribal') cultures see risk is seen as external and blame tends to be placed on those outside the group or 'traitors' within it. There may be a heightened perception of imagined future risks which serves to reinforce group boundaries.