Advancing safety in Irish hospitals:

A quantitative study of organisational, ward and nurse factors that impact on patient safety outcomes

Marcia Kirwan MSc RGN

Dublin City University

School of Nursing and Human Sciences

A thesis presented to Dublin City University for the degree of Doctor of Philosophy

Supervisors:

Dr Anne Matthews, Dublin City University, School of Nursing and Human Sciences

Professor P. Anne Scott, Dublin City University, School of Nursing and Human Sciences

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of PhD is entirely my own work, that I have exercised reasonable care to ensure that the work is original, and does not to the best of my knowledge breach any law of copyright, and has not been taken from the work of others save and to the extent that such work has been cited and acknowledged within the text of my work.

Signed: _____

ID No.: 51154668

Date: _____

ACKNOWLEDGEMENTS

Without doubt there are many people who deserve acknowledgement and thanks for the part they played in bringing this work to completion:

My supervisors, Dr Anne Matthews and Professor Anne Scott, for their invaluable wisdom, constant support and unfailing encouragement. I am truly grateful to you both.

Dr Emer Lawlor who gave me the inspiration to start and facilitated my secondment.

Colleagues and friends at DCU, who for reasons known only to them, provided me with opportunities over the years which meant I was in the 'right place at the right time'- Thank you, in particular to Mary Kirwan and Dr Melissa Corbally, and my colleagues in the Clinical Education Centre Evelyn Kelleher and Colette Lyng.

The other members of the RN4CAST team in DCU, Prof Anthony Staines for his help when needed, Daniela Lehwaldt, and in particular Dr Roisin Morris, for her knowledge and her friendship.

All the nurses and patients who participated in the study, and the link nurses and Directors of Nursing in the study hospitals.

Finally thank you to my personal team of friends and family who supported my work:

Marina Cronin, for all your help and support – I long to return the favour.

Rena McCabe and Miriam Conlan-Trant, your friendship and kindness means I never have to worry about my children waiting in the rain.

The Kirwan family – Catherine, Neil, Nicola and Elizabeth, and particularly my parents Michael and Breda who are still proud of me.

My children, Michael and Molly Regan, who have been truly wonderful in so many ways during this process. Thank you also for your help with data collection, with questionnaire-counting, box-labelling, and inputting data.

And lastly to my lovely husband Rob, from the bottom of my heart I thank you.

The madness ends here!

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABSTRACT

Background:
The task of improving patient safety has emerged in Ireland and internationally as a challenge for health services. Nurses have been identified as key players in patient safety due to the nature of their work.
Aims:
The overall aim of this study is to identify organisational and nursing factors in acute general hospitals which enable the delivery of safe patient care.
Methods:
The study was conducted in selected medical and surgical wards in 30 acute hospitals in Ireland. It sought to clarify organisational, ward and nurse factors which impact on nurse and patient reported patient safety outcomes through both regression analysis and multilevel modelling. Three surveys were conducted and linked together within the study: an organisational survey (n=30), a nurse survey (n=1,406) and a patient survey (n=285).
Results:
The organisational approaches to patient safety, taken by acute hospitals in Ireland, are presented. Nurses' perceptions of their work environment, of their work and workload, and of aspects of safety in their workplaces are included. Patient satisfaction data are reported, specifically that which relates to their perceptions of medication safety. Factors including the proportion of nurses on the ward with degrees, the experience level of the nursing staff, ward confidence in management, and the nurse work environment are shown to impact on nurse-reported patient safety outcomes. A link between staff ratios (registered nurse to health care assistants, and staff nurses to non-consultant hospital doctors) and patient satisfaction with medication safety is also revealed.
Conclusion:
Factors identified in this research have the potential to enhance patient safety in Irish hospitals. They have been shown to be associated with safer patient care, and higher rates of adverse event reporting by nurses, demonstrating a greater staff focus on the systems approach to safety.

Chapter 1 INTRODUCTION TO THE STUDY

Few who provide care to patients would disagree that in order to be of high quality, care must, first and foremost, be safe (Moss and Barach 2002, Broaden 2006). Patient safety has become a primary focus for healthcare internationally, and a prerequisite for the provision of effective quality care (Gardner et al 2002). Although those who work in healthcare have always been concerned with safety, the intensity of discussion and attention over the last 15 years around patient safety has resulted in a renewed awareness of the subject. Recently much of the focus of research in healthcare has been on patient outcomes, and how to ensure that patients experience the best possible outcome as a result of the care provided. This focus has manifested itself in unease for both professionals and the public at large around less than acceptable patient outcomes resulting from care provided (Clarke 2006).

While those working in healthcare are committed to safe patient care, it is widely acknowledged that mistakes can occur which result in patients being harmed (Kohn 2000, Reason 2000, Department of Health UK 2000). In recent years modern healthcare systems have identified the issue of patient safety as a global priority (World Health Organisation (WHO) 2006) and the response in many countries has been to examine safety in healthcare provision in their services. The publication of seminal reports both in the United States (Brennan et al 1991) and Australia (Wilson et al 1995) has led to an increased focus on the scale of the problem facing both healthcare staff and patients. Estimates from the Institute of Medicine (IoM) in the United States suggest that between 44,000-98,000 people die annually in U.S. hospitals as a result of clinical errors, at least half of which are preventable (Kohn et al 2000). The IoM (http://www.iom.edu/) is a non-profit organisation which works to provide accurate

advice to healthcare policy makers in the US on contemporary issues. It has a particular focus on patient safety and the promotion of policies and practices in healthcare which will enable the provision of high quality patient care. In the UK, events in which patient safety is compromised, are estimated to occur in 10% of all admissions (Department of Health 2000). International studies indicate that between 4% and 16% of patients admitted to hospital experience adverse events, at least half of which could be prevented (Brennan et al 1991, Wilson et al 1995, Kohn et al 2000, Dept of Health 2000, Baker et al 2004). Nevertheless a very positive result of the recent focus on patient safety has been a move away from the previous tendency to attribute blame for poor patient outcomes, to an approach where systems are examined and modified to prevent recurrence, and where learning, rather than blaming, is the focus.

Failures in healthcare delivery, through adverse event occurrence, have been highlighted through government and health service inquiries in many countries including Ireland (Government of Ireland 1997, Department of Health(UK) 2001 , Government of Ireland 2002, Department of Health and Children 2006, Health Information and Quality Authority (HIQA) 2008, Campbell 2008, House of Commons,2010). The impact of adverse events on patients, families and staff, has been discussed widely in medical and nursing literature and in the popular media. In 2007 in Ireland the Health Information and Quality Authority (HIQA) was set up to drive continuous improvement in health services in Ireland. The remit of HIQA includes development of standards for safer healthcare, monitoring of compliance with established standards and investigations of reports of poor quality or unsafe care. In February 2009, the Minister for Health and Children announced the Irish government's commitment to implementing key recommendations from the Report of the Commission on Patient Safety and Quality

Assurance (Department of Health and Children 2008). The Commission, set up by the Minister in 2007, recognised the growing international imperative for the development of policy in the area of patient safety and quality. The 2008 report acknowledged that despite huge investment in the Irish health service and highly educated health professionals working within it, the health service lacked a planned approach to patient safety across the services. Such an approach would ensure that patients receive safe care of the highest possible quality. The authors of the report made key recommendations, based on gaps identified in the current system, which they intended would ensure that patient safety became a priority for all those working within the service. Although patient safety has been a concern in the Irish health service for almost two decades, the commission report has brought the issue to the forefront of public policy. Safety in Irish health care is currently a pressing concern and tolerance for avoidable poor outcomes is diminishing.

Literature around patient safety focused initially on examining the culture of safety in healthcare, and subsequently, the factors which impact of safety outcomes. An effective safety culture in healthcare is one where adverse events are acknowledged, reported and investigated with the aim of learning from the event in order to prevent recurrence. Such a culture is known to enhance the safety of care provided to patients. Clarke (2006 p257) characterised organisational culture as the "accumulation of invisible, often unspoken ideas, values and approaches that permeate organisational life". However although patient safety literature focuses attention on the inevitability of human error, a "prevailing expectation" exists both within healthcare circles, and in the general public, that mistakes in healthcare are unacceptable (Smith and Forster 2000). Historically the

experience in healthcare has been of a culture which seeks someone to blame when things go wrong and this has given rise to fear.

In this culture, fear of punishment, of recriminations, or of being deemed incompetent, has given rise to a conspiracy of silence around adverse events, thus feeding the myth that mistakes are rare (Smith and Forster 2000). Those working in the health services have always been aware of different atmospheres and cultures in different organisations and even different wards (Clarke 2006). This study seeks to further examine this issue by looking at patient safety practices within wards, rather than at individual nurse level or at hospital level.

A growing body of research indicates that nurse staffing levels are associated with improved patient outcomes. The nurse's role in patient safety has been described as "indispensable" (Institute of Medicine (IOM) 2004 p3) with both staffing levels and workload clearly linked to patient safety (Aiken et al 2002, Institute of Medicine, 2004, The Association of Healthcare Research and Quality 2007). Nurses have a greater opportunity than other healthcare workers, due to their proximity to patients, to witness adverse events (Kingston et al 2004 and Johnson 2007) and therefore to strengthen and support the patient safety culture (Cook et al2004, IOM 2004 and Auffrey 2005). Their role in patient surveillance is acknowledged as crucial to patient safety, with one study suggesting that nurses intercepted 86% of medication errors made by doctors and pharmacists (Hinton Walker et al 2006). The assumption that significantly more nurses are needed to address shortcomings in patient outcomes is not only simplistic, but has implications for funding, recruitment and education. However worldwide recession has resulted in reduced funding for health services, the result of which in Ireland is a

reduced nursing workforce. Budget shortages for health in Ireland are predicted to continue until at least 2015. In light of this it is unlikely that nurse staffing levels will be increased in the foreseeable future, or that patient to nurse ratios in Ireland can be maintained at current levels. This research aims to examine other nurse factors, both at nurse level and aggregated to ward level, which can also contribute to enhanced patient safety.

1.1 Origins of the study

I have worked as a Clinical Nurse Specialist in Haemovigilance (blood transfusion safety) since 1999. This is a patient safety role which espouses the systems approach to patient safety. Initially I worked as a CNS in a hospital setting, and laterally in the National Haemovigilance Office (NHO) collating adverse event data, monitoring trends and developing blood transfusion practice nationally. The contribution of hospital-based nurses to patient safety has been of interest to me throughout this time. These nurses do not work in isolation, they work in groups on wards, and within different management systems and cultures. How they view patient safety and their role in it is dependent on many factors. This study examines some of these issues, in particular nurse perceptions of patient safety in their workplaces, their perceptions of support for safety in the organisation, and the factors that impact on their adverse event reporting practices.

The study was conducted under the umbrella of a three year project entitled the *Nurse Forecasting: Human Resources Planning in Nursing* (RN4CAST). This FP7 funded project aimed to develop innovative forecasting methods by addressing not only volumes, but quality of nursing staff as well as quality of patient care. The RN4CAST

project was undertaken by a consortium which included 12 European countries and is focussed on important unmeasured factors in forecasting models.

The data sources used in this study are those utilised in the overall RN4CAST project. These are a nurse questionnaire, an organisational profile questionnaire, and a patient satisfaction questionnaire. Additionally for the purposes of my personal research, supplementary data are collected. This data relates to the organisational approach to safety and nurse perceptions of key safety issues and of frequency of adverse event occurrences.

1.2 Aims and objectives of the study

The overall aim of this study is to identify organisational and nursing factors in acute general hospitals which enable the delivery of safe patient care.

The objectives are as follows:

1. to describe safety posts, safety training provision, and safety audit practices in Irish hospitals
2. to analyse the perceptions of nurses and patients regarding patient safety in these hospitals
3. to examine the impact of individual nurse factors on nurse-reported adverse occurrence rates and nurse-graded ward safety in Irish hospitals
4. to examine the impact of nurse factors aggregated to the ward level on nurse-reported adverse occurrence rates and nurse-graded ward safety in Irish hospitals
5. to examine the impact of organisational factors in Irish hospitals, including organisational culture, approaches to safety and staffing, on both nurse-graded patient safety and patient reported satisfaction with safety outcomes

6. to identify factors in Irish hospitals which enable nurses to fulfil the reporting function of their role in patient safety.

1.3 Outline of the remaining chapters

Chapter 2 describes the background to this study. It describes the growing focus on patient safety in healthcare internationally and nationally. In this chapter the nurse's role in relation to patient safety is also described.

Chapter 3 examines the origins of the systems approach to safety and the organisational cultural requirements for its success. The aviation industry's approach to safety is discussed along with the frequently-made comparisons with healthcare. The origins of the instruments used in the nurse survey are examined, including the Nursing Work Index and the Maslach Burnout Inventory. The suitability of these instruments to this research is outlined.

Patient satisfaction surveys are frequently used to assess quality of care provided. In this research a patient satisfaction survey is carried out. The literature around patient satisfaction surveys is explored in this chapter to examine its contribution to quality of care assessment.

Chapter 4 outlines the methodology of this research. Included in this chapter is a description of the research process: research design and data collection methods, along with analysis methods used. Where possible, multilevel modelling is used in the study to analyse the data at the level of the individual nurse and also aggregated to ward level. This enables examination of ward level factors which impact on patient safety outcomes. The outcomes used in this study for multi-level modelling are nurse-reported patient outcomes. Patient reported safety outcomes are analysed using regression analysis.

Chapter 5 contains a summary of the descriptive findings of the organisational profile survey, the nurse questionnaire and the patient survey. This chapter contains frequency distributions, percentages, mean responses and response rates for each of the questionnaires. For the nurse survey significant differences across wards and hospitals are highlighted through the use of independent-samples t-tests. Correlations between certain variables are explored

Chapter 6 contains details of further analysis conducted on the study data. The data in this study are clustered, which implies that the data is organised at more than one level i.e. at hospital level, at ward level and at the level of the individual nurse. For this reason multilevel modelling is employed as an analysis technique in this study and is reported on in this chapter. Where multilevel modelling is not suitable, regression analysis is used instead.

Chapter 7 contains a discussion of the findings presented in chapters 5 and 6. The results are discussed under three headings: the current profile of patient safety in Irish hospitals, the key workforce factors associated with patient safety, and the key nursing factors impacting on patient safety.

Chapter 8 contains a summary of the study results and arrives at conclusions arising from the key results. Keeping in mind the current challenges in the Irish economy realistic recommendations are outlined, based on the results. Future research possibilities are identified and outlined.

Chapter 2 BACKGROUND TO THE STUDY

Improving patient safety, and thereby improving the quality of healthcare provided, has emerged both in Ireland and internationally as a challenge for health care services (Department of Health and Children 2008). Ireland faces this challenge with an acknowledged background of highly public failures in healthcare provision (Department of Health and Children 2008). Investigations and inquiries carried out in Ireland as a result of these public failures (Government of Ireland, 1997, Government of Ireland, 2002, Department of Health and Children, 2006, Health Information and Quality Authority (HIQA), 2008, Campbell 2008) and internationally (Department of Health UK, 2001) have consistently identified common deficiencies leading to failures in the provision of care. These include poor communication structures, poor leadership, poor working relationships and teamwork, lack of reporting systems for adverse events, insufficient analysis of events, insufficient audit and failure to maintain professional development. All of the reports recommend improvements to the safety culture and standards within organisations. Heightened media response to such reports has added to the momentum of patient safety internationally.

The reports recommend a 'systems approach' to patient safety. In such an approach, management within organisations show leadership in promoting quality and safety, through a non-punitive approach. Learning from adverse events and near-misses becomes a focus for all staff in a protected, questioning and just culture (Kohn et al 2000). The systems approach recognises that the majority of adverse events in healthcare occur as a result of failures in systems which enable the error to occur (Reason 2000). In Ireland, as in many countries, modern patient safety strategies are indeed based in the 'systems approach' and a number of mechanisms are in place for

collating reports submitted on patient safety incidents. These include those managed by the Irish Medicines Board, the Clinical Indemnity Scheme, the National Haemovigilance Office and the Mental Health Commission. There is no one national data source that would provide overall data for adverse events in Ireland.

Patient safety is not a new concern for healthcare (Kohn et alet al 2000) but discussions on the topic have become stronger in recent years. As a result of reports such as *To Err is Human* (Kohn et al 2000), The Quality in Australian Healthcare Study (Wilson et al 1995) and An Organisation with a Memory (Department of Health UK 2000) attention is currently being paid to reducing the risks to which patients are exposed in healthcare settings. Prior to these reports, errors in healthcare were believed to occur rarely, and only as a result of "bad apples" within the service, or carelessness on the part of an individual. Following the publication of the above reports it became clear that errors occur with frequency (4% and 16% of patients admitted to hospital experience adverse event), sometimes with very serious consequences, and sometimes involving very experienced and competent staff (Wilson et alet al 1995, Dept of Health 2000, Kohn et alet al 2000, Baker et alet al 2004).

2.1. Patient safety strategy

Traditionally the culture around patient safety was a punitive one where apportioning blame was central, giving rise to non-disclosure of adverse events and to fear (Kohn et al 2000, Reason 2000). However, interest has shifted over the last decade from the 'person-centred' blaming approach to patient safety, to a 'systems approach' (Leape, 1994, Reason, 2000, Kohn et al. 2000). This approach largely draws on the early work of Reason (1990) and acknowledges that human error is inevitable. In high risk

industries such as the aviation and nuclear industries, this approach to safety has been shown to be effective. The systems approach allows for the examination of multi-factorial causes, and investigation of each error or adverse incident, focusing on what conditions or systems allowed it to occur (Kohn et al 2000, Reason 2000). In high risk industries a culture of safety is encouraged which ensures that safety is a high priority for everyone in the organisation, and human error is seen as a predictable feature of human performance (Hotouras 2009). Failure to acknowledge the likelihood of error occurrence has been shown to have catastrophic results and enormous cost both human and financial. In contrast errors in healthcare in the past were often attributed to single individuals. Those currently espousing the systems approach say this historical response was too simplistic (Looseley et al 2009) and needs to be replaced.

In complex environments such as aviation it is recognised that there can be more than one cause for errors. Health care is often recognised as a complex environment (Armitage 2009) incorporating teams of people, technology, patients, families, high cost activities. The healthcare system, like industry, functions well if everybody performs consistently to the highest standards. This, historically, has been the expectation of staff in healthcare. However it is now recognised that despite the best efforts of staff, and despite their best intentions, sometimes errors are made. These can be slips, lapses in concentration, lack of understanding and can, like in industry have many causes such as tiredness, interruptions, workload, or experience levels. The systems approach recognises that the majority of adverse events in healthcare do not occur as a result of deliberate actions on the part of renegade staff members. They occur mainly as a result of failures in systems which enable the error to occur, or simply fail to prevent it (Reason 2000). Reason's model of systems failure is built on the idea that a sequence of

errors must align to allow the final adverse event to occur. It is based in the idea that rather than insisting on errorless performances from staff, healthcare leaders should accept the inevitability of error and put in place strategies to help identify both errors when they occur, and the potential for errors before they occur. The systems approach does not eliminate individual responsibility, but holds people responsible who, knowingly and consciously, disregard risks to the patient (Kaplan 2003). However this type of careless or deliberate action is rare and most errors or incidents (estimated as 90%) are seen as a symptom of a systems failure (Reason 1997). In healthcare the tendency still remains to blame the person at the end of the sentinel event, often according to Ramsey (2005), the nurse. This places the nurse in a vulnerable position when making decisions about reporting patient safety incidents. It would appear that a cultural shift is required around patient safety in order to fully engage with the systems approach.

People working in health care have been described by American commentators as some of the most educated and dedicated of any industry (Mewshaw, White and Walrath 2006). They work in teams to provide the highest care possible to patients. A requirement of the systems approach to safety is effective teamwork and communication between members. However communication between healthcare workers, particularly between the professions can be problematic as discussed by Hotouras (2009) in the UK. Effective communication in safety conscious industries has been shown to provide an opportunity to break the error chain and prevent occurrence (Reason, 2000 and Kohn et al 2000). The IOM (2004) tells us that an effective safety culture in industry means that safety in the organisation is as important as productivity. Applied to healthcare such a safety culture would imply that patient safety should have

the same priority as high quality patient care. Errorless performance in healthcare is now accepted as an unrealistic expectation (Parker and Lawton 2003, Brous 2008). Assuming someone is at fault, as a strategy, has been found to be flawed. It mitigates against the success of any reporting system and promotes silence around errors instead (Smith and Forster 2000,Parker and Lawton 2003, Crigger 2005, Brous 2008). It does not improve the long term situation (Infante 2006) and often results in suboptimal performances by practitioners fuelled by fear (Liang 2004). Ultimately it undermines the functioning of a safety climate in healthcare (Meaney 2004). Merry and McCall Smith (2001) and IOM (2004) suggest that when apportioning blame there is a tendency to fail to pay adequate attention to the overall performance of the individual in the context of the entire event.

Government documents in both the UK and Ireland demonstrate an understanding that the blame culture of the healthcare system has not helped us to understand and reduce medical error (Department of Health UK 2000, Department of Health and Children 2008). Reason (2000) acknowledges that blaming people may be more satisfying in the short term rather than examining the causes of an error. Indeed it can be argued that holding someone responsible when something goes wrong ensures that standards of practice remain high, by putting pressure on staff to eliminate errors. However, fear of punishment or recriminations is a common cause of non disclosure around adverse events (Smith and Forster 2000, Liang 2004, Hotouras 2009) and has given rise to a conspiracy of silence which impedes the systems approach to safety. Warburton (2009) acknowledges that while changes are happening to move from the person centred (or blaming) approach to safety to the systems approach, the change is far from complete. Expectations of perfection as associated with healthcare professionals are impossibly

high, and they also hold themselves to this standard (Smith and Forster 2000). Individual blame is likely to be less expensive than adjusting faulty systems (Armitage 2009). Finding and removing a staff member deemed to be ultimately responsible for an adverse event is relatively quick and absolves the organisation at large from any culpability. A systems approach to resolution is likely to be much slower and involve many layers of personnel, and may necessitate the introduction of expensive wide-reaching changes across an organisation. The benefits however include organisational learning which in the longterm is likely to prevent re-occurrence of the adverse event.

2.2. Adverse event reporting

Moullin (2002) describes adverse events in healthcare as those which either harm, compromise or threaten the safety of patients. A systems approach to safety is dependent on full and open reporting of adverse events to maximise the learning around the incident and to prevent its recurrence. Incident reporting remains the first step to finding out what happened and to promoting patient safety (Johnstone and Kanitsaki 2006, and Burkoski 2007). In order to implement safe practice, it is first necessary to identify the potential for unsafe practice and then to address the cause. Error reporting can be carried out by the person who made the error or by the person who discovers the error of another. In healthcare, by virtue of the nurse's proximity to patients, it is most often the nurse who reports patient safety issues to the relevant authorities (Kingston et al 2004).

Under reporting of adverse incidents in healthcare is an acknowledged problem (Reason 2000, Johnstone and Kanitsaki 2006) and one which is under-examined in terms of the role nurses play in reporting or not reporting. The International Council of Nurses (ICN

2002) states that nurses have a responsibility to address patient safety in all aspects of their work with patients, including reporting adverse events promptly to the appropriate authority. If errors go unreported they may result in avoidable harm occurring to patients, an undermining of the nurse –patient trust relationship or an undermining of the reputation of the profession (Johnstone and Kanitsaki 2006). Modern patient safety thinking suggests that unreported errors result in lost opportunities in terms of lessons to be learned, with similar avoidable errors occurring as a consequence (Hart and Hazelgrove 2001). This has implications for nurses in relation to patient safety and incident reporting. This research examines the relationships between nurse adverse event reporting rates and the nurse work environment and nurse characteristics.

2.3. Challenges in healthcare to the systems approach

Successful patient safety programmes require an organisational culture of safety (Mayer and Cronin 2008) which implies that safety is a value shared by all, including management. Safety must be the dominant characteristic of the culture of an organisation. Culture begins with what an organisation perceives as its purpose and priorities, what types of activities are valued, and which are less valued (Clarke 2006). This implies that in a systems approach to safety, everyone from management down in an organisation, fully embraces the approach with its open, blame free, reporting. Healthcare is a complex and wide ranging activity. Systems in healthcare are interdependent and involve humans, equipment, IT, and many different specialities. Such variation and complexities increase the challenge for those introducing a systems approach to patient safety and may account for relatively slow progress in moving from traditional approaches to a systems approach (Leape and Berwick 2005, Mayer and Cronin 2008).

The systems approach is dependent on the commitment of staff throughout the organisation to open disclosure of adverse events and near-misses. A requirement of the systems approach is a "just culture", where how a person acts is viewed fairly and within the system in which it occurred. Kaplan (2003) notes that in healthcare it remains a challenge to create a culture where information about safety can be shared without fear of reprisal. Difficulties arise because healthcare workers are socially conditioned to look for someone to blame (Mayer and Cronin 2008). The socialisation towards this belief is endemic in healthcare and is likely to contribute to staff attitude to patient safety. There is significant reluctance amongst healthcare providers to share information regarding errors, thus giving rise to a climate of guilt, shame, and silence (Department of Health (UK) 2001, Volker and Clark 2004). Reluctance is likely to stem from fears such as liability for injury, lack of trust in the team, reputation and career damage and ostracism by fellow professionals**.** Dekkar (2007) suggests another reason for non-reporting of errors is the belief that the organisation will not do anything to resolve the problem. This demonstrates a failure on the part of healthcare organisations to convince staff of their commitment to a systems approach.

Health care workers find a non-punitive approach difficult to accept. Blendon et al (2002) show that physicians believe that individual professionals are more likely to be responsible for an error than the systems, making a systems approach difficult to apply. The IOM (2004) outlines how nursing culture expects perfection, and this implies culpability if anything less than perfection is achieved. Such embedded cultural beliefs in healthcare suggest that the systems approach to patient safety might pose difficulties for those working in healthcare. The tendency in healthcare to attribute blame based on

the severity of the outcome (Mayer and Cronin 2008) is also related to how medical errors are viewed in the legal system (Dekker 2007). Meaney (2004) warns against attempting to impose a safety culture without taking into account what health professionals believe in relation to safety systems.

Tort law as described by Liang (2004) focuses on blaming individuals. This field of law, as it exists in many countries including Ireland and the UK, involves a defendant and a claimant, where an act by the defendant is shown to have caused damage to the claimant. This challenges the systems approach to patient safety and causes confusion for those working in healthcare. Even if a no-blame policy is fully endorsed by an organisation from management downwards, there is still the very real possibility of blame being assigned if the case goes to court. Often in litigation cases the last person to touch the patient is found culpable (Liang 2004) resulting in the legal system being seen as an impediment to current patient safety thinking. Liang (2004) suggests that blame systems may have been justified in the past where all decisions were made by the doctor, and other staff simply carried out his directions. Nowadays in healthcare there is a multilayered, multidisciplinary approach to patient care, where the patient is involved in decision making. This multidisciplinary approach to healthcare makes the notion of assigning blame to one person questionable, as no one person can be responsible for all care given. However to date, the response in law to human error in healthcare, may suggest that the opposite is true. Liang (2004) suggests that society at large supports the legal system where blame is assigned following medical error.

2.4. Nurses and patient safety

The nurse's role in patient safety has been described as key to the success of any patient safety scheme, with nurse staffing levels and workload clearly linked to patient safety (Aiken et al 2002, Institute of Medicine 2004 and The Association of Healthcare Research and Quality 2007). Ramanujam et al (2008) examines the relationship between nurses' perception of job demands and their perceptions of safety. They confirm that nurses' perceptions of patient safety decrease as the demands of the job increase. Nurses feel if they are overworked, their patients are less safe. The nurse is often identified as holding an influential position for ensuring the safety of patients due to the high rate of interaction between nurses and patients (Cook et al 2004).

Links are acknowledged between patient outcomes and adverse events, and nurse staffing levels and work environment. Aiken et al (2001 and 2002) reported that staffing levels, nurse environment, and management approach, contribute to uneven quality of care, adverse outcomes for patients, medical errors, increased patient mortality and failure to rescue. Cho et al (2003) also demonstrated a correlation between higher nursing staff numbers and reduced adverse patient events. Clarke, Sloane and Aiken (2002) reported that nurses from units with low staffing and poor organisational climates were twice as likely to report risk factors, needle-stick injuries, and near misses than those on well staffed units. It is clear that Aiken's work demonstrates, through empirical evidence, that the organisation of nurses' work is a determinant of nurse and patient outcomes (Havens and Aiken 1999). Adequate nurse staffing enables improved levels of patient surveillance and therefore improves patient outcomes (Aiken et al 2002). Education level of nurses impacts mortality and failure to rescue rates in surgical patients also (Aiken et al 2011).

The Institute of Medicine's analysis of the nurse's role in patient safety (2004) suggests that nurses and the environment in which they work are critical to ensuring safety for patients. This is based firstly on the fact that nurses make up the biggest clinical work force in the health service; secondly, because of the work they do, nurses are regularly involved in commission, detection and prevention of patient safety incidents. In addition nurses' work routinely involves patient surveillance and co-ordination of care, both vital to ensuring patients' safety (Brady et al 2009). Warburton (2009) acknowledges the role nurses play in patient safety describing them as being at the 'sharp end' of patient care. This description recognises the nurse as "the medium through which other professionals and staff interface with patients" (Brady et al 2009). Co-ordination of the care provided by the multidisciplinary team is implicit in the role of the nurse (Brady et al 2009). Such close interaction with patients enables nurses to identify patient safety issues and because of their position in providing direct care, they are ideally placed to implement necessary changes following analysis of adverse events.

An Bord Altranais is the regulatory board for nurses and midwives in Ireland. Its remit includes maintenance of the register of nurses and midwives, development of guidelines for the profession and additionally it has a disciplinary function. In Ireland the Code of Professional Conduct for Each Nurse and Midwife (An Bord Altranais (ABA) 2000a), underlines the nurse's role in patient safety and states that nurses are accountable practitioners who must report any circumstances which might compromise the safety of patients to the appropriate authorities. It clearly states that An Bord Altranais can take "appropriate action" where nurses fail to meet the requirements set out in the document. The implication for patient safety is that nurses must report any adverse events of which

they are aware, and failure to do so can result in disciplinary action being taken. This obligation on nurses to take on the challenges of the patient safety is clearly not without its costs both personally and professionally to nurses as outlined below.

To summarise the above, it can be therefore seen that a systems approach to patient safety depends on healthcare workers taking responsibility for reporting errors, and on open and frank analysis of the causes. Nurses, because of their involvement in patient care find themselves either involved in, or identifying, adverse events or near-misses, more frequently than other professionals. Warburton (2009) described nurses as "reliable sentinels" (p224) citing their contribution to exposing problems in cardiac surgery in the Bristol Report (Department of Health 2001). The Bristol Report examined poor outcomes in a paediatric cardiac unit in the UK. Similarly in Ireland the "Lourdes Inquiry" highlighted the role of one midwife in eventually bringing issues to light (Government of Ireland 2006), although others had tried to do so previously and failed. The Lourdes Inquiry examined high rates of peripartum hysterectomy by an obstetrician in an Irish hospital. The findings included a poor safety culture, medical dominance and low expectations of accountability. It cannot be ignored that historically nurses have suffered when they attempted to take a stand on issues of patient care or inadequate standards (Pink 1992, Kellet 1996, Kohl et al 2000, Department of Health and Children 2006). Clinton and Obama (2006) suggest that the reticence shown by health care providers to enter into an open and transparent system of patient safety is legitimately based in self-protection. Those who have experienced a punitive culture in the past may be less willing to accept the possibility of a no-blame culture. Harding Clarke identified that midwives, in the Lourdes Hospital Report (Government of Ireland 2006), who in the past had tried to raise issues around patient safety and found their

efforts rebuked, were very reluctant to do so again. These high profile cases demonstrate the risks to nurses when choosing to report issues of patient safety. However despite this, nurses are the most frequent reporters (Milligan and Denis 2004, Johnstone and Kanitsaki 2006) of adverse events – testimony both to the importance nurses place on patient safety, and to their importance to patient safety.

It is acknowledged that a systems approach should reduce reluctance to disclose errors as individuals are not blamed. While this assumption seems reasonable, it fails to take into account any reasons which may contribute to such reluctance. Nurses, as the most frequent reporters, encounter many challenges in the workplace both personally and professionally around error reporting.

2.4.1. The challenges of patient safety for nurses

Nurses face many challenges in contemporary patient safety strategies, not least of which is the view that the role they play is central to the success of the process. The issue of patient safety being seen as the responsibility of nursing is not new. Cook et al (2004) demonstrate that most healthcare workers accept this as being the case. This implies that if nurses are reluctant to report errors and incidents, the patient safety agenda may remain largely unaddressed. It is important to state that patient safety is the responsibility of all in an organisation, but the reality is that nurses are the most frequent reporters of adverse events. This places an enormous burden on nurses to protect patients at both personal and professional risk to themselves.

The culture of the nursing profession, and of organisations in which nurses work, along with the environment in which nurses practice, impact greatly on how they act in

relation to patient safety. Often nurses' practice and education focuses on ensuring errors do not occur, rather than on accepting that they do and managing them when they happen (Johnstone 2007). Nurses learn early in their careers that mistakes are unacceptable (Kalisch and Aebersold 2006).Nurses may fear recrimination when they identify adverse events, and therefore chose to forego reporting or, at the very least, allow events to go under-reported (Johnstone and Kanitsaki, 2006, Parker and Lawton 2006). Johnstone (2007) recognises the moral tensions and cultural difficulties which nurses encounter when reporting errors. In their concept analysis of the patient safety culture in nursing, Feng et al (2008) concluded that the safety culture is the product of the shared values and beliefs of nursing staff in relation to patient safety and that it is unique to the particular organisation. If the environment is supportive nurses are more likely to comply with safety requirements.

Another concern is that increased openness about errors may make nursing actions or mistakes more visible. If such actions are associated, even occasionally with punishment it is likely to influence nurses thinking around reporting. Increased reporting may cause it to appear that *more* mistakes are occurring, even though it is more likely that *less* are being hidden. This in turn may reflect badly on individual nurses or units. Again this exposes nurses to reprisal or peer pressure. Reason (2000) and IOM (2004) recognise that nurses are at risk of receiving a disproportionate share of blame, by virtue of their reporting patterns.

Nurses working within the systems approach to safety may find themselves in a position where they must report substandard care or adverse events in which they were involved, or in which a colleague was involved. This may involve nurse colleagues or other

members of the multidisciplinary team. Organisational structures may pose challenges in such situations. In the Lourdes Report (Government of Ireland 2006) it is evident that hospital management were keen to maintain a veil of secrecy around events. Midwives were unsupported when they tried to bring attention to substandard care.

The power of nursing within healthcare organisations contributes to nursing confidence, or lack of it, as a profession. The Lourdes Report (Government of Ireland 2006) describes nurses being deeply committed to their patients and their work, but lacking in confidence in their nursing knowledge. The report suggests that there was no organisational expectation of accountability from nursing or midwifery staff; they were expected to do their work without question. This image of submissive nurses conflicts with the image of autonomous, accountable professionals as depicted by nursing's professional bodies, but reflects the truth of Irish nursing in one hospital in recent times. With the advent of pre-registration degree-level education in 2002 and many post-registration education, practice developments (including for example nurse prescribing) and leadership initiatives over the past decade, such patterns are seeking to bring about an evidence-based and accountable professional culture within nursing (An Bord Altranais 2007, 2010).

This view is reiterated by Lawton and Parker (2002) whose study went on to point out that nurses are more likely to report poor practices than doctors, but generally only where the practices breach written protocols. Where no protocols exist nurses are also reluctant to report, even when they clearly recognise the poor practice. This lack of professional confidence is often associated with a lack of power within organisations. It gives rise to a reluctance to exercise accountability or advocacy on behalf of the patient

as demanded by the Code of Conduct (ABA 2000). This reluctance may be based in an unquestioning culture developed over many years, fear of reprisal and powerlessness within an organisation (Government of Ireland 2006). This is evident in Hart and Hazelgrove's (2001) writing about cultural censorship around adverse events in the health services. They suggest that nurses' unequal relationships with doctors in terms of power and autonomy place them in a position where they find it difficult to report adverse events. Many adverse events when recognised by nurses, were "explained" by doctors, and subsequently not reported. This demonstrates a culture of subservience which still exists in relation to adverse events: the nurse recognises the event and instead of exercising professional accountability to the patient by reporting the incident as outlined in the Code of Conduct (ABA 2000), the nurse defers to the doctor. The doctor, rather than report the incident, explains it away. Nurses, through these actions, demonstrate a lack of confidence in their professional knowledge, and difficulties in shaking off their historical place in healthcare organisations.

There seems to be confusion as to where the nurse's accountability lies, to the medical profession or to the patient as evidenced in the Lourdes Report (Government of Ireland 2006). Weick and Sutcliffe (2003) in a re-examination of the Bristol Inquiry point to the existence of a culture of entrapment in healthcare. This manifests itself through staff involvement in ritualistic practices during which they fail to pick up on cues which may suggest that something is wrong. This culture further explains the secrecy sometimes found in healthcare around adverse events. Sometimes events are simply explained away but not deliberately hidden as a result of this culture. Such cultures allow poor standards and unsafe practices go unchallenged.

The systems approach to safety is sometimes seen as a barrier to individual accountability and responsibility. Lachman (2007) points out that such an approach does not relieve the individual nurse of responsibility. The nurse is responsible for reporting the error and participating in the investigation in order to improve the systems. Whether a nurse exercises accountability by choosing to report an error is connected to her autonomy to make independent decisions about her practice. Macdonald (2002) applies the principles of relational autonomy to nurses' practice, i.e. that autonomy is more easily achieved if enabled by support structures within the organisation or profession. Infante (2006) agrees that there are no completely autonomous practitioners working in healthcare, suggesting that in order to function in a role, each person must depend on others to carry out their particular functions. This acknowledgement lends itself to the systems approach to patient safety. In the systems approach an error is not made because of the failings of one person, but as a result of a combination of events which culminate in the error. Macdonald (2002) contends that professional autonomy is strengthened by supportive social structures and therefore weakened by their absence. He concludes that nurses need supportive organisational and inter- and intra-professional structures in order to practice with autonomy. Again this points to the context in which nursing occurs being important to how nurses practice. The practice environment must be taken into account when analysing the nurse's experience of patient safety. Hardingham (2004) suggests if an organisation wants its employees to act in a certain way, it must put in place the supportive social conditions which allow that to happen. It is suggested that this also applies to moral integrity- the environment in which they practice must provide the supports for nurses to act on their values. This acknowledges that nurses need to be supported with regard to the choices they make in relation to patient safety.

Fullbrook (2008a), points out that nursing autonomy is encouraged politically, by governments and professional bodies. She suggests that the expected professional behaviour of nurses has its origins in this political agenda rather than the law. By this she means that the level of autonomy required by professional codes is greater than would be required through law. She claims that very often nurses worry about being sued if they fail to live up to the standards set down for them. The laws relating to negligence in healthcare, state that negligence can only be proved if the person accused is proven to have acted in such a way that is found to be below the expected standard. This presents difficulties for nurses who discover or are involved in errors. If a nurse reports an error she may be exposing herself or others to blame in the first instance, and ultimately to litigation. However Fullbrook (2008b) points out that cases where nurses have been sued for negligence in court are extremely rare. She believes the real risk to nurses who do not live up to standards is that they will be struck off the professional register. This is substantiated through the claim made by the Institute of Medicine (IOM 2004) that nurses involved in errors have been found blameless in inquiries by independent agencies, but were unfairly disciplined by the professions regulatory bodies. In the United Kingdom a midwife, Jilly Rosser, was found guilty of misconduct and was struck off the UKCC register in 1989. When she took her case to the High Court the judge made it clear that he did not find her conduct worthy of being struck off (Flint 1989). These cases suggest that the professional cost to nurses of highlighting adverse events may still be high, and essentially punitive in nature, in direct contrast to the requirements of the systems approach. Where hospital management endorses a non-punitive approach, actively encouraging nurses to report adverse events this may help to counteract any fear felt around the reporting process.

Nurses often identify errors in patient care simply because they spend more time with patients. Personal internal conflict can occur as to whether these mistakes should be reported. Crigger (2005) talks about mistakes, which may appear ambiguous in terms of cause or culpability. She suggests that decisions about such errors may be made by nurses applying cultural standards, rather than acting independently. This implies that nurses choose to report them only if the culture of the organisation is one where reporting without blame is encouraged. In the systems approach this cultural influence could be seen as either facilitating or impeding its success. Smith and Forster (2000) concur that the complex environment in which healthcare is practised, shapes behaviours in terms of how errors are handled. The decision to report an error in the current healthcare environment cannot be taken lightly by nurses. Reporting holds the real risk of a backlash from colleagues, or loss of peer respect as described by Bolsim (2003) following the Bristol Inquiry. The nurse risks potential punishment by the professional body if found to be at fault, but also potentially if found to have acted in contravention of the code of conduct by failing to report an incident.

Ahern and McDonald (2002) demonstrate that nurses make decisions based on different belief systems. Those who believe themselves to be primarily responsible to patients are more likely to report than those who feel primarily responsible to either the doctor or the organisation. The choice the nurse makes is likely to be based in fear, or heavily influenced by the organisational culture. The expectation of free and open reporting, which is integral to the systems approach fails to acknowledge such conflicts.

Nurses are morally bound to protect their patients from poor standards or inadequate care (Pyne 1994). Morally a nurse may feel that reporting an incident is the correct course of action to prevent further harm to patients (Johnstone and Kanitsaki 2006) and to fulfil obligations as an advocate for patients. Nurses are required to place the patient's interests above their own as an ethical obligation (Volker and Clark 2004). Again if the nurse decides to go against her moral obligations for fear of retribution or ostracism she may be left with profound moral distress. Moral distress occurs when there are inconsistencies between how a nurse behaves in practice and what he or she believes is right (Mitchell 2001). Corley et al (2005) suggest that the environment and culture in which nurses practice influence moral distress levels, and therefore the decisions that nurses make. This working environment is complex and changing in many ways - sicker patients, shorter stays, reduced nurse numbers, long hours, staff turn over, higher knowledge and technology requirements and increased paperwork (IOM 2004). Such rapid change holds challenges for nurses to continue to take the right decisions for their patients. Erlin (2007) states that as accountable practitioners they need to make decisions about reporting based on their ethical values and have confidence in their own judgement. This would appear to be a reasonable expectation of nurses, but again it fails to take into account the context in which nurses practice and the impediments which may be in place to prevent such ethical decision-making. It further underlines the difficulties experienced by nurses who are involved in reportable events.

Cox (2008) suggests that organisational factors may influence nurses' decisions and actions when they make choices which are not in the best interests of the patient. Dekkar (2007) suggests another reason for non-reporting of errors is the belief that the organisation will not do anything to resolve the problem. An organisation must

demonstrate commitment to the philosophy of the systems approach. A half-hearted approach by hospital management will produce a similar response from staff. Johnstone (2006) describes how non-reporting of errors can result in avoidable harm occurring to patients. On a practical level it can result in unreliable or misleading data thereby adversely affecting practice and quality of care. On a personal level for nurses error reporting may be seen as a high risk activity for low returns.

Those promoting the systems approach to patient safety, both in Ireland and worldwide, struggle with issues such as responsibility, and healthcare culture. In organisations' haste to implement more effective safety strategies they may have failed to address its impact on key staff. Mitchell (2002) believes nurses have a pivotal role to play in patient safety, not least in the difficult task of changing the culture around patient safety, from a punitive culture to a blame free approach. This work does not imply that nurses are solely responsible for patient safety or for error reporting in Ireland. However it is an examination of how nurses in Ireland perceive patient safety and respond to its challenges.

2.5. Background summary

The nurse's role in patient safety is clearly vital. The close interaction between nurses and patients means that the nurse is ideally placed to pick up on errors or incidents relating to patient safety. The Code of Professional Conduct for each Nurse and Midwife (ABA 2000) is unambiguous in relation to the nurse's role in patient safety. It states that the nurse, as an accountable practitioner, has a responsibility to report any issues which may compromise patient safety. An Bord Atranais, as the professional body governing nursing in Ireland, is empowered to take disciplinary action if nurses

are found to be in breach of the Code. Living up to her responsibilities in patient safety holds personal, professional, moral and legal risks for the nurse and therefore should not be assumed or underestimated. Many factors, both organisational and personal, influence nurses work in patient safety. Wu (2000) describes what he terms "the second victim" in relation to patient safety, the healthcare worker who reports the incident. Playing a vital role in patient safety comes at a cost to nurses.

The systems approach to patient safety is widely acknowledged as essential to reducing the risks to which patients are exposed. This approach is set to replace the long established approach in the healthcare environment which presumed that someone must be to blame. The change to this system is not without its challenges, all of which impact on nurses. These challenges are inter-linked, impacting on how nurses respond to the requirements of the systems approach to safety. The first obstacle is a deeply embedded culture of blame within healthcare. Workers within healthcare are suspicious of a non-punitive culture and are concerned that the organisation will still look for someone to blame if an error occurs. In order to advance safety in healthcare an open and just culture is required throughout healthcare organisations. The experience in safety conscious industries indicates that the systems approach can be fully integrated into the culture of an organisation when everybody in the organisation is engaged, through education, in the process, and fully understands the principles behind it. Management in healthcare organisations has the ability and responsibility to influence the culture of safety in hospitals. Through advancing the culture of safety management can empower staff members to act if patient safety issues arise, and be confident of a fair and just environment. This approach, if taken by management in the Lourdes Hospital (Government of Ireland 2006) would have enabled nurses, midwives and other health

professionals to report safety and quality concerns in a supportive environment. It is possible that many women would have been protected if such professionals had spoken up, and been listened to earlier.

A second obstacle is the very real fear of reprisal if a mistake is made. Within healthcare, the tendency to look for someone to blame when things go wrong, is commonplace. Health care staff, indoctrinated with the belief that error is unacceptable, have tended to hide errors when they occur, rather than admit to them. The systems approach promises a non-punitive approach to error reporting, but this concept is difficult for staff that perceive management within the organisation does not fully endorse this approach. This is likely to contribute to the reluctance to report any errors which occur. The inevitability of human error is now acknowledged by healthcare through government reports in many countries, however the reality experienced by those working in healthcare can be quite different. How management in acute hospitals in Ireland approach patient safety within their organisations, and how nurses working in direct patient care in these hospitals, perceive the commitment of management to patient safety is of interest to this study.

The third issue is in the area of responsibility. This study is concerned with the responsibility of nurses in relation to patient safety. It does not suggest that nurses are solely responsible, but acknowledges that patient safety is the responsibility of all working in health care. The choice not to report an adverse event, which might have repercussions both professionally and personally, exposes the nurse to the risk of discipline from her professional body as she may be found to be going against the code of conduct (ABA 2000). Emerton (1992) claims that accountability in professional

practice is not an optional extra for nurses, it is essential to nursing. It is precisely this belief that can cause conflict for nurses involved in patient safety incidents. It is acknowledged that organisational culture impacts on the nurse's decision whether or not to report an adverse event. A supportive culture is likely to result in increased reporting. Historically nurses have suffered when they reported incidents which put patients at risk and this has impacted greatly on nurses' decisions. Nurses have a responsibility to report adverse events to the appropriate authorities in order to enhance organisational learning and prevent recurrence. Which factors impact on nurses reporting patterns is of interest to this study. The three obstacles summarised above present difficulties for nurses working in Ireland. Nurses are aware of their professional and moral obligations regarding safety, but are fearful of the consequences which may arise as a result of highlighting adverse event occurrence. This fear is likely to be the result of a long history in healthcare of apportioning blame following an adverse event. This study examines nurse and organisational factors which enhance patient safety and enable nurses to fulfil their reporting obligations.

The Institute of Medicine (2004) suggests that healthcare depends on professionals who struggle to do their best in less than ideal circumstances. Adhering to the requirements of the systems approach to safety in organisations where a punitive culture still exists requires moral courage from nurses. Liaing (2002), Pearson (2005) and Ramanujam et al (2008) suggest that the failure to acknowledge the influence of the environment in which nurses work on patient safety, may contribute to difficulties in achieving full acceptance of the systems approach. Johnstone (2005) agrees that much is made of the nurses role in patient safety but this often ignores the fact that the systems approach makes safety everybody's business. This work looks particularly at the nurse's

experience but it remains important to note that safety relies on organisational vigilance not just the nursing workforce.

Chapter 3 LITERATURE REVIEW

The aim of this study is to identify organisational and nursing factors in acute general hospitals which enable the delivery of safe patient care. It takes place at a time of ongoing change in Irish and international health services. Patient safety is not a new issue for either nurses or health services, but over the last 15 to 20 years the emphasis placed on it has increased in intensity. Reports published suggest that the incidence of adverse events occurring to patients while in hospital is much greater than previously acknowledged (Brennan et al 1991, Wilson et al 1995, Kohn et al 2000, and Department of Health 2000). Following these reports, demands increased from within healthcare and from the public, to address patient safety deficits. The systems approach to patient safety is now universally recommended and requires new thinking around how best to keep patients safe. The systems approach to safety originated as the response of high risk industries, such as the aviation industry, to identified and unacceptable risks within the industries. Since the mid 1990s hospitals in Ireland have looked to this systems approach to enhance the safety of care provided to patients. However, the transition to the systems approach to patient safety, at hospital level, has not been examined to date in Ireland. This study examines the current approaches to safety taken by acute hospitals and the perceptions of nurses working in direct patient care around patient safety. The organisational culture into which the systems approach is introduced is critical to its success, and it is likely that the culture of healthcare in Ireland, as in other countries, may impact on the rate at which the approach becomes embedded. Literature in relation to organisational safety culture is examined in this section. This includes a brief exploration of comparisons made between the safety cultures of the health care and aviation industries.

Linda Aiken's work in relation to nurse and patient outcomes is frequently cited (Aiken et al 1994, 1997, 2001, 2002, 2003, 2010, 2011, 2012, Aiken and Patrician 2000, Rafferty et al 2007, Clarke and Aiken 2008, Lucero et al 2009, 2010). Elements of the nurse questionnaire used in this research have been developed and adapted by Aiken and her team over 20 years. In recent years the questionnaire has been increasingly used in studies measuring patient safety outcomes. The progress of this work, and its findings, are explored in this section, to demonstrate and analyse the current state of the research around the impact of nursing on patient outcomes. The implications of previous work for this study are outlined.

Patient satisfaction surveys are frequently used as indicators for quality of care received. In this study a patient survey was used which included patient reported patient safety outcomes. It is reasonable to expect that factors which impact on patient safety might also impact on patient satisfaction with certain aspects of safety. Exploration of recent literature in relation to the usefulness of data collected through patient surveys has formed part of the background to this research and thus has been included here.

3.1. Search strategy

For this work electronic databases such as CINAHL, Medline and Blackwell, were searched for related literature in the English language from the 1980s onwards. The searches were carried out over three years (2009-2012) using related keywords (such as "patient safety", "patient care", "nursing", "organisational culture", "safety culture", "adverse events", "systems approach", "aviation safety") and combinations of key words and phrases. Related searches were carried out using words such as "patient outcomes", "patient satisfaction", "nurse outcomes". Government reports, tribunal and

inquiry findings related to the area of patient safety, from both Ireland and abroad were reviewed where appropriate.

The literature discussed in this chapter is divided into three major themes, which in-turn are divided into shorter subsections. The themes and subsections are as follows:

Patient safety and organisational culture

- Healthcare safety culture
- Patient safety and nursing
- The culture of safety in the aviation industry

Nursing and patient outcomes research

- Origins of the Nursing Work Index
- Practice Environment Scale of the NWI (PES-NWI)

Patient Satisfaction

- Patient satisfaction surveys as an indicator of quality of care
- The concept of patient satisfaction
- Features of patient satisfaction

3.2. Patient safety and organisational culture

The concept of a culture of safety within healthcare organisations is almost always referred to in publications on patient safety, including the Report of the Commission on Patient Safety and Quality Assurance (Government of Ireland 2008). An effective safety culture implies the existence of an organisation wide commitment to safety as a priority, where patterns of behaviour clearly indicate that safety standards are upheld by all. The concept of "primum non nocere (first, do no harm)" is integral to healthcare and has formed a basis for medical and nursing education since the mid 1800s (Ilan 2005).

However although this concept is integral to healthcare, for many years errors and adverse events were acknowledged as rare but acceptable collateral damage, in a field of science where the successes far outweighed the failures (Leape 1994, Millenson 2002). More recently the extent of this collateral damage has been the focus of both the popular media and healthcare publications. Reports from the United States (Brennan et al 1991, Kohn et al 2000), the United Kingdom (Department of Health 2000) and Australia (Wilson et al 1995) estimated the rate of error occurrence in healthcare as between 3.7% (Brennan et al 1991) and 16.6% (Wilson et al 1995).

3.2.1. Healthcare safety culture

The culture in healthcare around errors and adverse events is frequently described as punitive. Chapter 2 above describes this culture and the implications for nurses. It has been established that this punitive culture poses difficulties for organisations and staff in reporting, learning from, and consequently preventing errors (Feng et al 2008, Looseley 2009).The systems approach to patient safety requires that staff report all adverse incidents and near-misses in a transparent manner, without fear of reprisal. Thus organisational learning is maximised and the chances of recurrence are minimised. Such a non-punitive approach to error reporting is said to elicit information unobtainable by other means (Barach and Small 2000).

Cooke (2006) points out that a gap can exist between the systems approach the organisation espouses, and the punitive approach which staff experience. Based on 144 staff interviews across three hospital trusts, she describes a “mock safety culture”, which achieves a low level of compliance with the systems approach to safety, without any real change to the culture of the organisation. It sustains the old punitive culture,

while declaring to use the systems approach to safety. Those interviewed for Cooke's study describe a continuing culture of fear and secrecy, veiled in a no-blame culture. She later (Cooke 2009) describes this situation as likely to undermine any attempts to improve safety in the organisation. Cooke's studies suggest that although hospital management may appear to address the requirements of patient safety, there is value in asking staff for their perceptions of safety in the organisation.

Compliance with the systems approach to safety is not often easily achieved. Adverse event reporting is integral to the systems approach to safety. Traditionally a veil of silence has existed around adverse events in healthcare. Asghari et al (2009) examines doctors attitudes to handling errors made by their peers. Only 13.9% of doctors, at a continuing education programme in Tehran, felt that in an error leading to patient death, they would report the implicated doctor to the medical council. The reasons for the reluctance to report were not established but the approach favoured was to discuss the event with the implicated doctor. Several studies have been conducted which examined adverse event reporting patterns in healthcare. Commonly these studies also examine reasons for non-reporting of adverse events. Reasons cited include negative experiences following submission of a report (Firth-Cozens et al 2003), fear of repercussions and retribution (Attree 2007, Vincent et al study 1999), and fears "nothing would be done" featured highly in the findings (Attree 2007 and Dekkar 2007). Nurses in particular report negative experiences. Their decisions to report are often linked to managerial outlook (Attree 2007). If management are seen to be open to such reports and supportive of the reporter, nurses would be more inclined to report. This supports Cooke's view above. Firth-Cozens (2003) points out that although nurses and doctors frequently consider reporting adverse events, only a small proportion follow through

with this. A positive finding of this study was that healthcare staff are often ready to make a report if the support exists within their workplace.

3.2.2. Patient safety and nursing

Nurses have been identified as the most frequent reporters of adverse incidents in health care (Milligan and Denis 2004, Johnstone and Kanitsaki 2006, Levinson 2012). When compared with doctors in studies by Vincent et al (1999) and Lawton and Parker (2002) nurses and midwives have been found to be by far the most likely staff group to report incidents. In a large scale study of 266,224 reported events Rowin et al (2008) demonstrate that nurses reported 45.3% of incidents compared with doctors 1.1%. Nurses were identified as the most frequent reporters from a single professional group. Ricci et al (2004) in a retrospective analysis of 211 incident reports find 79.5% were reported by nurses, while 8% were reported by doctors.

Although nurses are known to be the best reporters of adverse events in healthcare, this does not imply that they report all events of which they become aware. Tucker and Edmondson (2003) examine how nurses learn from incidents. Through 239 hours of observation they conclude that nurses tend to fix things as they go along rather than report issues. This first order response, while effective in terms of individual learning, actively works against organisational learning as required in a systems approach. This in turn can lead to burnout and stress for those nurses, stemming from frustration caused by meeting the same issues over and over again. The authors describe how the culture of healthcare welcomes such a "fixer" nurse as this behaviour conveys the impression of flawlessness, further boosting the impression of error free healthcare. The findings are consistent with Reason's description of staff as harm absorbers (2004). This in

combination with a reluctance to report errors based in fear of punishment serves to reduce the likelihood of organisation-wide acceptance of error reporting in healthcare.

3.2.3. The culture of safety in the aviation industry

Healthcare has looked to the approaches to safety taken in other safety conscious industries. The systems approach to patient safety has been recommended by government publications in many countries worldwide including Ireland. Its success in industry has been explored in the medical and nursing literature (Barach and Small 2000, Helmreich 2000, Sexton et al 2000, Leape and Berwick 2000, Van der Schaaf 2002, Ottewal 2003, Thomas et al 2003, Mann 2004, Martin et al 2005, Douchette 2006, Vickers 2008, Crowch 2008 and Loosely et al 2009). Arising from this literature, extensive comparison between the culture of safety conscious industries and healthcare has occurred.

The culture of safety in the aviation industry is well described. Democratisation has occurred in the industry where all staff members receive shared safety training. Such training is ongoing regardless of experience or seniority (Looseley 2009). Staff safety skills (including those of pilots) are evaluated regularly and are tied into permission to fly. This has become a cultural norm over three decades. The aviation industry is acknowledged to be one of high risk, meaning that if something goes wrong it is likely to have catastrophic consequences. Human error is acknowledged to account for up to 70% of the aviation errors (Helmreich 2000) which occurred in the 1960s, 1970s and 1980s. Following many years of concentrating on technical skills for its pilots' education, recognition occurred in the aviation industry in the 1970s and 1980s, that human error is more prevalent in causing errors than lack of flying skills. As a result the industry now includes skills such as communications and teamwork in their staff

training programmes (Mann 2004). The industry recognises that the more complex the environment, the higher the risk, and therefore the greater the need for effective communication between team members (Crowch 2008). It has been apparent in aviation since the early days of the safety programme that lives depend on the relationships between the workers (Mann 2004). It is not enough to technically excel, if the team does not function well. The result of investment in safety in aviation is a flatter hierarchical structure which encourages more open communication between members of the aircraft team. Acceptance in aviation that human error is inevitable does not imply complacency, but rather encourages heightened awareness of the potential for human error. Success in aviation's safety record has been achieved through long-term and ongoing efforts to improve safety and tackle the causes of error (Loosely et al 2009).

Ongoing surveys of aviation staff are conducted to assess safety culture (Helmreich 2000). These are designed to detect any decline in standards. Practices such as the ability of junior cabin crew to speak up to senior pilots, and the responsiveness of senior staff to such junior staff are assessed. The areas under examination include team functioning, organisational leadership, attitudes to error and communication.

3.2.3.1. Comparing cultures of safety in healthcare and aviation

Healthcare organisations are also identified as being of "high risk" due to increasing patient acuity, increasing technical developments and its reliance on people to ensure its success (Lyndon 2006). Mistakes in healthcare, like aviation, can also lead to disastrous results. Safety issues, in either industry are not new, and have always been discussed within these industries. However aviation has responded to the risks much more effectively than healthcare. Helmreich (2000) suggests this may be due to

visibility and cost factors. Human error was found to be the cause of 70% of air disasters in the 1960s and 1970s. In contrast, errors in healthcare were not as visible and were often covered up, so the cost was not reflective of the reality. Public interest in aviation safety subsided as the safety record improved, and the interest switched to safety in healthcare following publication of seminal reports. Safety in aviation was seen as early as 1970 as fundamental to the industry's survival, and funds were redirected to develop a safety programme. In healthcare patient safety is often deemed to be integral to the functioning of hospitals and so suffers from the same budgetary constraints as other aspects of healthcare.

The culture around errors in healthcare is one where mistakes are seen as moral failings (Ottewal 2003) rather than the inevitable consequences of human behaviour in complex systems. Tamuz and Thomas (2006) in their study of how healthcare organisations interpret and classify safety events use a methodology more commonly used in aviation. They conclude that different professions view adverse events differently. What is deemed a reportable event by one group is not by another. This causes problems for healthcare as if errors are not recognised, then they cannot be reported. Unfortunately in healthcare it is acknowledged that professional groups mainly network within their own groups and that the different views may not be known across the professions (West 2006). The education and socialisation of nurses and doctors in particular in the healthcare setting, may influence their attitudes to patient safety. The tribal nature of the professions in healthcare is known to inhibit interprofessional working (Hall 2005, Adamson et all 1995, and Garman et al 2006). In aviation all staff are socialised into a culture of safety through intraprofessional training and organisational expectations. In healthcare if professionals are not brought together formally (as in aviation) to learn

how each other thinks about patient safety, adverse events may continue to go unrecognised.

Teamwork in healthcare is a widely discussed topic and its benefits for patient safety are well established (Cooke et al 2001, Rafferty et al 2001, Atwell and Caldwell 2006). The experience of the aviation industry suggests that teamwork is critical to the safety agenda. Team training takes place at all levels within the aviation industry and its implementation has promoted a change of attitude and culture (Looseley 2009). However such changes did not happen overnight, as the infallibility of the captain was firmly entrenched in the aviation industry culture of the 1970s. Currently pilot recruitment processes and training examine areas such as ego and a sense of infallibility. Through shared team safety training, all members of the team are empowered to voice concerns (Martin et al 2005). In healthcare teamwork is known to be hindered by both intra- and inter-professional hierarchical structures (Hall 2005) and a punitive organisational culture. The doctor's perceived sense of infallibility may prevent other members of the team from highlighting patient safety issues.

In a study to examine staff attitudes to error stress and teamwork, Sexton, Thomas and Helmreich (2000) compare data collected by 40 different airlines over 15 years with data collected from healthcare staff over three years. They demonstrate that 70% of hospital consultants deny the effects of fatigue on their performance, while only 26% of pilots did so. This shows how staff in the aviation industry are more accepting of their vulnerability to making mistakes. Medical staff in this study favour the hierarchical system of healthcare, over a flatter structure as found in aviation. Pilots, in fact, reject the notion of a steep hierarchy. Medical staff overwhelmingly assessed the level of

teamwork as high in their area, while the nurses assessed it as much lower. Status in the team was definitively linked to the staff member's perception of the functioning of the team. Lewis et al (2011) suggest medical staff find it difficult to let go of the status associated with their profession, thereby making less hierarchical structures more difficult to achieve in health care.

Thomas et al (2004) in another study in a neonatal intensive care unit report that hierarchy, and difficulty questioning authority, are found to inhibit team function. The researchers recommend training to overcome team difficulties citing the aviation industry as proof that training can improve team function. Research in safety critical industries, such as aviation, tells us we must understand the context in which people work when looking at safety practices (Leape 1994). In Lyndon's (2006) literature review around communication and teamwork in patient care, measured against the requirements of the aviation industry, she warns against directly importing concepts from aviation without understanding the experiences of nurses in the context of healthcare teams. Assertiveness is required when bringing attention to safety deficits, but in healthcare this must be seen within the historical hierarchical structures.

In a study by O'Toole (2002) of the engineering industry, managerial leadership was identified as one of the greatest influences on employees' perceptions of the safety culture. Management in healthcare is often viewed as isolated from the frontline. This is evident in the results of a study by Gaba et al (2003) which compares the results of safety climate surveys from hospitals with a particular interest in patient safety (Patient Safety Consortium) with those from naval aviators who had recently been involved in a safety incident. The study was large and yielded responses from 6,901

naval aviators (collected over 3 years), and 2,989 hospital staff (collected over 6 months). The researchers report that hospital leaders' commitment to the safety agenda does not necessarily translate into a climate of safety as reported by other staff members.

Carroll et al (2002) suggest that the assumption in healthcare is that the value of error management lies in the approach itself, with a tendency to overlook the context in which it is introduced. The researchers recommend increased visibility and commitment from management on safety issues to improve the culture of safety within hospitals. The studies suggest that a real commitment is required from management to ensure the success of a transparent error reporting and investigation system. They recommend that managers in healthcare must be seen to take part in and be open to change in error management.

Aviation is a relatively recent industry, whereas healthcare has existed much longer in various forms. It is likely that historical issues of hierarchy and poor team communication are very strongly entrenched in healthcare and will not be easily eradicated. Interestingly Lyndon (2006) noted that hierarchy issues also still exist to some extent in aviation. More errors go unchallenged when the captain is flying than when the first officer is in charge. This suggests that even in an industry which is extolled as having an advanced and rigorous approach to safety, some cultural behaviours are more difficult to eliminate. Nonetheless, the success of the aviation industry in addressing risks continues to inspire those working to improve safety for patients (Hotouras 2009, Golemboski 2011, Lewis et al 2011).

3.2.4. Summary of 'safety culture' section

The aviation industry has demonstrated that managerial commitment and team training can bring about a change in safety culture. However the challenges for healthcare today, which did not exist for the aviation industry 30 years ago, are both financial and social. Deficits in aviation safety elicited a governmental response which secured large financial commitments to developing a safety agenda. In healthcare patient safety is not viewed as requiring any large financial commitment, as it is seen as part of the overall work of healthcare. Socially, the change of culture which is needed in the healthcare setting must now take place under increased public scrutiny and this will surely be harder to achieve. Technology and media have made huge advances over the last 30 years and the demands of the public have changed. The public expects healthcare to respond to patient safety deficits quickly and as demonstrated by the aviation industry culture change does not happen quickly. Healthcare is on a trajectory, moving beyond a punitive culture towards a systems approach to safety (Carroll et al 2002). A clear understanding of the factors which influence the culture change necessary will enable this transition. Close examination of the experiences in aviation can aid this understanding. However in healthcare we must be careful not to see the aviation model as a panacea, but to adopt its principles into the culture and make the necessary changes (Lewis et al 2011).

Patient safety is a current priority in healthcare. In this study in order to examine factors which enable the delivery of safe care to patients, it is first necessary to establish measurable patient safety outcomes. To this end the literature around nursing and patient outcomes was examined, with particular emphasis on the work of Linda Aiken and the use of the Nursing Work Index scale, and its derivatives. The Practice

Environment Scale of the Nursing Work Index is included in the nurse questionnaire used in this study.

3.3. Nursing and patient outcomes research

For almost twenty years Linda Aiken and a team at the University of Pennsylvania have examined issues around organisational and nursing influences on nurse and patient outcomes (Aiken et al 1994, 1997, 2001, 2002, 2003, 2008, 2011, 2012, Aiken and Patrician 2000, Rafferty et al 2007, Clarke and Aiken 2008, Lucero et al 2009, 2010). Among the patient outcomes examined were mortality, failure to rescue (this term refers to patient deaths caused by failure to detect deterioration), and adverse event occurrence. Aiken explored the relationship between these outcomes and overall organisational characteristics, the organisation of nursing within the organisation, nurse staffing levels and skill mix. This work is the most frequently cited and replicated outcomes research available in nursing and health services research, and is central to this study.

3.3.1. Origins of the Nursing Work Index

The origins of the Nursing Work Index (NWI) lie in a study by Kramer and Hafner (1989) when the tool was developed from the characteristics identified in the original Magnet Hospital studies and from extensive literature review. Magnet hospitals are those which were identified as "good places to work for nurses", as demonstrated by low turnover rates and attractiveness to nurses. The concept originates in the 1980s work of the American Academy of Nursing (AAN) in which the original magnet hospitals were identified (McClure, Poulin, Sovie and Wandelt 1983). The process of identifying the original hospitals is well documented, including the use of nursing

"experts", in eight regions in the US, to nominate a total of 165 hospitals for inclusion in a list of hospitals which were known to be good for nurses. Following a selection process which included ranking of hospitals and staff interviews, common characteristics emerged in relation to how nursing is perceived, managed and conducted in these hospitals which differed to other American hospitals. These remaining 41 hospitals were designated Magnet Hospitals. The original findings of the magnet hospital studies are confirmed in repeated studies conducted in the 1980 and 1990s (Kramer and Schmalberg 1988a, 1988b, Kramer and Hafner 1989, and Kramer 1990). Although the Magnet hospital study findings are acknowledged to be highly significant for nurses (Kramer and Schmalberg 1988a, 1988b, Kramer and Hafner 1989, and Kramer 1990, Aiken et al 1994, 2000, 2001, Buchan 1999 and Buchan et al 2003), its limitations are also acknowledged. It depended on the personal nominations of a limited number of AAN hospital nursing experts, a process which can not guarantee the inclusion of all the hospitals which could meet the criteria. However, the reduction from 165 hospitals originally nominated, to 41 indicates a stringent inclusion-exclusion process as described above. In 1993, with the establishment of an accreditation system by the American Nurses Credentialing Centre (ANCC), the focus on magnet status was renewed. The system enables hospitals to apply for magnet status and be assessed against quality indicators and standards defined by the American Nurses Association (ANA) (Flynn and McCarthy 2007). The characteristics identified as integral to Magnet hospital status are used in many countries when the focus is on recruitment and retention of nurses (Flynn and McCarthy 2007, Aiken et al 2008).

The original NWI serves as the basis for the development of the NWI-R by Aiken et al (1994). In their study nurses were asked the extent to which each item is present in their

current job. As with the Kramer and Hafner study (1989), the organisation is the unit of analysis. Aiken and Patrician (2000) defend the use of the nurse as a reliable reporter of organisational traits based on the findings of a sociological study where workers reported on traits of the organisation (Aiken and Hage 1968). This is an accepted method of examining the traits of an organisation, commonly used in organisational research. In the NWI-R an organisational trait is measured reliably when variation between nurses in a hospital is small. To increase reliability the number of respondents must be increased (Aiken and Patrician 2000). Reliability is dependent on getting a representative sample (Aiken and Patricain 2000), controlling for differences in nurses (eg education levels, ethnicity) and stability over time (as demonstrated through Aiken's extensive work).

This original study conducted by Aiken, Sloane and Lake (1994) examines the relationship between mortality rates (as a patient outcome) and the organisation of nursing in hospitals. Patient outcome research up to this point focused on a limited number of factors which impact on outcomes, such as medical staffing levels, doctors' education levels and hospital budgets. Aiken's team suggest that in fact nurses, as the health care workers in closest proximity to the patient, and nursing, must be considered when examining patient outcomes and mortality rates. They demonstrate that hospitals acknowledged by nurses to be "good places to work", have better patient outcomes, as reflected by lower mortality rates. Mortality figures are an acknowledged means of measuring patient outcomes and the quality of care particularly in the field of medicine (Hartz et al 1989, Krakauer et al 1992 and Silber et al 1992). Using the 1988 Medicare mortality figures each magnet hospital is compared with five matched hospitals. The magnet hospitals demonstrate lower mortality rates (Aiken et al 1994), controlling for

differences in predicted mortality and patient composition. The researchers conclude that the differences in the organisation of nursing between the groups, was the main contributing factor to the differing mortality figures. It is certainly highly credible that the organisation of nursing in hospitals would influence patient mortality as nurses are closely involved in patient monitoring and surveillance. The use of the magnet hospital list by Aiken et al (2004) appears to be well founded, as the 41 hospitals listed shared characteristics in term of nursing which differentiated them from other US hospitals. However it remains true that we do not know if other hospitals in the US also exhibited these features but were not nominated and therefore were not listed.

In a further study in 1997, reported through multiple papers, Aiken examines the effects of nurse specialisation in specialised AIDS units on both nurses and patients (Aiken and Sloane, 1997, Aiken and Sloane, 1997a, Aiken, Sloane and Lake, 1997, Aiken, Sloane and Klocinski 1997). For the first time differences in the organisation of nursing within hospitals is acknowledged, not merely across hospitals. The researchers compare data collected using the NWI-R from nurses caring for patients with AIDS in dedicated units in 20 hospitals, with data from nurses in general medical wards in the same hospitals and with data from nurses in general medical wards in matched hospitals, including three magnet hospitals (which did not have dedicated AIDS units). Two of these are original magnet hospitals, and one is deemed by the researchers to be closer to a magnet hospital than to the others based on earlier research (Aiken et al 1999). The inclusion of this hospital with the two magnet hospitals is supported in hindsight by the data collected with nurse questionnaire as results on the three subscales are shown to be similar in all three hospitals. The nurses who responded were similar in demographic profile across all hospitals.

Aiken et al (1997) suggest that hospital organisations impact on nurse autonomy, control of resources and the nurse physician relationship within those hospitals. They suggest that enhancement of these three features would result in better patient outcomes. Significantly for my study, the 1997 reports of the study, also suggest that the same is true at unit level. They showed that patient outcomes in terms of AIDS care was better in dedicated units than general wards (Aiken and Sloane 1997a). It is possible that a particular type of nurse and patient may be found in specialised units, and these features in themselves may contribute to increased autonomy and control of resources. Aiken et al (1997a, 1997b) acknowledge this point. However they also demonstrate, through the use of non-specialised units in Magnet hospitals, that similarly better outcomes for both nurses and patients are possible in non specialised units in those hospitals. Thus it is the organisation of nursing which is critical.

This study allowed for examination of two organisational models dealing with similar patients. In the general wards in magnet hospitals nurses have higher levels of autonomy, control over practice and better relationships with medical staff. Organisations where nurses throughout the organisation feel valued and empowered (as in Magnet hospitals) have improved outcomes for nurses and patients also. The 1997 study is limited as the claims are made following analysis of data from only two original Magnet hospitals, and one deemed close to magnet status by the authors. However it seems reasonable to suggest that outcomes are better for nurses and patients where the organisation enables autonomy, control over resources and good nurse-physician relationships to be features of nursing within the organisation. The impact of the ward or unit in this 1997 study is relevant to my current study. It emphasises the differences

which exist across wards in hospitals. Further work reported by Aiken and Sloane (1997b), Aiken Sloane and Klocinski (1997), Aiken et al (1999) and Clarke, Sloane and Aiken (2002) highlights the impact of the ward or workplace on burnout levels of nurses, nurse needlestick injury, patient mortality and patient satisfaction levels. Again the difference in nurse and patient outcomes between wards which were seen to be positive places for nurses and those which were not, was highlighted. These studies suggest that differences in patient outcomes can exist within hospitals, rather than simply between hospitals.

The relationships between nurse staffing and mortality and failure to rescue are tested in a further study. In another use of the NWI-R, Aiken et al (2002) conducts an analysis of data from 10,184 nurse questionnaires, combined with discharge data from 232,342 surgical patients and administrative data from 168 Pennsylvania hospitals. Data collected for this study includes a survey of 50% of nurses registered and working in Pennsylvania. For patient outcomes, they control for demographics, nature of admission, and co-morbidities; additionally they control for hospital size, teaching status and technology. Patient mortality levels are linked in this study to nurse workload, and significant relationships identified between nurse staffing and mortality and failure to rescue. It appears on reading this research that the staffing ratios obtained at organisational level may not relate to the units from which the patient data was collected. This may have biased the results somewhat. However it cannot be ignored that the results point to a link between nurse staffing and workload, and patient outcome. As nurses have been identified as the healthcare worker with most contact with patients, and are actively involved in monitoring and surveillance of patient conditions, it follows that their numbers and skill mix would influence patient outcome.

Put simply, the lower the nurse-patient ratio, the higher the mortality rates (Aiken et al 2002).

The impact of nurse education levels on patient outcomes has also been examined. A follow-on paper from Aiken et al (2003) questioned if the proportion of nurses educated to degree level or higher is associated with mortality and failure to rescue. They controlled for the same variables as before but also for the likely effect of the qualifications of the surgeon. The results revealed that the number of nurses educated to baccalaureate level influences mortality rates, and by increasing the number of nurses with higher level degrees a decrease in patient mortality figures can be achieved. The nurse survey in this study was conducted by surveying 50% of the nurses registered in Pennsylvania. Thus we have no way of knowing the education levels of the nurses who cared for the patients for whom the outcome data were analysed. The researchers claim to provide empirical evidence that having a high proportion of highly educated nurses improves the outcomes of surgical patients, at least in Pennsylvania. Initial concerns regarding response bias (ie nurses with higher education levels may be more inclined to respond) were answered by the authors who compared the demographics from this survey with a US Department of Health survey of nurses conducted in the year 2000. No significant difference was found. A limitation in the study is that it was carried out in one American state and a widening of this would add substantial weight to the findings.

The wider use of the NWI-R outside of the US can be seen in reports of the International Hospital Outcomes Study. These include data collected from the United States, England, Scotland, Canada and Germany in 1998-1999, and aim to examine the

relationship between nurse staffing and nurse and patient outcomes (Aiken, Clarke and Sloane 2002). Aiken et al (2001a and 2001b) present analysis of data from 43,329 nurses in over 700 hospitals in the five countries. Throughout these countries, nurses report similar shortcomings in quality of care and work environment. Fewer than half the nurses surveyed feel management is responsive to their needs. The survey also reveals high levels of nurse involvement in work other than nursing, in combination with necessary nursing work left undone. Only one in nine nurses in Germany, and one in three elsewhere, feel the care in their area could be rated as excellent.

3.3.2. The work environment of nurses and the NWI

Lake (2002) revisited the Nursing Work Index (NWI) along with the original data set (Kramer and Hafner (1989) and the data collected through the Nursing Work Index – Revised (Aiken et al 2001a). Her intention in this work was to develop, from the NWI, a scale to measure the nursing practice environment. The resultant PES-NWI is currently the version of choice in more recent studies. Contained within the overall scale are five subscales which measure different aspects of the nurse work environment. These include:

- *Staffing and resource adequacy*
- *Collegial nurse physician relationships*
- *Nurse manager ability, leadership and support for nurses*
- *Nursing foundations of quality of care*
- *Nurse participation in Hospital Affairs*

The PES- NWI was selected by the National Quality Forum as a Nursing Care Performance Measure in 2004 (Lake 2007). This is the version of the NWI used in my study.

The relationship between the work environment of nurses and nurse and patient safety outcomes has been tested using the PES-NWI. Clarke (2007) reports on the first usage of the PES-NWI as a predictor of nurse occupational safety. This study revisits nurse data collected in 1999 which was first reported on by Aiken et al (2002). Scores for the five subscales on the PES-NWI are obtained for each nurse, and the mean score for each hospital used as a characteristic of that hospital. The impacts of hospital organisational characteristics are analysed for nurses working in the top 25% of hospitals. Hospital staffing is calculated as the mean number of patients assigned to each staff nurse on the last shift worked. Mean number of years in nursing is used as an indicator of experience levels in the hospitals. The study shows through logistic regression that nurses in the top 25% show a one third reduction in the risk of needlestick injury, ie nurses with better working environments are at lower risk of injury. No relationship is evident between staffing levels and needlestick injury. However the staffing level used here is aggregated across units and shifts, and it is possible that more specific unit (or ward) level staffing details would result in a different finding. Nurses qualified less than 5 years are more likely to be injured than other nurses indicating a link between experience levels and safety.

Aiken et al (2008) also reports on a re-analysis of the data collected in 1999 using the PES-NWI. The results show that in better practice environments patients have lower risk of death and failure to rescue. Another secondary analysis of these data, using the PES-NWI, is reported by Friese et al (2008). The results suggest that the practice environment for nurses was significantly associated with surgical outcomes for cancer patients (after adjusting for differences in patients and hospitals). Again data was

analysed at hospital level only. The relationship between the nurse work environment and patient safety outcomes is also confirmed through the work of Laschinger and Leiter (2006) with particular emphasis on the role of nurse leadership.

Using the PES-NWI in England, Rafferty et al (2007) have examined the effects of nurse staffing levels on both patient and nurse outcomes. This study comprises nurse data, organisational data and patient outcome data. The nurse staffing measure in this study relates to the total number of patients and nurses on the last shift, as well as the number of patients for whom the individual nurse was responsible as in Clarke's study (2007). The mean of all patient loads is used for the hospital staffing measure. Analysed as outcomes are "nurse-rated quality of care" and the nurse assessment of whether care had "deteriorated or improved" in the last year. The outcome "failure to rescue", based on the work of Silber et al (2003), is linked to length of stay and patients who were found to have stayed 1.25 times their expected length of stay are deemed to have a complication. Logistic regression is carried out to determine relationships between the variables. The results show that patients in hospitals with the heaviest patient load are 26% more likely to die overall, and 29% more likely to die following an extended stay, than those in hospitals with the lowest patient load per nurse. Higher nurse workloads are also associated with increased adverse outcomes for nurses. Robust attempts are made by the researchers of the study to verify the findings, including recalculating staffing levels by restricting analysis to general medical and surgical wards, excluding nurses with very high workloads, and conducting analysis with and without high risk patients.

Aspects of the nurse practice environment as measured by the PES-NWI have been examined in relation to patient outcomes. A Belgian team has examined the relationship between the work environment of nurses and nurse assessed quality of care in three Belgian hospitals in two ways (Van Bogaert et al 2009a, 2009b). In one study both logistic regression and linear regression is carried out on the data. Ward level nurse management is found to have a significant positive relationship with quality of care, as is hospital management/organisational support. Nurse characteristics such as burnout are shown to be impacted by the work environment also. The overall results suggested that nurse characteristics explain the connections between specific work environment ratings and nurse outcomes. Van Bogaert et al (2009b) also use structural equation modelling to investigate the relationships between the nurse practice environment, nurse outcomes and quality of care. The model shows that nurse burnout has a mediating effect between nurse practice environment and nurse assessed quality of care and that aspects of the nurse work environment directly impact on burnout. These studies use a shortened version of the Maslach Burnout Inventory (Byrne 1994, Van Bogaert et al 2009a). This analysis also demonstrates that nurse management at ward level has an impact on assessments of quality of care. Although these are very small studies, they clearly demonstrate the impact of the nurse work environment and nurse burnout levels on patient outcomes.

The data collected in 1989-1999 for the International Hospital Outcomes study have been tested again by Poghosyan et al (2010) in combination with data from New Zealand and Japan which was collected later (2001 and 2005). In total data from 54,738 nurses in 646 hospitals are analysed by Poghosyan et al (2010) to determine the relationships between burnout and nurse ratings of quality of care. The PES-NWI

subscales used are aggregated to hospital level. One way analyses of variance (ANOVAs) carried out to examine differences in mean burnout scores for nurses who reported poor or fair quality of care compared to those who reported good or excellent quality of care yielded very different results across countries. Logistic regression revealed once again that higher levels of nurse burnout are associated with less satisfactory patient outcomes as measured by reduced quality of care.

The relationship between nursing and the nurse work environment, and patient satisfaction, has been tested by Kutney- Lee et al (2009a) across 430 hospitals in the US (California, Pennsylvania, New Jersey and Florida). They used the publicly available data from the HCAHPS survey of patient satisfaction, data from the American Hospital Association (AHA) annual survey which yielded information on hospital characteristics and nurse data from the University of Pennsylvania Multi-state Nursing Outcomes Study (20,984 nurses). The results reveal a relationship between the number of patients a nurse looks after and the nurse work environment (Poor environment : 5.3, Mixed environment: 4.9, Better environment: 4.6). Most notable is the percentage of patients who would definitely recommend the hospital 69.9% in better work environments and 59.6 in poor work environments. In 9 out of 10 measures patient satisfaction has significant positive associations with the quality of the work environment (quietness at night the only exception). Linear regression modelling examines the joint effects of nurse work environment and patient to nurse ratios on patient survey responses (10 measures). The nurse work environment had significant effect on all 10 measures in both sets. The effect of staffing levels demonstrate that for every additional patient a nurse looked after the percentage of patients who would definitely recommend the hospital decreased by 1.44%.

Hospital characteristic data in the study is at least one year older than other data sources, so it is possible that restructuring may have occurred. Patient data was limited to hospitals who voluntarily submitted to the survey. This may not be representative of all hospitals. Nonetheless the findings are compelling that patients' reports of satisfaction are higher in hospitals where the work environment is better for nurses and where more favourable nurse-patient ratios exist.

In a patient safety focussed study, the nurse surveillance capacity has been measured by Kutney-Lee et al (2009b). Again this involves secondary analysis of data from 1999 (Aiken et al 2001). A Hospital Nurse Surveillance Capacity Profile is constructed for each hospital by ranking hospitals using nurse characteristics (staffing, education, clinical expertise and years experience) and the nurse practice environment. Staffing is calculated using the mean number of patients cared for by nurses across a hospital. The education variable is the proportion of nurses *within each hospital* with a baccalaureate degree or higher. An expertise variable is constructed as mean expertise scores calculated across each hospital. The experience variable is the mean number of years the nurses in a hospital worked as a nurse. A mean score is used for each subscale in the PES-NWI.

Hospitals overall surveillance capacity is calculated as the mean ranking (between 1 and 10) across all nine indicators (staffing, education, expertise, experience, PES-NWI subscales (x5)). Outcomes of hospitals in the highest and lowest rankings are compared and nurse responses aggregated to hospital level. The results show that nurses in higher ranked hospitals took care of 2 fewer patients than nurses in the lower ranked hospitals.

Over 40% of nurses have degrees in the highest ranked hospitals (20% in the lower). In the higher ranked hospitals nurses rank their expertise higher and have more years experience than the lower ranked hospitals. In the higher ranked hospitals nurse rate the practice environment more favourably than in the lower ranked hospitals. In higher ranked hospitals significantly fewer nurses rate care as fair or poor compared with lower ranked hospitals (6.9 as opposed to 23.4).Significantly fewer nurses in these hospitals report occasional or frequent infections or falls compared to nurses in lower ranked hospitals. The surveillance capacity of nurses is an interesting and useful measure in relation to patient safety as this aspect of the role of the nurse is frequently discussed as integral to the patient safety agenda.

The relationship between work left undone by nurses and patient outcomes has been examined by Lucero et al (2010a, 2010b), revisiting the data collected in 1999 from nurses in Pennsylvania. The first study aims to describe nurses' reports of unmet patient needs (or necessary work left undone) and examine the variation in quality of care across hospitals (Lucero et al 2010a). Across hospitals, nurses report leaving two out of seven things undone. The variation is significantly greater for unmet needs across hospitals than within hospitals. The composition of nurses within hospitals did not affect the statistical significance of the variation across hospitals. The quality of nursing care was measured on an aggregate of nurse-reported "work left undone". However differences in quality of care across hospitals seems to be closely associated with variations in the quality of care environments.

In the second analysis of this data (Lucero et al 2010b) hospitals are categorised into three categories using data from PES-NWI: Unfavourable nurse practice environments

(scores of 2.5 on one subscale or less), mixed practice environments (scores above 2.5 on 2 or 3 subscales), favourable practice environments (above 2.5 on four or five subscales. A composite total is obtained for each nurse and aggregated to hospital level as in the previous study. Responses to questions on adverse incident occurrence are reclassified as frequent or infrequent. The associations between unmet nursing care needs and the frequency of adverse events are examined with multiple regression methods. The results show that an increase in one unmet need increases the nurse-reported adverse events from 7-9 points. Nearly one third of the influence of unmet needs on infections is accounted for by the practice environment of the nurses.

In the studies the nurse workload is calculated across hospitals although staffing levels and patient allocation vary greatly between general wards and intensive care and operating theatres. The grouping of hospital nurse practice environments is unclear (mixed practice environment- above 2.5 in 2 *or* 3 subscales, favourable practice environments – above 2.5 on 4 *or* 5 subscales). Clarification would seem to be required in order to ensure the study can be replicated. For the section entitled "care left undone" in the questionnaire a list of seven activities integral to nursing are listed. It is unclear if nurse respondents could indicate that nothing was left undone. If no box was ticked was this to be interpreted as not answered or as no work left undone. The difference could result in an inaccurate composite of work left undone. Nonetheless the study shows a link between care left undone, the nurse practice environment and patient outcomes which is worthy of further exploration. While analysis by Lucero et al (2010) is at hospital level, it is unknown if the relationships established hold true at ward level.

More recent studies reported on by Aiken et al (2011, 2012) build on the previous work. In a study of 665 hospitals (2011) logistic regression reveals that 10% more degree educated nurses in a hospital can result in a 4% decrease in patient mortality and failure to rescue. The authors also demonstrate that if nurse workload is decreased by one patient per nurse in hospitals with a poor work environment, the effect is negligible, however if decreased in hospitals where the nurse work environment is best, the effect on mortality and failure-to-rescue is 9% and 10%. This study conclusively defines the work environment of nurses as a major predictor of patient safety outcomes. In further research across 12 European countries and the US, nurses in hospitals with better work environments are shown to be only half as likely as others to rate the safety in their units as poor or failing (Aiken et al 2012). Patients in these hospitals with better work environments are also shown to express higher levels of satisfaction.

3.3.3. Summary of nursing and patient outcomes research section

Based on the research detailed above, the impact of nursing on patient care, and on the organisation's influence on nursing, is well established. The potential of this research is that both staff and patient outcomes can be enhanced by paying attention to the aspects of healthcare organisations which contribute most to those outcomes. The early work of Aiken (1994) has become very influential in the field of outcomes research and served as a basis for other studies. Nurse staffing levels, and the nurse working environment, in repeated studies across several countries, have been consistently linked with patient and nurse outcomes. The work on nurse surveillance capacity carried out by Kutney-Lee (2009b) also emphasised the role of the nurse in patient safety. However Aiken's research has taken account of limited organisational features (hospital size, teaching status, technology status) and this information was frequently centrally accessed from

US state statistics, rather than from the hospital itself. Access to additional organisational information such as staff numbers may have been of benefit to the studies.

Linear analysis has been conducted in all the work reported above with most studies examining differences across hospitals. The clustering of nurses, within wards, within these hospitals has not been thoroughly examined. The difference in nurse and patient outcomes in different wards can be seen in Aiken's earlier work in AIDS units, however the analysis methods used did not maximise the potential of the data. Multilevel modelling may have added to these studies, showing differences in outcomes within hospitals as well as between hospitals. The composite calculated for the nurse work environment in Aiken's work was usually a hospital composite. This failed to acknowledge the differences between wards caused by different staff, different management systems and different patients. Recent work where the NWI was used, by Van Bogaert et al (2010) carried out analysis on nurse data from Belgian hospitals at both the level of the nurse and the level of the ward or unit. In that work, the work environment of the ward also predicted nurse-reported quality of care. This research acknowledged that nurses work in small ward groups and that variability exists in the nurse work environment between wards in the same hospital, and not simply between hospitals.

In outcomes research different sources of measureable outcomes are frequently used. One source is that of patient satisfaction surveys. These can be used to support and strengthen a study reflecting the views of patients about the care received. Patient

satisfaction has been increasingly used in recent years as an important measurable outcome in healthcare.

3.4. Patient satisfaction

The literature around patient satisfaction as a measurable patient outcome will be explored in this section. As a patient outcome, patient satisfaction is generally associated with the quality of care provided.

3.4.1. Patient satisfaction surveys as an indicator of quality

Patient satisfaction is been used increasingly as a quality indicator by health services (Larsson et al 1999, Williams 2004, Wagner and Bear 2009, Bleich et al 2009) and is viewed as an important patient outcome (Avis et al 1995, Aiken and Patrician 2000). The move towards patient centred or consumer led health care has prompted health care providers to seek the views of their consumers or patients (Avis et al 1995, Sitzia and Wood 1997, Williams et al 1998). Spooner (2003) defines patient satisfaction as "a judgement people form that is influenced by all prior health care impressions and experiences as well as present perceptions and expectations" (p162). The increased focus on patient safety, in Ireland and internationally, has been partly led by media discussions and the demands of the general public. The levels of satisfaction expressed by patients in Ireland in relation to certain safety markers is therefore an important reflection of safety practices in Irish hospitals.

3.4.2. The concept of patient satisfaction

In many countries over the last 20- 30 years patients have been recognised as a vital source of information about how healthcare functions. Patients' rights to have their

views heard have been recognised as important when planning or evaluating services (Avis et al 1995). Much of the literature suggests that while patient satisfaction research has become popular, little attention has been paid to the concept of patient satisfaction. Literature reviews (Avis et al 1995 and Sitzia and Wood 1997) which examine the early patient satisfaction research conclude that the concept of satisfaction, and the model which underpins much of the research, rest on the assumption that expressed satisfaction reflects expectations which have been met. A small amount of empirical evidence existed at the time of those reviews, to support the idea that patients express satisfaction based on previously held expectations Linder-Pelz 1982, Swan et al 1985) and this situation has remained largely unchanged.

Swan et al (1985) report a very strong relationship between confirmation of expectations and patients' overall satisfaction. Kravitz (2001) agrees in a conceptual paper linking patients' expectations to satisfaction with care. Nonetheless he acknowledges throughout, that culture and context play equally important roles in the patients' satisfaction ratings. Further to such early work an assumption is made in much of the subsequent literature that expectations and satisfaction ratings are linked (Coyle and Williams 1999, Cleary et al 2003, Han et al 2003, Avis et al 1995, Laschinger et al 2005). This assumption is disputed by others as detailed below.

Avis et al (1995) and Williams et al (1998) suggest that the concept of patient satisfaction as associated with expectations is essentially flawed. Avis et al (1995) agree that the meaning of "satisfaction" may not be consistent among patients when evaluating their care as the concept of satisfaction has not been sufficiently clarified. Importantly however, they still described the measurement of patient satisfaction as an

"intrinsically positive phenomenon" (Avis et al 1995 p316) as it seeks the opinion of service users, with the aim of evaluating and improving healthcare. Whether patients express satisfaction levels based on a comparison of their experiences of care provided and their prior expectations has been examined in a study by Avis et al (1997). The results show high levels of satisfaction are expressed by patients who express expectations, but whose expectations were not met during the consultation. In the study, Avis et al (1997) demonstrate that new patients sometimes come with negative assumptions, and express relief afterwards that things were better than expected. In the study patients express disappointment regarding some aspects of the consultations (for instance information shared), but these disappointments do not translate into dissatisfaction. In the study the researchers note that patients do not deem themselves qualified to make negative judgements on the care they received, particularly as they felt dependent on the health services at that time. They noted that patients tended to blame themselves for poor communication and outcomes not achieved. The findings of the study show expressions of satisfaction are sometimes linked to other feelings, such as relief or gratitude. Biases such as social desirability of responses and self interest, have been discussed in the literature as impacting on how patients respond to satisfaction surveys (Sitkia and Wood 1997 and Harding and Taylor 2010).

Williams et al (1998) suggest that the expectation fulfilment model predicts that any non-fulfilment of expectations should result in an expression of dissatisfaction. In their study all the interviewees report some negative experiences through interview but in the survey express a high level of satisfaction. The researchers identify two concepts which were involved in the mechanisms of evaluating a service: duty and culpability. The first refers to the elements the respondent believes to be the obligations of the service

providers. The latter refers to the culpability of the service for negative experiences. This study suggests that patients have negative experiences which do not impact on their reported rates of satisfaction if they can find mitigating circumstances for the failures. In the current health service environment such mitigating circumstances might be funding or staffing shortages, or recruitment freezes.

Avis et al (1997) suggest qualitative approaches to patient evaluation of service are more likely to yield valuable information about dissatisfaction and promote consumer involvement. This view is supported by Harding and Taylor (2010) who report on patient satisfaction research amongst allied health outpatients. In that study patients express very high levels of satisfaction with the service provided. However responses to two global questions, one of which asked for suggestions for improvements are deemed the most useful, suggesting areas which are important to satisfaction for patients. In another qualitative study by Sorlie et al (2006) the patients describe themselves as very satisfied with their care and are grateful for the care they receive. However the researchers note that patients are willing to compromise on less than optimal situations which they feel they have to accept as the reality of hospitalisation. Examples given are of busy staff with little time to communicate, or patient reluctance to ring for help because staff are so busy, or food which is below standard generally but which they describe as satisfactory because it alleviates hunger. Older patients also describe hospital as a safe place on which they feel dependent and therefore are unlikely to express dissatisfaction with the service. This supports the view that advanced age impacts satisfaction scores. The authors recommend that patients should not be considered as a single homogenous group and that expressed satisfaction rates should not encourage complacency amongst health care providers.

Coyle and Williams (1999) agree with William et al (1998) that patient satisfaction surveys do not identify areas of dissatisfaction or disappointment, and acknowledge they often show very high levels of satisfaction. They suggest that patient satisfaction research should be refocused so that eliciting dissatisfaction becomes the aim. In their review they look to patient satisfaction research to determine what is known about dissatisfaction. They argue that the patient satisfaction model which suggests satisfaction is a function of met expectations is flawed. Such surveys fail to pick up on dissatisfaction. They point out that dissatisfaction cannot be conceptualised in patient satisfaction research as the opposite of satisfaction. The evidence from the literature suggests patients feel inhibited from expressing dissatisfaction in surveys, and therefore we cannot assume satisfaction and dissatisfaction as being on the same continuum for respondents. To assume they are, is a reflection of healthcare provider hopes, rather than measures based in the reality of the service as experienced by patients.

Williams et al (1998) suggest that dissatisfaction arises when something goes wrong and the patient believes it to be the fault of the service. This can be counteracted if the patient can attribute the failing to circumstances which excuse the failure, for instance a doctor who failed to communicate effectively was excused because she was not feeling well, or a delayed outpatient appointment excused because of Christmas holidays. In this case the patient may actually express satisfaction with care which is less than perfect. Such intervening patient beliefs suggest that satisfaction and dissatisfaction are not on the same continuum. Williams et al (1998) recognise through review of literature that patient reluctance to express dissatisfaction stems from gratitude or powerlessness. Williams (1994) suggests therefore satisfaction should not be interpreted as high quality

care but rather that nothing very bad occurred. Williams et al (1998) suggest that if service providers wish to take account of the views of patients they should look at capturing dissatisfaction. It may be that dissatisfaction is best captured through interview, but that satisfaction can be measured effectively through surveys.

Williams et al (1998) conclude that the satisfaction ratings may not be a reflection of all around good experiences, but rather a reflection of a patient acknowledgement that people are doing the best they can. They suggest that satisfaction ratings should not be seen as a reflection of the patients view of the service provided but rather as a reflection of the patients perception of culpability and duty. A focus on negative experiences reported in interview may not accurately reflect the reality of the situation either and should be examined in relation to reported satisfaction rates. Williams et al (1998) suggest that such criticisms expressed in interview may be just "criticisms" and not evaluations of the service. This view may explain the different findings in the interview and survey data. This research suggests patient satisfaction surveys can be used as a reflection of patient outcomes. The discrepancies frequently noted between survey data and interview data does not indicate that the survey data is inaccurate but simply reflects that the two processes measure different things – satisfaction and dissatisfaction.

3.4.3. Demographic considerations in patient satisfaction research

Sitkia and Wood (1997) through their comprehensive review of the concepts and issues around patient satisfaction in the early days of satisfaction research explore the commonly held belief that socio-demographic characteristics impact greatly on patient satisfaction responses. They conclude that there was a lack of consistency regarding the influence of such factors. Age is identified as the most consistent determinant with older people having higher level of satisfaction. Educational attainment has also been linked

to satisfaction levels with those with lower levels of education expressing higher levels of satisfaction. Other characteristics such as social class are cited as being linked to patient satisfaction with those of higher classes expressing higher levels of satisfaction (Sitkia and Wood 1997). At that point in time gender and ethnic origin was cited as impacting to a lesser extent on expressed satisfaction (Sitkia and Wood 1997). However, in contrast to much of the literature Han et al (2003) fail to detect an influence on satisfaction levels from patient demographics. Biasing factors such as social desirability, self interest and gratitude may also influence patient responses in satisfaction research (Williams 1994, Sitkia and Wood 1997).

Young et al (2000) examine the extent to which the satisfaction scores of patients are associated with their demographic characteristics and the characteristics of the hospital environment. Both advancing age and better perceived health status were significantly associated with higher satisfaction scores. The researchers recognise the potential of patient satisfaction data for comparison purposes. However they were concerned that organisations could be penalised or rewarded for factors which influence the scores in patient satisfaction surveys, but in fact are out of the control of organisations. For instance, hospitals with older patients may have higher satisfaction scores, reflecting the patient demographics rather than care received. They are concerned with research which suggests that patient demographics are possible proxies for expectations through which their satisfaction responses are developed. It is unclear from this study and related literature what causal relationship exists. It is possible for instance that older patients are treated differently, or more kindly, than younger ones accounting for the difference in satisfaction rates. Or indeed perhaps patients who perceive themselves to be healthier are more positive about life in general and therefore more satisfied. They conclude that

there is a need to adjust scores in patient satisfaction surveys for differences in patient populations and organisations.

Bleich et al (2009) in a study funded by the Harvard Initiative for Global Health, explore what determines patient satisfaction with health services outside of the patient experience. Included in the analysis is data from 21 countries from the World Health Survey in 2003. Again age was found to be positively associated with satisfaction ($P<0.001$) and a statistically significant relationship was found between education levels and satisfaction levels ($P<0.01$). Patients who described their health as very bad, bad, moderate or good, were less likely to be satisfied with the health system than those who described their health as very good. The authors agree that most of the variation in responses is due to factors such as age and education levels. They found that in wealthier countries, patients expressed lower levels of dissatisfaction. They suggested that attitudes can be influenced by media and that this too should be taken into account when considering satisfaction levels. Thi et al (2002) and Cleary et al (2003) concurred that higher self perceived health status is linked to higher satisfaction rates.

Larsson et al (1999) conducted a study of 831 patients in medical and surgical units of two Swedish hospitals. They aimed to examine gender differences in inpatients regarding perceptions of received care and the subjective importance of various care conditions. Virtually no differences were found between men's and women's evaluations of care. On the ratings of subjective importance, women score higher than men on most scales. Logistic regression confirms this difference. The outcome according to the researchers, is that there are different values at play for men and women when assessing quality of care. The authors suggested that it is a stronger

indicator of poor quality care if a person is dissatisfied with something important to them personally, rather than something which is less important to them. This they suggest means that quality of care for women could be regarded as poorer than for men. However the mean scores for all dimensions for women are still very high at 3.31 – 3.53, out of a potential score of 4 (for the highest quality rating). The researchers conclude that until more is known about the difference noted they could not make recommendations for practice. Thus it would seem there is no valid reason for obtaining gender information in satisfaction surveys. This is supported by the findings of the literature review conducted by Sitkia and Wood (1997).

3.4.4. Summary of patient satisfaction section

Surveys which address patient satisfaction are common. Responses to such surveys are subjective and interpretation can be difficult as satisfaction ratings may be a function of expectations, which are likely to vary between patients. Alternatively they may be a function of different demographic features which act as proxies for expectations or are linked to them. Limitations of patient surveys have been identified in the literature: they may fail to detect dissatisfaction and simply assess satisfaction levels, responses can be influenced by social desirability, patient demographics or other biases, and they frequently result in high rates of satisfaction being reported when dissatisfaction can be found through interview. Several reasons are suggested for high satisfaction responses including patient reticence to answer negatively and lack of understanding regarding the concept of patient satisfaction and the purpose of collecting such data. Sitkia and Wood (1997) recommend that researchers be aware of the influence of all of the above characteristics when interpreting results. A valid and reliable satisfaction survey used

regularly can produce meaningful data over time which is actionable and can enable health services to respond to patients needs (Laschinger et al 2005).

Much of the literature reviewed relating to patient surveys is over 10 years old. In the 1990s as health care became more consumer led, patient satisfaction surveys became more widely used. This has led to a proliferation of research and discussion papers around the usefulness of such surveys. Many of the points raised then remain relevant today and have been supported by more recent literature. However although limitations have been identified in patient satisfaction questionnaires, the principle behind them is never in doubt. Researchers consistently point to their usefulness in measuring the quality of care provided.

3.5. Conclusion to literature review

In 2009 the Irish government made a commitment to implementing the key recommendations from the Report of the Commission on Patient Safety and Quality Assurance (DoHC 2008). This was recognition of the growing international imperative for national healthcare organisations to respond to patient safety statistics as seen in recent reports. The 2008 report acknowledges that the Irish health service lacks a service wide approach to patient safety. The literature explored in this chapter clearly demonstrates the industrial origins of the systems approach to safety. It is likely that aviation safety is held in high esteem by patient safety experts by virtue of its successful implementation, rather than because the two fields are identical. However the success of the safety agenda in aviation is largely due to team work and collegiality, flat hierarchical structures, training and recertification and management commitment. How these issues translate to healthcare is important to patient safety. In this study data are gathered on the work environment of nurses including measures of teamwork,

management support and leadership. Also included are items measuring provision of, and attendance at, safety training. For the first time a picture can be constructed of how management in acute hospitals in Ireland is addressing patient safety. The role played by nurses and nursing in patient safety is consistently referred to in the literature. Factors impacting safety associated with nursing include staffing levels, education levels, experience levels, the work environment, and the organisation of nursing within hospitals. In this study the perceptions of nurses regarding patient safety in Ireland are gathered. Previous research suggests that such nurse-reported features of organisational life are reliable. It is hoped that as a picture of patient safety in Irish hospitals emerges, factors which can enhance safety will be identified through the measuring the impact on safety outcomes.

The impact of nurses and nursing on patient care has been established in many studies. Some of the most influential work in nursing outcomes research has been outlined in this chapter. Research on the work environment of nurses has demonstrated that the structure of the PES-NWI enables analysis of patient outcomes at nurse and at hospital level. Exploration of the literature relating to prior usage of the nurse questionnaire enables consideration of the merits of different methods of analysis on the data. The methods of analysis used up to now have been mainly linear, thereby considering nurses within hospitals as one group, and highlighting differences across hospitals. These methods do not recognise that nurses work in different work environments *within* hospitals also. Linear methods of analysis assume independence of participants, while multilevel modelling looks for variability between groups. Work carried out by Aiken et al (1997) noted differences across wards when outcomes in specialist wards and general wards were compared. However the effects of the clustering of nurses within wards,

while acknowledged in reports of that study, were not fully examined. Multilevel modelling (MLM) as an analysis approach, takes into account that individuals working in groups are influenced by the group. It seeks to determine if variability exists between groups rather than between individuals.

Patient satisfaction surveys are increasingly being used to assess the quality of care provided to patients. When a patient questionnaire is used with the PES-NWI Kutney-Lee (2009b) demonstrates that more patients are willing to recommend the hospital to others if cared for in environments which have been shown to be better for nurses. However it is clear from the literature that patient surveys should not be used exclusively and the results should be interpreted in light of many other factors. As an outcome measure, patient satisfaction can be used in conjunction with other measurable outcomes to give a more complete picture of care provided. Cleary (1999) comments on the questionnaire used in this study as an example of a patient survey instrument which seeks reports on specific care experiences that act as a reflection of quality rather than on amenities etc. He suggested that the questions are less influenced by patient characteristics and as such more useful in terms of quality measurement. In this study the items measuring patient satisfaction with medication safety are to be used to measure patient safety outcomes.

In this study the impact of the overall hospital approach to safety will be examined in relation to patient satisfaction with medication safety. Also factors will be identified which if addressed could result in increased patient satisfaction with safety practices and ultimately increased patient safety.

Chapter 4 METHODOLOGY

The overall aim of this study is to identify organisational and nursing factors in acute general hospitals which enable the delivery of safe patient care. The objectives are as follows:

1. to describe safety posts, safety training provision, and safety audit practices in Irish hospitals
2. to analyse the perceptions of nurses and patients regarding patient safety in these hospitals
3. to examine the impact of individual nurse factors on nurse-reported adverse occurrence rates and nurse-graded ward safety in Irish hospitals
4. to examine the impact of nurse factors aggregated to the ward level on nurse-reported adverse occurrence rates and nurse-graded ward safety in Irish hospitals
5. to examine the impact of organisational factors in Irish hospitals, including organisational culture, approaches to safety and staffing, on both nurse-graded patient safety and patient reported satisfaction with safety outcomes
6. to identify factors in Irish hospitals which enable nurses to fulfil the reporting function of their role in patient safety.

In this chapter the first section below contains details of the study design. Within this section the use of survey methodology is discussed, leading on to a description of features of questionnaires. Included also is a description of instruments contained within questionnaires as relevant to this study. Following this the research instruments used in this study are outlined and issues of validity and reliability addressed. This is followed by a description of study sampling techniques and data collection procedures. A plan for

data analysis procedures is presented prior to a report of the ethical considerations involved in this study.

4.1. Study design

Previous research studies have established the influence of nursing factors and organisational factors on patient safety outcomes in other countries, as demonstrated through the literature outlined in the previous chapter. This study further develops this work, by addressing the issue of clustered data (nurses and patients within wards, within hospitals). It seeks to establish the influence of the ward environment on patient safety outcomes. The culture of the workplace in many industries is acknowledged to be of critical importance to the success of safety initiatives. In healthcare nurses are seen as key players in patient safety, however individual nurses do not work in isolation. Instead, in the hospital setting, individual nurses work in ward groups with other nurses. Each ward can be seen as a separate unit within the organisation having its own manager, nurses and patients, and therefore, as distinct from any other ward. The clustering of nurses in separate ward environments is central to the current study. Patients are also cared for in these distinct ward environments and in this study it was essential that nurses and patients could be linked to wards and subsequently to hospitals. Three surveys have been conducted to address the aims and objectives (an organisational or hospital survey, a nurse survey and a patient satisfaction survey) and will be expanded on later in this chapter.

4.1. 1. Survey research

This section contains details of the survey research methodology used. The origins of the methodology are outlined and its suitability to this work are highlighted.

A survey approach is useful when descriptive information is sought from research subjects and where the relationships between certain variables are of interest (Parahoo 2006). Surveys typically are used in quantitative research to collect quantitative data. This methodology enables the exploration of relationships between variables in order to address the objectives of the study.

Quantitative studies are based in the positivist paradigm. Positivism is a philosophical school in which a number of empirical researchers have rooted their methodologies. The positivist school has its origins in the natural sciences or empiricism (Proctor 1998, Risjord 2010) and is frequently described as the traditional scientific approach to research. In the positivist paradigm "the world is viewed as something that is available for study in a more or less unchanging form" (Houser 2008 p38). Positivism evolved after a period described as the "Enlightenment" where philosophers in the mid 1800s such as August Comte suggested that social investigators should look at society itself for answers rather than to more abstract concepts such as metaphysics or theology (Sarantakos 1993, Crossan 2003).

The impact of positivism in the first half, and to a lesser degree the second half, of the 20th century on nurse researchers is described by Risjord (2010) as being both historical and philosophical. While research approaches used by nurses were in keeping with the main research trends of that period this does not imply that the affiliations between nursing and empirical research was an unconscious adoption of positivism by nurses. Nurse theorists at this time defended positivism and its suitability to research carried out by nurses (Risjord 2010), however opposition to its use began to grow (Clark 1998). As a world view positivism was disputed by some nurses as being too narrow and

opposition to it grew suggesting that it provided a superficial view of the phenomenon under investigation (Parahoo 2006). Risjord (2010) acknowledges that positivism became a pejorative term for some researchers in nursing who were convinced of its unsuitability to the needs of the profession. Within this field of thought qualitative research is believed to address the needs more fully. Lincoln and Guba (1985), proponents of a qualitative approach to social research, write that all facts are value-laden and suggested that values are excluded from quantitative research. However more recently a less pedantic view regarding the suitability or non suitability of quantitative research to the needs of nurse researchers is common. The view that nurse researchers should seek answers through various research paradigms is supported by Fawcett et al (2001) and Weaver and Olson (2006). It is recognised that both quantitative and qualitative approaches to research can make a valuable contribution when investigating issues of interest to the profession (Carter 2000a).

If the collection of numerical or measurable information is the priority of the researcher, quantitative research is the most appropriate approach (Carter 2000a). The role of the researcher in quantitative research is to try in so far as possible to make unbiased observations of the phenomena under investigation (Houser 2008), through a transparent data collection and analysis process. Precise and standardised collection tools are required in quantitative research. Surveys can be used to produce numerical data which can be subjected to statistical analysis (Carter 2000b). A survey as a research design can comprise one or more methods of data collection based in either questionnaire format or interview format. Surveys are frequently used in descriptive studies which are designed to provide in depth information about the characteristics of subjects or a setting within a particular field of study (Houser 2008). Such surveys are

carried out to describe populations, to measure associations between variables and to establish trends and links (McKenna, Hasson, Keeney 2006). They are conducted to obtain information about peoples' opinions or perceptions (Knapp 1998 and Houser 2008). They also enable demographic information to be collected which will help with interpretation of results. Survey results can be obtained statistically, in numerical or quantitative form, which enable a greater understanding of the subject matter.

4.1.1.1. Essential elements of surveys

The purpose of surveys as used in quantitative research is to produce numerical or quantifiable data which can be subject to statistical analysis. Such emphasis on quantifiable data is in-keeping with the principle of quantitative research that observable data is readily quantifiable and measurable. Quantitative researchers are preoccupied with issues which reflect their beliefs about acceptable knowledge (Bryman 2004) and these issues are relevant to survey based research.

The first of these preoccupations is measurement. The survey readily lends itself to gathering quantifiable data which enables measurement. Bryman (1989 p104) points out that survey research

> entails the collection of data….on a number of units and usually at a single juncture in time, with a view to collecting systematically a body of quantifiable data in respect of a number of variable which are then examined to discern patterns of association.

Unlike in an experimental design survey researchers do not manipulate the variables to observe the consequences. This limits their use in terms of definitive causal statements. Causality is a further preoccupation of quantitative researchers. These researchers are

not often content to describe phenomena but wish to attribute cause (Bryman 2004). However cross-sectional surveys (surveys where all data is collected within the same time frame on a particular issue) do not often address direct causal relationships as there is ambiguity about the direction of the causal influence between variables. In the case of cross sectional surveys causality is imputed. The researcher must draw on theory or other sources to infer that one variable has a causal relationship with another (Bryman 2004). Punch (2005) talks of surveys where the relationships between variables are important as correlation surveys. Bryman (2004) and Punch (2005) suggest that researchers who use cross-sectional surveys seek to develop techniques similar to experimental researchers to enable causal inferences to be made. This search has produced many commonly used techniques employed by survey researchers such as Multiple Linear Regression. Users of these methods accept that there may be many contributing causes, or factors, to explain an outcome, and that the relationship between the variables may not be direct.

Another preoccupation of quantitative researchers is the concept of generalisability. This means that the findings can be generalised to the whole population although only a sample of these were examined. In survey research generalisability is linked mainly to sampling strategies (Bryman 1998). The sampling procedures employed in this study will be outlined below p117. A further concern of quantitative researchers is that of replication. In survey research this implies that the data collection methods are robust enough to provide similar results if the study was repeated. The reliability testing of the questionnaires in this study is described below (p98).

In this study the survey methodology employed takes the form of questionnaires rather than interview format. Questionnaires are a very common method of quantitative data collection in social and health research. They comply with the requirements of quantitative research in that they are predetermined, standardised and structured (Parahoo 2006). As a convenient data collection method they enable the collection of a very large amount of data from respondents in a widespread geographical area. Additionally questionnaires allow for the collection of demographic data along with data on the subject being investigated. For these reasons the use of questionnaires in this research was appropriate. The advantages and disadvantages of questionnaires in research studies will be discussed in the next section.

4.1.2. Research Instruments

Three questionnaires have been used to collect quantifiable data:

- A nurse questionnaire (Appendix A)
- An organisational profile questionnaire (Appendix B)
- A patient satisfaction questionnaire (Appendix C)

As the study aims to identify factors which enable the delivery of safe patient care by nurses, the nurse questionnaire used is of primary importance. Included in the nurse questionnaire are variables which would be used in analysis as nurse-reported patient safety outcomes. Also it enables measurement of the impact of various nurse factors on the identified patient outcomes. Relevant variables can be aggregated to ward level also in order to establish the influence of the ward cluster on the outcomes. In addition to the nurse questionnaire an organisational (or hospital) profile questionnaire has also been employed. The organisational questionnaire is necessary in order to elicit information about hospital level factors which may impact on patient safety outcomes. Thirdly a

patient satisfaction questionnaire is included to extend the patient safety outcomes used in the study beyond nurse-reported outcomes to direct patient reported satisfaction with care received. As the greater amount of data is likely to be obtained through the larger nurse survey, this will be used primarily for study analysis; however variables can be imported from the other surveys into the nurse data in order to examine their impact on nurse-reported outcomes.

4.1.2.1. Questionnaires

The accuracy of the data collection tools to measure whatever is under investigation and consistently reproduce results is fundamental (Topping 2006). Drawing accurate conclusions in a descriptive study is dependent on the collection of complete and believable data (Houser 2008). Questionnaires are frequently used in quantitative research as they offer a stable, consistent and uniform data collection technique (Sarantakos 1993). They are a convenient method of data collection for the researcher and respondent alike. The main advantages of questionnaires are that they can reach large numbers, are structured and predetermined, yielding data in identical format from respondents (Parahoo 2006 and Houser 2008). Using questionnaires, the researcher tries for as large a sample as is feasible to reduce sampling error, and in doing so amasses a large amount of data (Knapp 1998). For the researcher, the uniformity and consistency of the questionnaire is central. For the respondent, a questionnaire can be completed in their own time with fewer pressures than an interview situation. Self completed questionnaires, where no identifiers are sought, are reassuring for the respondent concerned about anonymity. They also avoid any potential interviewer bias.

Some of the features which make questionnaires popular in quantitative research can also be seen as drawbacks to this method of data collection. The objective and uniform methods of a questionnaire do not allow for clarification of issues or responses. Responses must be taken on face value. The fact that questionnaires can be completed in the respondent's own time means that the researcher cannot be certain of the conditions under which the questionnaire was answered (Sarantakos 1993). Hinkin and Holtom (2009) suggest that a lack of time to complete the survey will also impact on response rates. Partial response is possible also where sections are left out with the intention of returning to them and this can result in non response to some sections. The closed question design of many questionnaires limit responses, and as sections of questionnaires can be answered in any order by the respondent, this may also impact on the responses given (Sullivan-Bolyai and Bova 2010). Knapp (1998) suggests that with very large amounts of data true causal relationships can be difficult to establish.

Houser (2008) points out that researchers using this data collection method are dependent on the honesty of the respondents. She is supported by Sullivan-Bolyai and Bova (2010) and McKenna, Hasson, Keeney (2006) who assert that the possibility exists that some respondents may give socially acceptable answers rather than their true responses. Such social desirability is less likely to be a problem when using anonymous self completion questionnaires (Fowler 2002). Parahoo (2006) highlights the opportunities for conferring with others presented by questionnaires as a means of data collection. Hinkin and Holtom (2009) outline many drivers which impact on the respondent's willingness and ability to take part in survey research. These include relevance, organisational response to previous research, managerial and co-worker influences, survey characteristics and workload.

Response rates to questionnaires can be boosted by several considerations. Fowler (2002) highlights that attention must be paid to those who choose not to respond. He cautions researchers to consider if demographic differences exists between the group of non responders and that of the responders. This is difficult to ascertain, but establishing that the responders' demographics fall within expected norms may highlight any obvious exclusions. He suggests that consideration must be paid to questionnaire design in order to boost response rates. Edwards et al (2002) demonstrate through systematic review that response rates tend to be higher to shorter questionnaires. Murphy-Black (2006) supports this by advising researchers to ask only what is needed to answer the research questions and advises that shorter questions or statements are also likely to yield better results. Such a format is likely to encourage respondents to follow the order rather than skip between sections (Sarantakos 1993). Edwards et al (2002) agree that a questionnaire handed out personally may improve response rates as the respondent connects the questionnaire to an individual. Later in this chapter (p86 below) the components of this study's questionnaires are outlined. Additionally data collection procedures are described.

4.1.2.2. Instruments included in questionnaires

Within questionnaires when multiple items or statements are used to measure a single concept such as burnout and the scores are combined to obtain an overall score, this instrument is known as a scale (Sullivan-Bolyai and Bova 2010). The Likert scale was developed in 1932 and takes the form of a group of statements with a set of responses constructed around a continuum of agreement/disagreement to which subjects are asked to respond (Edelmann 2000). A Likert scale measures attitudes, beliefs, opinions, values

or views. It usually comprises both positive and negative statements, arranged in random order to avoid people repeatedly ticking the same box (Parahoo 2006).

Such scales have been criticised because total scores arrived at when there are many diverse items, may not have any real meaning (Sarantakos 1993). Factor analysis of such scales is a means of refuting this criticism. Scales are frequently divided into subscales which are summed to demonstrate responses to various components of a concept rather than the overall concept. Edelmann (2000) describes further difficulties with scoring in Likert scales where the same total score can be arrived at from different combinations of answers. Thus the same total score does not necessarily mean the same thing. However as a scale seeks to find an individual's overall response to a valid construct, it is the score, not how it was achieved, that is important.

Likert-type scales are sometimes used. In appearance they are similar to Likert scales but often each item can be treated individually rather than getting a total score which is more often the case in a true Likert scale (Parahoo 2006). Both scale types are relevant to the nurse questionnaire used in this research.

4.1.2.3. Study questionnaires

In this section the details of each of the three study questionnaires are outlined.

The nurse questionnaire (see Appendix A)

This questionnaire is based on the version used for the International Hospital Outcomes Study (IHOS) (Sochalski et al 1997, Sochalski and Aiken 1999, Clarke and Aiken 2008). The nurse questionnaire in this research includes nurse reports on aspects of work-life including experiences at work, burnout, job satisfaction, intention to leave.

Nurse perceptions of safety and quality of care, work left undone, and adverse incident occurrence are also included. However an additional section has been added for the purposes of this study. The questionnaire is made up of the following sections.

A. About your job

- The Practice Environment subscale of the Nursing Work Index Scale (PES-NWI) (Lake 2002) was included in this section. This scale contains five subscales as follows: Nurse Participation in Hospital Affairs, Nursing Foundations for Quality of Care, Nurse Manager Ability, Leadership and Support for Nurses, Staffing and Resource Adequacy, and Collegial Nurse-Physician Relationships. Also contained in this scale were four items which are additional to those used in the original use of the scale. These items are all similar in content to those contained in the scale measuring Nurse-Physician Relationships. The validity and reliability testing of this scale is described later in this chapter.
- The Maslach Burnout Inventory is also included in this section. This scale contains three subscales as follows: Emotional Exhaustion, Depersonalisation and Personal Accomplishment. The validity and reliability testing of this scale is further discussed later in this section.
- Also included in this section are further individual items relating to job satisfaction, intention to leave and recommending the hospital to others.

B. Quality and Safety

- Included in this section of the nurse questionnaire are items relating to perceptions of quality and safety

- Also included are Likert-type scales relating to opinions on safety issues and incident occurrence. A group of seven items are drawn from the larger Hospital Survey on Patient Safety Culture (Agency for Healthcare Research and Quality 2007)

C. About your most recent shift at work in this hospital (workload)

- This section includes items relating to hours worked, workload and colleagues
- Also items relating to non-nursing work and work left undone.

D. About You

- This section contains demographic details including gender, age, nurse education, fulltime status, years worked.

E. Additional questions

- This section includes two global items on empowerment from the University of Western Ontario Work Empowerment Program (Laschinger 2006)
- Item to measure nurse attendance at in-service safety training
- Items on adverse event reporting including three questions relating to frequency of events reported taken from the Hospital Survey on Patient Safety Culture (Agency for Healthcare Research and Quality 2007)

Organisational Profile Questionnaire (see Appendix B):

The organisational profile is made up of questions related to the following:

- Hospital designation (university and activity)
- Status as a referral centre (national or regional)
- Inpatient/outpatient numbers in one year
- Annual expenditure in last year
- Bed numbers and occupancy rates

- Staff numbers and turnover
- Sick leave rates
- Workforce planning approach used
- Staff training provision

An additional section related to quality and safety has been added to the core questionnaire. These are added to measure the interventions at hospital level to address some of the more established requirements of patient safety. The items included examine the following:

- Quality and safety roles in the hospital
- Provision of related in-service training for staff
- Hospital approach to adverse incident reporting.

Patient Satisfaction Questionnaire (see Appendix C):

The patient satisfaction questionnaire used in this research comes from the US based Hospital Consumer Assessment of Healthcare Providers and Systems (2005). The questionnaire contains the following sections:

- Levels of satisfaction with care received from nursing staff
- Levels of satisfaction with care received from medical staff
- Levels of satisfaction with the hospital environment
- Levels of satisfaction with the hospitalisation experience
- Levels of satisfaction with discharge preparation
- Overall rating of the hospital
- Overall personal health rating
- Education level of respondent.

4.2. Study considerations

In this section the validity and reliability of the data collection tools are outlined. Ethical considerations of the study and sampling strategies are reported.

4.2.1. Validity and Reliability of data collection instruments

Reliability is the degree to which an instrument measures a concept or its attributes consistently (Carter and Porter 2000). A method is reliable when it produces similar results when used repeatedly (Lacey 2006), even by different researchers (Sarantakos 1993). It is empirical in nature and reliability can only be demonstrated through empirical verification (Knapp 1998). A reliable instrument or questionnaire is one which can produce the same results if the construct (or concept) is measured again (Murphy-Black 2006, LoBiondo-Wood and Haber 2010). High reliability reduces the chances of random error occurrence during data collection. Random errors are unsystematic and can result from issues related to the context of the study or personal issues with the respondent (LoBiondo-Wood and Haber 2010). Ideally, a questionnaire can be deemed reliable if it is administered several times to large groups and if the results are analysed demonstrating agreement (Knapp 1998, Murphy Black 2006, Parahoo 2006). This test retest method tests the stability of the instrument. This method of reliability testing is not always possible or appropriate and in these cases another means of determining reliability must be used.

Other than stability, there are two other attributes of reliability: homogeneity (internal consistency), meaning that all the items in the instrument measure the same concept or characteristic, and equivalence, meaning an instrument will produce the same results as an equivalent instrument (Carter and Porter 2000, LoBiondo-Wood and Haber 2010).

All of these attributes are concerned with the degree of consistency and they are often expressed in terms of a correlation coefficient (LoBiondo-Wood and Haber 2010).The range for this is between 0 and 1. A level of 0.7 or higher is considered to be an acceptable level of reliability. The most common test of internal consistency is Cronbach's Alpha. This is used for items where there is no right answer (Murphy-Black 2006).This test simultaneously compares each item in a scale with the others to check for consistency (LoBiondo-Wood and Haber 2010 and Sullivan-Bolyai and Bova 2010). When the result is above 0.7 (LoBiondo and Haber 2010) this is seen as evidence to support the internal consistency or homogeneity of an instrument. If the intercorrelations between pairs of items is high, this demonstrates high item to item internal consistency (Knapp 1998).

Validity is concerned with minimising the occurrence of systematic error (LoBiondo-Wood and Haber 2010). Systematic error can occur if relatively stable characteristics of the population bias their responses (such as education level) or cause incorrect instrument calibration (such as social desirability as previously discussed). As such wide scale social desirability in responses can have the effect of the instrument not measuring what it was intended to measure. If this is suspected it might be necessary to revisit and adjust the instrument.

Achieving validity is a principle of research in the social sciences (Sarantakos 1993). Internal validity is described as the extent to which the questionnaire measures what it was intended to measure (Sarantakos 1993, Murphy-Black 2006, Topping 2006). The validity of a questionnaire can be checked in a number of ways. Content (face) validity takes place when a group of experts in the discipline in which the questionnaire is to be

used examine the instrument to make a judgement on how well it measures what it was intended to measure (Knapp 1998). Ultimately a judgement must be made regarding content or face validity (Carter and Porter 2000). Content validity ensures irrelevant questions are removed and that the meanings are clear (Parahoo 2006).

Construct validity refers to how well the questionnaire or the scale within the questionnaire measures a particular construct (e.g emotional exhaustion). It aims to "validate a body of theory underlying the measurement by testing of the hypothesized relationships" (LoBiondo-Wood and Haber 2010, p290). Construct validity can be established using different methods. One of the most common is Factor Analysis. Factor analysis gives the researcher an indication of the extent to which a set of items on a scale or questionnaire measures the same underlying construct (LoBiondo-Wood and Haber 2010). Factor analysis is carried out to look at relationships between items in the same scale. It is used to establish the existence of subscales which measure related contructs individually, but taken together are part of the overall scale. In some cases the subscale scores within a scale are more useful than the overall score. Exploratory factor analysis is carried out in this study.

External validity is connected to the generalisability of the research. In quantitative research this is often related to sampling issues (strategy and size) and response rate. Respondents to a questionnaire must be truly representative of the total population. Attention should be paid to demographics of responders and non-responders. Scales within questionnaires should have evidence of reliability and validity so the researcher can be confident that the findings reflect what was intended to be measured (Sullivan-Bolyai and Bova 2010). Previously validated questionnaires or scales have advantages

when used in research as they can be relied upon to a greater extent and greater comparisons can be made with results, but they should be tested for use within the new population (Murphy-Black 2006). This is discussed later in this chapter in relation to the current study.

4.2.1.1 Validity and reliability of the nurse questionnaire

In this section both previous validity and reliability testing carried out on the nurse questionnaire, or the instruments contained in it is outlined. Additionally, testing carried out as part of this study is outlined.

A pilot study conducted by Bruyneel et al (2009) examines the predictive validity of the nurse questionnaire as used in the IHOS for the RN4CAST project. It has been found to be robust and psychometrically sound. Associations have been confirmed between nurse-perceived outcomes and the following nurse work environment factors: nurse-physician relationships, staffing and resource adequacy and nurse manager leadership and support. A one-point increase in the rating of the nurse-physician factor is associated with an increase in the odds of reporting high job satisfaction and excellent nurse-perceived quality of care of 2.5 and 4-fold respectively. A similar increase is seen with a one-point increase in the rating of staffing and resource adequacy. This questionnaire is the core questionnaire used in this study.

The nurse questionnaire has undergone Content Validity Indexing when a group of eight practising nurses in Ireland checked its contents for use in an Irish context. Content Validity Indexing does not simply ensure a level of agreement from the panel of experts, but calculates an index of inter-rater agreement or relevance to the subject

matter (Lo Biondo-Wood and Haber 2010).It is a process whereby independent expert raters evaluate the content of the questions asked in a survey (Houser 2008, Lo Biondo-Wood and Haber 2010). Raters score each item on a 1 to 4 scale, with 1 = not relevant and 4 = highly relevant. The raters in this case were asked to rate the questions in relation to relevance to their workplace and therefore to nurses in medical and surgical units in Ireland. Accuracy is dependent on the competence of the raters in the subject matter (Houser 2008) so the raters were 8 nurses who work in hospitals in Ireland. These volunteers comprised a convenience sample, identified through personal contacts. They completed the survey rating process online and anonymously in September 2009. The scores were then aggregated and analyzed for chance agreement between raters. The CVI rating indicates the extent to which the instrument will measure what it is intended to measure and the likelihood that the data collected will reflect the context under analysis. Commonly a CVI rating of 0.78 to 1.0 is deemed acceptable (LoBiondo-Wood and Haber 2010). For Irish nurses the CVI rating on the Practice Environment Scale has been found to be 0.79 and for the Maslach Burnout Inventory the CVI IS 0.64 (possible range 0-1, lowest to highest). Possible reasons for the lower result achieved by the MBI are explored later in this section.

4.2.1.2. Nursing Work Index Practice Environment Scale

The nurse work environment has been linked to patient safety outcomes in previous work as described in the literature review section of this work (p51 above). Within this study the work environment of nurses is measured through the inclusion in the nurse questionnaire of the Nursing Work Index Practice Environment Scale (NWI- PES) as used in the IHOS (Sochalski et al 1997, Sochalski and Aiken 1999, Clarke and Aiken 2008). Much of the research in which the NWI, or later derivatives of the original tool

has been used, can be found in the literature review chapter of this work (p51 above). This section contains an overview of its previous uses, and the validity and reliability testing which has been carried out on the tool to date.

The original NWI was developed by Kramer and Hafner (1989) from the findings of earlier Magnet Hospital research. This original study highlights 41 United States hospitals which nurses identified as good places to work (McClure, Poulin, Sovie and Wandelt 1983).The original 65 items included in the NWI, were derived from the organisational traits reported by the magnet hospital nurses as characteristic of their work environments. A Likert scale enabled respondents to score each item by indicating their level of agreement (from strongly agree to strongly disagree) that it was a feature of their workplace.

Criterion-related validity was demonstrated at this time through correlations between job satisfaction and turnover rates. The writers theorised that the best indication of job satisfaction was low turnover rates and, with this in mind, correlated the mean satisfaction scores with the turnover rates arriving at r =.95. Within hospitals, high correlations were demonstrated between quality of care and job satisfaction (r = .89 - .95, p = >.001). Face validity was demonstrated through assessment by three of the original four magnet study researchers, and content validity through its development from the magnet hospital characteristics as identified by nurses within those hospitals.

In the 1990s a research team at the University of Pennsylvania headed by Linda Aiken used the NWI to measure organisational traits of hospitals (Aiken et al 1994, Aiken Sloane and Lake 1997, and Aiken, Sloane, Lake, Sochalski and Weber 1999). This

innovative use of the NWI is key to all subsequent use of the tool. The unit of analysis in this case was no longer the nurse but was the clinical unit or hospital. The researchers took the approach that nurses in direct care would be able to accurately report on organisational attributes. This is a valid means of examining organisational traits (Aiken and Hage 1968). In this case reliability is demonstrated when consistency is demonstrated across a group of nurses responses (in a unit or hospital) to a particular item. Reliability is increased by increasing the number of respondents from each unit and hospital.

The NWI was adapted for use by the University of Pennsylvania research team (Aiken and Patrician 2000) to become the Revised Nursing Work Index (NWI-R). Kramer and Hafner (1989) in their research using the NWI had used three statements, two of which were value statements, asking nurses to rate each items importance in terms of job satisfaction and patient care. These value statements were eliminated by Aiken's team and the statement "this factor is present in my current job" was retained. The number of items was reduced and three subscales were derived from the NWI-R as characterising a supportive professional practice environment (autonomy, control over work environment and relationships with physicians). The relevance of these concepts to the nurse practice environment was supported by an extensive literature review.

The reliability of this tool was outlined by Aiken and Patrician (2000). They believed the representativeness of the tool was increased by asking all nurses in the unit to take part and by encouraging a high level of participation. Reliability in this instrument moves from consistency across items within the NWI to consistent responses from groups of nurses at either unit or hospital level. Aiken and Patrician (2000) also

recommend that the heterogeneity of the respondents must be accounted for by controlling for variables such as age, race, education levels etc. The stability of the NWI-R has been demonstrated through repeated use of the tool by both Aiken's team and others with no significant differences found in subscale scores. The Cronbach's alpha scores for the tool as a whole has been reported as 0.96 (Aiken and Patrician 2000) and after aggregation of individual nurse scores within units the Cronbach alpha scores for the three subscales was greater than 0.84 in all cases.

Criterion validity of the NWI-R was supported by correlations which demonstrate that it distinguishes between organisational types i.e. higher subscale scores in hospitals known to be good places for nurses to work. Differences in burnout levels can be explained by differences in organisational or unit form (Aiken and Sloane 1997b). Caution is advised as certain items on the NWI-R refer to unit sensitive issues (such as those which refer to unit management or care planning and delivery) and some to organisational issues (for example those which refer to the chief nursing officer or hospital governance issues). For those items which are measuring unit traits, if the intention is to study units it would be inappropriate to calculate global scores (Aiken and Patrician 2000).

Further work on the NWI was later described by Lake (2002) a member of the University of Pennsylvania team. In this work five subscales were identified to measure the practice environment of hospital nurses. Lake worked with two sets of data: the first was that collected by Kramer and Hofner (1989) between 1985-1986 in 16 magnet and eight non magnet hospitals, and the second was collected by Aiken et al (2001) in 1999 in Pennsylvania. The subscale development went through five stages as described by

Lake (2002). Forty-eight items from the original 65 items were selected as they were relevant to the nurse practice environment. Lake (2002) describes the details of the factor analysis used to extract the subscales. These were then rotated to enhance interpretation and the most robust subscale structure was tested for validity, reliability and generalisability. Thirty one items were retained over five subscales and these subscales demonstrated high reliability at both individual and hospital level.

Table 4.1 Reliability testing carried out by Lake (2002)

Subscale name	**Cronbach's Alpha**
Nurse participation in hospital affairs	.83
Nursing foundations for Quality of Care	.80
Nurse manager ability, leadership and support for nurses	.84
Staffing and resource adequacy	.80
Collegial nurse-physician relationships	.71
Composite	.82

Lake (2002) suggested the lower scoring of the subscale "Collegial Nurse-Physician Relationships" may be as a result of this scale containing only three items. This is supported by Field (2009) who suggests that either too many items or too few items in a scale can impact on the Cronbach's Alpha score achieved. Lake (2002) suggests augmenting the scale with additional statements. The version used in this study has additional items (Li et al 2007) which relate to the relationship between nurses and physicians.

The reliability of the hospital level measures were found to be robust: average inter-item correlation was found to be 0.64- 0.91(should exceed 0.6) and the intraclass correlation was found to be 0.88-0.97 (should exceed 0.6). Lake (2002) suggests that differences between magnet and non-magnet hospital nurses mean scores demonstrate the validity of the subscales and composite. She asserts that the reliability and validity of the

resulting NWI designed to examine practice environments (PES-NWI) is a sensitive tool for detecting differences in nursing practice environments.

The NWI has been evaluated by other researchers with less positive findings. Slater and McCormack (2007) in their UK-based study which set out to examine the factor structure of the 15 item NWI-R, failed to replicate it. These 15 items were identified by Aiken as four conceptual factors in previous studies (Aiken and Patrician 2000). However it is important to note the sample size in Slater and McCormack's work was comparatively very small (342 nurses in one hospital site). They obtained a 50% response rate (172 nurse respondents). They used all grades of nursing and did not confine it to those in direct care. While they failed to replicate the four factor structure identified by Aiken's team originally, they did identify a three factor structure using the 15 items. Interestingly these are very close to three of the factors identified earlier by Lake in the PES-NWI. Cummings et al (2006) examined the foundations of three instruments based in the NWI including the NWI-R and the PES-NWI. They found questions could be raised about the validity of the instruments when the published details from previous work were used to reconstruct the measurement models. They were then estimated using structural equation modelling, the chi-square test of model fit, and Canadian nurse data from 1998. A lack of model fit resulted from their work.

Boyle (2004) in her study in the US used the NWI-R at unit level, rather than at hospital level as used by Aiken's team. Her research examined the relationship between specific unit characteristics and adverse events. Factor analysis carried out by Boyle did not confirm the three subscales identified by Aiken, rather she identified four categories, only one of which was the same as Aiken's. She suggests the difference in factor items

may be a result of Aiken's team using a conceptual method to define Magnet characteristics rather than factor analysis.

4.2.1.3. Maslach Burnout Inventory

Much has been written about burnout levels in caring professions. In recent work the burnout level of nurses has been linked to adverse outcomes for patients. Workplace burnout has been described as a psychological syndrome in response to workplace stressors and is associated with professionals who do "people work" (Maslach, Schaufeli and Leiter 2001). Three key dimensions of workplace burnout were identified in the 1980s by social psychologist Maslach as exhaustion, feelings of cynicism or detachment and a lack of accomplishment (Maslach, Jackson and Leiter 1996). Burnout research began in professions where a core element is the relationship between the provider of the service and the recipient. The scale most widely used by researchers is the Maslach Burnout Inventory (Maslach and Jackson 1981). The Maslach Burnout Inventory (MBI) utilises the three dimensions of burnout within its three subscales: Emotional Exhaustion (EE), Depersonalisation (DP) and Personal Accomplishment (PA). The 22 item MBI is included in the nurse questionnaire utilised in this study. This inclusion will enable analysis of the impact of burnout levels of Irish nurses on patient safety outcomes. This section contains a brief overview of validity and reliability testing which has been carried out on this commonly used tool.

The development of the MBI is described by Maslach and Jackson (1981). Many of the original 25 items included in the scale were derived from earlier exploratory studies around the issue of burnout in the 1970s. Interview and questionnaire data collected during these studies was used to construct the scale. The items take the form of

statements about feelings or attitudes. In its original form respondents were asked to respond to the statements on two scales: one measuring frequency (ranging from "never" at 0 to "everyday" at 6), and one measuring intensity of feeling (from mild to very strong). In many subsequent studies, including this research, only the frequency scale is utilised. It has been found to be the most robust.

The EE subscale describes respondents' feelings of depletion due to their work. It is a nine item subscale. The PA subscale describes self achievement and contains eight items. The DP subscale contains five items and measures a detachment towards recipients of care. Numerical cut-off points are outlined in the MBI Manual (Maslach et al 1996), however as Schaufeli et al (2001) point out these cut-off points were developed through an arbitrary process. The authors divided the normative sample into three equal sized groups. The MBI Manual does not claim the scale to be a diagnostic tool for workplace burnout, but suggests that it enables comparison. Doran (1987) suggests that rather than using it to classify individuals as "burnt out" or "not burnt out", it enables them to be placed on a continuum of "more burnt out" to "less burnt out". The following table outlines the scoring procedures for using the MBI.

Table 4.2 Scoring for MBI

Maslach Burnout Inventory Scoring	**Low**	**Medium**	**High**
Emotional Exhaustion (EE)	0-16	17-26	≥27
Depersonalisation (DP)	0-6	7-12	≥13
Personal Accomplishment (PA)	0-31	32-38	≥39

On both the EE and the DP subscales higher scores correspond to higher burnout. Maslach and Jackson (1981) found a weak-moderate correlation between the subscales (0.44). This they suggest is to be expected from separate but related subscales. Lower scores on the PA subscale correspond to higher levels of burnout. Low correlations

between this subscale and the other two (-0.17 and -0.28) support the separate nature of the subscales. However the very low scoring does call into question if the subscales are all reflective of the same construct – burnout. The reliability of the MBI is described originally by Maslach and Jackson (1981). Internal consistency was estimated by Cronbach's coefficient alpha using a sample (n=420) of workers from the following groups: nurses, teachers, social workers, probation officers, counsellors and others. The coefficients for the frequency scale are as follows:

4.3 Reliability of MBI (Maslach and Jackson 1981)

MBI	**.83**
EE	.89
PA	.74
DP	.77

In test-retest reliability tests, separated by 2-4 weeks, the coefficients obtained were as follows: EE (.82), PA (.80) and DP (.60). The sample (n=53) used in this case was made up of graduate students in social welfare and administrators in a health agency.

Validity tests run before the publication of the Maslach Burnout Inventory are described by Maslach and Jackson (1981). An individual's MBI scores were correlated with behavioural ratings made by co-workers or knowledgeable observers (family members). The co-worker ratings were carried out on a group of mental health workers. The co workers ratings correlated well with individual's scores for both the EE and DP subscales. No significant relationship was shown between co-workers ratings and the individual scores for PA. The family member ratings were collected from the spouses of a different group. This time 142 policemen and their wives were surveyed. When rated by a family member a correlation was demonstrated between high scoring PA and

positive behaviour on coming home from work. Validity was also demonstrated by the confirmation of hypotheses. Policemen who scored higher on the EE scale were rated by their wives to come home upset or anxious. Those who scored higher on the PA scale were noted to come home cheerful and happy. Maslach and Jackson (1981) also showed that those who are more burnt out are less satisfied with the opportunities available to them within their jobs and more likely to leave. They reject that burnout is simply a synonym for job dissatisfaction. They compared the scores of 91 social service and mental health workers on the MBI and their responses regarding job satisfaction. Job satisfaction had a weak negative correlation with EE ($r=-0.23$, $p<0.05$) and DP($r=-0.22$, $p<0.02$) and weak positive correlation with PA ($r=0.17$, $p<0.06$). They suggest that as less than 6 percent of the variance is accounted for by any one of these correlations, the idea that burnout is a synonym for job dissatisfaction can be rejected.

The MBI has been shown to perform similarly in different countries (Poghosyan, Aiken and Sloane 2009). In this eight country study Cronbach's alphas higher than 0.7 for all subscales were obtained in all countries. The EE subscale is generally shown to be the most robust (Kalliath et al 2000, Densten 2001, Vahey et al 2004). The statements on depersonalisation (DP) have come in for some criticism in non –American studies (Kristensen et al 2005) when they refer to treating people as objects or not caring about them. Kristensen et al (2005 p195) in a pilot study using 70 human service workers asked the respondents to note any questions which they found difficult to answer. The DP subscale caused negative reactions from respondents. Some statements in the PA subscale were noted to be "very American" and "would never function in Denmark" (p195). This suggests that cultural differences may make these statements unworkable outside of the US.

Schaufeli and Van Dierendonck (1995) speculate that Americans respond more extremely to the MBI than other cultures. They suggest that this might be a result of the very high emphasis on personal achievement in American society, causing burnout symptoms to be felt more acutely by Americans than by respondents from countries where the emphasis on personal achievement is less. American respondents have been shown to have higher burnout scores than Dutch respondents (Shaufeli and Van Dierendonck 1995). This difference has also been seen in other European studies including an Irish study (Doran 1987). The use of national norms is frequently advised. Maslach, Schaufeli and Leiter (2001) acknowledge these cultural differences but do not accept that these differences account for variation in burnout scores.

Content Validity Indexing was carried out on the nurse questionnaire as previously described. The Maslach Burnout Inventory overall score was lower than the normally accepted range (0.78-1.0) at 0.64 (possible range 0-1, lowest to highest). This may be a reflection of difficulties experienced by non-American nurses with the language used in this scale.

4.2.1.4. Safety Culture Scale

A group of seven items are included in the quality and safety section of the nurse questionnaire which were drawn from the larger Hospital Survey on Patient Safety Culture (Agency for Healthcare Research and Quality 2007). The group of items was presented in the questionnaire as a Likert-type scale relating to nurse perceptions on the culture of safety. Factor analysis was carried out within the study on these items which

came from different sections of the larger AHRQ questionnaire. The factor analysis process will be reported on in Section 5.2.5.5.1. p155 below.

4.2.1.5. Patient Satisfaction Questionnaire

The patient questionnaire used in this study is routinely used in the US by the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHPS 2008). In the US the HCAHPS (*Hospital Consumer Assessment of Healthcare Providers and Systems*) survey is the first national, standardized, publicly reported survey of patients' perspectives of hospital care. It is a tool which sets out to measure patients' perceptions of their hospital experience. It enables comparisons to be made locally and nationally. The questionnaire contains core questions regarding the patients' perceptions and overall experiences. Education level is the only demographic item required in the questionnaire used in this study. In the US this questionnaire is given to patients following discharge from hospital. Respondents in the current study were inpatients with at least three nights experience in the hospital. However it was not piloted for use with Irish patients. During data collection the researcher was present as the questionnaire was being completed in all cases and any queries or misunderstandings regarding the content of the questionnaire were addressed directly.

4.2.2. Ethical considerations and procedures

Ethical considerations were of principal importance through all phases of the study. As with all research projects adherence to ethical principles was essential. The International Council of Nurses (2003) recommends adherence to ethical principles for researchers. These include beneficence and confidentiality. However the risks to participants in survey based research are acknowledged as minimal (Fowler 2002), and often

participants are pleased to have contributed to data collected. It was not anticipated in this study that any of the questionnaires could cause distress for the participants. An anticipated benefit of the study was the collection of empirical data on a subject about which little work has been done in Ireland to date. No adverse effects were anticipated through participation in the research as confidentiality was guaranteed. No hospitals, nurses or patients were to be identified in reports of the study and all nurse, ward, hospital identifiers were removed. The cover letter which accompanied the nurse questionnaire clearly explained that by submitting the questionnaire the nurse was giving consent for the data to be used by the researchers. It also explained that withdrawal was possible at any time and researcher contact details were supplied (see Appendix A). In the instructions supplied with the patient questionnaire participants were clearly told that participation was optional and that completion of the questionnaire implied consent for data to be used as part of the study. No patient identifiers were gathered. Respondents to the questionnaires received no benefits, financial or otherwise.

Ethical approval for the study was obtained from Dublin City University Research Ethics Committee. Following this eighteen research committees were approached seeking ethical approval to conduct the study. These committees cover all eligible hospitals. Approval for the study was obtained in all cases (see table 4.5 below) although the process varied greatly in many cases. As demonstrated in the table some Research Ethics Committees (REC) accepted applications for more than one hospital site. These groupings were based on Health Service Executive (HSE) regional groupings or hospital groupings. Some of these hospitals had additional local procedures which either preceded or followed the application to the REC. Other

hospitals had a local REC only and separate applications were prepared for all of these. In the case of two hospitals involved in this research the application was considered by Nursing Research Access Committees. However in one of these cases it was an additional step in the process after an application to the main REC.

Patient information leaflets were adjusted to reflect changes recommended by committees. The process of obtaining ethical approval to conduct the study in all 30 hospitals took over nine months. As demonstrated in Table 4.4 the length of time for this process varied between 1.5 weeks and twenty six weeks.

Table 4.4. Summary of Ethics Procedures

Hospital ID	Access required Prior to application		Application to Research Ethics Committee		Chair-person's Approval	Access following approval		Weeks from 1st application or access contact to Final ethical approval
	General manager / CEO	Director of Nursing	Regional or group	Hospital		General manager / CEO	Director Of Nursing	
A			**X**				X	4
B			**X**				X	4
C			X				X	4
D			X				X	4
E	X	X	X				X	7.5
F	X	X	X				X	7.5
G	X	X	X					7.5
H	X	X	X					7.5
I			X				X	13 (clarification required)
J			X				X	13 (clarification required)
K			X				X	1.5
L			X				X	1.5
M			X				X	1.5
N			X				X	1.5
O			X					26
P			X	X		X		26
Q			X					26
R		X	X		X		X	11.5
S	/	X	X	X (nurse committee)				20
T				X	X		X	4
U		X		X			X	5
V	X			X			X	6
W				X			X	2
X							X	10.5
Y	X	X	X				X	26 (new application required)
Z			X		X		X	1.5
VV				X				6.5
WW	X	X						2
YY			X					6
ZZ				X	X			2.5

*****Shaded areas indicate groupings where applicable

4.2.3. Sampling

The generalisability of quantitative research is linked to the sampling methods utilised in the research and to the response rates obtained (Knapp 1998). The sample size chosen from the population to be studied and the methods used to generate the sample are important when discussing the generalisability of the research. It is widely acknowledged that random sampling yields results in quantitative research which are more generalisable than other sampling methods (Bryman 1989, May 1997). However in this study purposive clustered sampling is to be used. The units and nurses in this research form clustered samples within hospitals as described by Bryman (2004), Sarantakos (1993). Bryman (1989 p116) acknowledges that sometimes a non-random sample is preferable to a random sample such as in studies where the researcher seeks to emphasize "certain facets of the broad domain". In this study the impact of the ward on patient safety outcomes is of primary interest. Cluster sampling is frequently used when subjects form natural groups (Houser 2008) such as nurses in hospitals. Significant consideration should be given when using cluster sampling techniques in research as to whether its use is justified in each case (Haber 2010). In this case clustered sampling offers advantages for analysis by enabling unit level analysis. The disadvantage of such non random sampling can be reduced through increasing sample size (Procter and Allan 2006). To this end great effort has been made to maximise the nurse response at unit level.

All acute general hospitals in Ireland were invited to participate in this study. Non acute hospitals were not included. The inclusion of acute hospitals only would enable comparison with similar studies in acute hospitals internationally. As the total number of acute hospitals in Ireland is 31, it seemed prudent to invite all to participate in order

for results to be generalisable across the sector. Only general medical and surgical units within the participating hospitals were included. This provided standardised data for the analysis of the effect of the ward cluster. Aiken (1997) describes the unique environment found in specialised units and it is likely that inclusion of specialised units in this study may have impacted on ward level data and therefore made the results less generalisable. All the hospitals which gave ethical approval for the study and access to nurses, patients and wards were included. The process of obtaining ethical approval is outlined above in section 4.2.2.

A convenience sample of between two and four wards per hospital was chosen. Four wards per hospital where possible, would enable adequate analysis of differences between wards in the same hospital. In some cases this resulted in all general medical and surgical units being used in some hospitals, however in others decisions were taken about unit choices in conjunction with the hospital management. In smaller hospitals four general wards were not available for the study and therefore either two or three wards were used.

Generalisability is also linked to response rates. Nurse response rates from wards to the nurse questionnaire are important to the study. If random sampling of units within hospitals or of nurses nationally was used, the response rate from any one unit or hospital may not be adequate for thorough analysis. There is widespread use of purposive or convenience sampling in research conducted in organisations as opposed to random sampling (Bryman 1988, Bryman 1989, Hinkin and Holtom 2009). A researcher focus on increasing response rates in non random samples is acknowledged

to be beneficial in reducing the limitations of such techniques (Hinkin and Holtom 2009).

Representativeness as an essential element in quantitative research dictates that the sample is chosen so that it represents to a high degree the population it represents (Sarantakos 1993). Such representativeness ensures that findings are applicable to the whole population being studied. Representativeness is also enhanced by increasing response rates to surveys (Hinken and Holtom 2009) and a focus on increasing response rates was a feature of this study.

4.3. Data collection procedures

A pilot study is usually required to solve any mechanical problems with an instrument (Sarantakos 1993, Gerrish and Lacey 2006). Its purpose is to check if questions are likely to be widely misinterpreted and to check the surveys feasibility (Houser 2008, Lobiondo Wood and Haber 2010). The instruments used in this study were not subject to a pilot study, due to their previous validation procedures as described above (p98). The nurse questionnaire in its current form has been used extensively and successfully elsewhere, specifically in the International Hospital Outcomes Study (Aiken et al 2001a). The Nursing Work Index was used previously within an Irish context (Flynn and McCarthy 2007) and was found to be a useful measurement of the nurse work environment in an Irish context. In addition the Content Validity Indexing carried out demonstrated the two major scales in the PES-NWI were applicable to an Irish context.

The organisational questionnaire was not subject to a pilot study prior to use either. However in all cases the researcher discussed the content of the questionnaire and

clarified all points during a meeting with the nominated link person at hospital level. Further details on data collection will follow in the next section.

4.3.1. Study sampling strategy and questionnaire dissemination

Thirty acute general hospitals agreed to take part in this study. This resulted in a nationwide geographical spread of hospitals, and in variation of hospital size and type. Each hospital was assigned a unique numerical identifier, as was each ward. These identifiers were used in order to enable connections to be made between hospitals and wards for analysis purposes while maintaining strict confidentiality. Each nurse questionnaire was also assigned a unique identifier which meant that although no nurse names were collected individual responses could be linked to both wards and hospitals. In ten of the study hospitals patient data was gathered in the same units as the nurse data. This enabled links to be made between patients, nurses, wards and hospitals.

The Director of Nursing in each participating hospital was contacted or met with in some cases. The director was asked to nominate a project link person from within the nurse management team. This enabled close links with those hospitals during data collection and proved particularly useful for hospitals located long distances from the researcher's base. The nominated link person was also responsible for overseeing the completion of the Organisational Profile Questionnaire. This named person strategy for completion of this questionnaire was useful when clarifications were sought at the time of data entry and analysis. The researcher visited each hospital at least once to deliver questionnaires to the units and provide information to nurses and managers. Posters were provided for display in participating ward areas and staff rooms.

Packs were created for distribution to all nurses working in direct patient care in the units selected. These packs contained a questionnaire and a cover letter introducing the project and guaranteeing confidentiality. Sarantakos (1993) states that a well thought-out cover letter can motivate the potential respondents, and may also influence response rates. Also included in the pack were contact details for the researcher and an envelope to return the completed questionnaire to a well labelled box placed prominently within the ward. The box was left on the ward throughout the data collection period and collected when either the ward manager or the link person said that all nurses willing to participate had done so. A one-page "Information for Nurses" sheet was also made available in the ward areas giving further details on the study (Appendix A). Follow up reminders letters were distributed to nurses by the link person at intervals during the data collection period and weekly phone-calls were made to the ward managers by the researcher to encourage participation.

Following completion of the nurse and organisational data collection phases, the patient survey was carried out in ten hospitals. The researcher visited each hospital for one day for data collection purposes in this phase of the research. The aim was to collect data from 30 patients in each of the ten hospitals. Patients in the study wards were approached by the researcher and asked to help with the study by completing the questionnaire. In all wards the researcher spoke with the ward manager in order to find out which patients would be able to complete the questionnaire. This convenience sampling is a limitation of the patient survey aspect of this research. It is possible that researchers were guided to approach patients who would give more favourable evaluations of the unit.

4.4. Data Analysis Techniques

Data collection for this study took place between September 2009 and May 2010 as described above. These data were analysed using SPSS version 18. SPSS is one of the most commonly used computer packages for analysing quantitative data. It is very suitable for the analysis of survey derived-data. Both descriptive and inferential analyses have been carried out on data collected through the nurse questionnaire, the organisational questionnaire and the patient satisfaction survey. In this section data analysis and data reduction techniques are outlined.

The following Table 4.5 contains a summary of the study data available for analysis. Included in the table is the source questionnaire and the level at which this data is available (nurse level, ward level, hospital level).The patient safety outcomes available to the study are also included.

Table 4.5 Data available for further analysis

Data available on:	Nurse Survey	Organisational Survey	Patient Survey
Data on Nurse characteristics (available at nurse level and unit level)	Country of nurse training, Education levels, Experience levels,		
Nursing in general wards in Irish hospitals (available at nurse level and may be aggregated to ward level)	**Nurse work and workload**		
	Patient to nurse ratio. Necessary work left undone. Non nursing work carried out. Registered nurse to other nursing care staff ratio.		
	Experience at Work		
	Nurse work environment Level of emotional exhaustion		
	Experience of Patient Safety		
	Adverse incident occurrence rate. Safety grade of ward. Number of adverse events reported. Perceived safety culture.. Perceived adverse event reporting culture Confidence management will act to resolve problems reported. Safety related in-service attendance rates.		
Organisational data (available at hospital level only)		Hospital activity levels. Hospital Safety score (Number of designated safety personnel + provision of in-service safety training + safety audit practice). Grade of Clinical Risk Manager. Total nurse to doctor ratio. Staff nurse to Non Consultant Hospital Doctor ratio. Registered nurse to HCA ratio (med and surgical).	
Patient safety outcomes (Nurse survey derived outcomes at nurse level, patient survey derived outcomes at unit level)	Nurse-reported adverse event occurrence. Overall safety grade. Number of formal adverse event reports submitted.		Patient Satisfaction with medication safety.

4.4.1. Descriptive Analysis

Descriptive analysis is an essential phase of the research process and involves the presentation of results in the form of percentages and frequencies, along with mean values and standard deviation statistics. No attempt is made to manipulate the variables at this stage, however frequently an examination of the descriptive results leads to the development of research questions or hypotheses about relationships to be tested in the next research phase (Carter 2000). The descriptive results of this study are presented in chapter 5, with the subsequent development of hypotheses in chapter 6. Inferential analysis builds on descriptive results and seeks to explore relationships between variables.

4.4.2. Further Analysis techniques

This section outlines additional analysis techniques used in this study which will be fully reported on in both chapters 5 and 6.

4.4.2.1. Inferential Analysis

In this study relationships arising from the descriptive analysis were examined using the following:

- independent samples t-tests to compare means between two groups
- one way analysis of variance to compare the mean scores of more than two groups
- correlations to describe the strength and direction of the linear relationship between variables.

4.4.2.2. Data reduction techniques

Additionally data reduction techniques were used on a group of items contained in the nurse questionnaire. This group of seven items relate to the culture of safety in the ward and organisation. Factor analysis takes a larger set of variables and reduces it to more manageable subsets by searching for groups among the intercorrelations of the set of variables (Pallant 2007, Field 2009). The seven items relating to safety culture are selected items from different sections of the much larger questionnaire entitled the Hospital Survey on Patient Safety Culture (Agency for Healthcare Research and Quality 2007). This process is reported on in chapter 5.

4.4.2.3. Multi-level modelling

In view of the clustered sampling described earlier, multi-level modelling (MLM) will be carried out in this study. Multilevel modelling is used to analyse data that have a hierarchical structure or where the data is organised at more than one level (Tabachnick and Fidell 2007, Field 2009). In this research nurses were clustered in wards which were clustered in hospitals. Different variables were available for different levels of analysis e.g. a nurse level Emotional Exhaustion variable could be aggregated to ward level, giving a ward mean for Emotional Exhaustion which could then be applied as an additional variable to each nurse in the ward. Nested data structures violate the independence assumption which is required by traditional statistical techniques (Peugh 2010). MLM takes into account that individuals who share a common environment must have more in common with each other than they do with individuals in a different environment (Kahn 2011). In this study the influence of the ward will be examined. Many researchers have linked the nurse work environment with patient safety outcomes.

This study will look at a two level model (level1=nurse level, level 2= ward level) to examine the influence of the ward on patient safety outcomes.

Prior to modelling using MLM techniques, verification is needed that the data is suitable to this method of analysis. This verification is carried out by examining the Intraclass Correlation (ICC).The ICC represents the proportion of the total variability in the outcome that is attributable to the groups. If the group (the ward in this study) has little impact on the individual (the nurse), the outcome will have high variability within the groups, making the differences between groups appear small. The ICC obtained in this case will be small. In this case analysis at the individual level is more appropriate. Therefore the value of the ICC indicates if MLM is required. Peugh (2010) reports that ICC values of between .05 (5%) and .20 (20%) are common in multilevel research studies reported. However an ICC of 10% is acknowledged to demonstrate enough group level variability (Kahn 2011) to proceed with MLM. In all models developed for this study, and presented in the results chapter, the ICC exceeded this cut-off point.

In addition to the ICC calculation, the design effect may be calculated to quantify the effect of independence violations on standard error estimates (Peugh 2010). It is an estimate of the multiplier that should be applied to standard errors. This can correct any negative bias that results from clustered data. The design effect is calculated using the average number of nurse responses in a ward (13 in this study) and the ICC. A design effect >2.0 indicates the suitability of the data to a multilevel approach (Peugh 2010). In all models developed and presented in this study the design effect was >2.0. Although the size of the groups is said not to be very significant, and that differences in sizes are expected in MLM (Tabachnik and Fidell 2007), in this study all units with less than five

nurse responses will be removed prior to MLM. This will result in a dataset containing 1397 nurses in 108 wards. Additionally prior to the development of each model reliability checking will be carried out for both the smallest (n=5) and the largest unit (n=24).

A step by step approach is to be taken to develop the models in this study. These steps are:

Step 1. *Development of the Null Model (or no predictors model).*

In this step the variance, both within the groups (units) and between the groups, could be examined. The ICC at this stage describes the proportion of variance common to each ward, rather than the variation between individuals in their groups. Restricted maximum likelihood (REML) is the maximum likelihood estimator used in all multilevel models in this study. In REML the regression coefficients are treated as unknown quantities to be estimated based on the data. REML subtracts the degrees of freedom when calculating the variance estimates and as such is frequently recommended (Peugh 2010, Heck, Thomas and Tabata 2010).

Step 2. *Specification of the Level 1 Model*.

In this step a predictor is introduced, having established that reasonable variance exists between groups. This must be a nurse level predictor. With this predictor in place it is possible to examine how much variability it accounts for both within wards and across wards. The Wald Z values at this point indicates the outstanding variability to be explained across and between wards. In all models in this study the outstanding variability to be explained at this point indicates that further ward level predictors could be included in the model.

Step 3. *Specification of the Level 2 Model.*

In this step further ward level predictors are introduced. This step tests the influence of the ward on the patient safety outcomes. The variance explained by the model can be calculated and reported for each model.

4.4.2.4. Multiple Regression Analysis

In order to incorporate the patient survey and to utilise patient survey derived patient safety outcomes in the analysis, the nurse dataset was greatly reduced. Patient data were available from a subset of ten hospitals. This resulted in a nurse dataset which included a total of 467 nurses in 35 units. The Independent Variables (IVs) related to staffing, used with patient survey derived Dependent Variables (DVs) were imported into the reduced nurse dataset from the organisational survey. This resulted in all nurses in a hospital having the same value for the staffing IVs. For this reason multilevel modelling was not appropriate, as the IVs could not be aggregated to unit level. A requirement of multilevel modelling is that for all IVs used, the nurse level data would be aggregated to unit level. Therefore multiple regression analysis was the method of choice in determining predictors of patient survey derived dependent variables. These outcomes related to patient satisfaction with medication safety.

Multiple regression is a statistical technique which is used to analyse the relationship between a single dependent variable and several independent variables (also known as predictors). As a technique it uses the known values of the independent variables to predict the dependent variable (Hair et al 2006). The dependent variable selected in this technique must be a continuous or scale variable, and the independent variables, though usually continuous, may also be dichotomous or binary in nature (Pallant 2007).

In multiple regression the effect of each independent variable is estimated independently, controlling for the effects of the other independent variables. Although regression analysis uncovers relationships between variables it does not imply that the relationships are causal. It must be acknowledged that strong relationships revealed may be influenced by other, as yet unmeasured variables (Tabachnik and Fidell 2007).

The researcher's choice of independent variables for inclusion can be guided by some considerations: regression analysis is more successful if each IV is correlated to the DV, but not with each other, and the goal is to identify the lowest number of IVs required to predict the DV where each IV predicts a substantial amount of variability in the DV (Tabachnik and Fidell 2007). Multicollinearity becomes a problem in regression analysis when the independent variables are highly correlated. However it must be acknowledged that it is unrealistic to find IVs which are completey unrelated in Social Science research. In most cases the IVs are correlated to some degree. The researcher should be alert to the damaging effects of IVs which are too highly correlated. During analysis the Variance Inflation Factor (VIF) should be used to identify multicollinearity (Hair et al 2006). A VIF value >5 indicates that the IV is too highly correlated with the others and should be removed. The tolerance value is also frequently used as a measure of collinearity. It measures the amount of variation in the variable that can not be explained by the other variables. If the value <0.1, this indicates that 90% of the variance is already accounted for by another variable and as such indicates that this IV should be removed.

Sample size is critical to regression analysis and authors differ on guidelines for the number of cases required. Tabachnik and Fidell (2007) provide a formula for calculating sample size :N > 50 + (8 x Number of independent variables). With 467 nurses in this reduced sample from 10 hospitals this data was suitable for regression analysis.

4.5. Chapter summary

In this chapter the survey methodology used in this study was outlined. Quantitative data were collected through the use of three questionnaires. Strict ethical principles were adhered to during all phases of the study. A focus on increasing response rates to the nurse questionnaire at all levels, and especially at ward level was central to the study in order to enable analysis of the impact of the ward cluster on patient safety outcomes. The clustered nature of the data overall, with nurses and patients clustered within wards, within hospitals, influenced the methods of analyses used in the study. Where appropriate, multi-level modelling was used to analyse the impact of the ward or workplace.

In chapter 5 the descriptive results of the study are presented in the form of frequencies and percentages along with some inferential analysis of the data. Chapter 6 contains details of hypotheses development, culminating in the use of multilevel modelling and regression analysis.

Chapter 5 DESCRIPTIVE RESULTS

The overall aim of this study is to identify organisational and nursing factors in acute general hospitals which enable the delivery of safe patient care. To meet the objectives of the study, data have been gathered through three surveys. A nurse survey has been carried out with 1,406 nurses in 112 general medical and surgical wards in 30 Irish hospitals. Organisational data have been collected through an organisational profile survey of each participating hospital, and an additional patient satisfaction survey has been carried out with 285 patients in 10 of the hospitals. The descriptive findings of all three surveys are presented in this chapter. The study hypotheses will be outlined and tested in the next chapter.

In this chapter the descriptive results presented, provide a general profile of acute hospitals in Ireland, a profile of patient safety activities within the hospitals, a profile of the nurses working in general wards within these hospitals, and of the care received by patients in these wards. The perceptions of nurses and patients regarding patient safety are also outlined. These results largely address the first objective of the study. The results are presented under the following headings:

- ***Results of the organisational profile survey***

In this section organisational profile survey data are presented. These data highlight differences in relation to activity, size and staff numbers, in the acute hospital sector in Ireland. They make clear ongoing structural and staff changes and help to contextualise both the nurse and patient surveys. These organisational results are available at *hospital level only*. These data have been incorporated into multilevel modelling and will be reported in the next chapter. As part of that process hospital level variables have been imported into the much larger nurse survey dataset. However these variables remain at

hospital level only, and each nurse in an individual hospital has the same value for these variables.

- ***Results of the nurse survey***

The majority of data in this study came from the nurse survey. These descriptive results provide a profile of nurses working in general wards in Irish hospitals. They provide an understanding of the workload of these nurses and of the type of work they do. Additionally they offer an insight into the experience of nursing this setting, and the perceptions of nurses regarding patient safety. Initially these descriptive data were at individual nurse level. In this chapter ***nurse level*** results are reported. In the Methodology chapter (Chapter 4 above) the clustered structure of the data in this study has been highlighted. In this section where relevant, variation in mean responses between wards and between hospitals is also reported. Additionally in the next chapter (chapter 6 below), where appropriate, some of these nurse level data will be aggregated to ***ward level*** and therefore rather than representing the response of individual nurses to a question, the value used will be the mean response for nurses in that ward.

- ***Results of the patient satisfaction survey***

The results of the patient survey are available for 10 of the original 30 study hospitals. Between 25 and 30 questionnaires have been collected per hospital. These results provide a picture of the experiences of inpatients in general wards in Ireland in relation to care received, environment and perceptions of medication safety practices. In this section the ***patient level*** results are reported. However in the next chapter the results of the patient survey will be aggregated to a ***ward level score*** to be imported into the nurse dataset for the 10 hospitals for which both sets of data are available. All nurses in a particular ward will have the same value on imported patient survey variables.

In this chapter, in addition to the ***descriptive findings***, the picture presented of Irish hospitals, nurses and patients is further developed through some exploration of relationships between variables and differences between groups. Analysis of relationships between variables is necessary to understand how the variables relate to one another and to examine the strength of those relationships. In this study it also provides a basis for more advanced analysis techniques. No attempt is made at this point to explore the possible effects of clustered data structures. Such analysis will be presented in the next chapter. This chapter contains frequency distributions, percentages, mean responses and response rates for each of the questionnaires, along with some inferential analyses. For the nurse survey significant differences across wards and hospitals are highlighted.

5.1. Results of the organisational profile survey

An organisational profile questionnaire has been completed by a nominated member of the nurse management team in all 30 study hospitals. While a questionnaire was returned by every hospital, some sections of the questionnaire were not always fully completed. Every effort was made to correct this at the time of data collection. In some cases the information requested was not available at hospital level. A profile of the study hospitals is presented below including information on hospital size, activity type and levels, nurse staffing levels, university status and bed numbers. An overall staffing profile is also presented through staff ratios calculated from organisational profile data.

In addition to the above profile data, hospital quality and safety data were also obtained through the organisational profile. These hospital level findings are presented in this section.

5.1.1. Profile of the study hospitals

All of the hospitals were public hospitals and twelve were university hospitals. Six hospitals were identified as national referral centres, 18 were regional referral centres. Variations were noted in patient numbers, annual activity, bed occupancy and numbers of beds in medical and surgical wards. Factors named as impacting on the running of hospitals were: mergers with other hospitals, moving of wards, and substantial increase or decrease in bed numbers. Explanations given for such changes included the influence of a staff recruitment moratorium in the Health Service (effective from March 2009, and ongoing) and increases in day case activities. Additionally, some hospitals reported opening new buildings and facilities, while others reported closures. Key differences in hospitals are presented below in table 5.1.

Table 5.1. Profile overview of study hospitals (year ending 2009)

	Number Open beds*	University/ Not	High technology hospital (heart or transplant surgery)	Inpatient admission/ year	Number of registered nurses- WTE
Z	892	yes	Yes	22,689	1,375
R	702	yes	Yes	32,583	1,307
Q	623	yes	Yes	27,000	987
O	620	yes	Yes	15,911	1,051
W	612	yes	Yes	16,228	954
S	605	yes	Yes	21,833	955
E	554	yes		24,137	948
B	474	yes		23,156	688
CC	435	yes		24,086	726
N	402	yes		9,993	504
P	349	yes		9,581	374
DD	334			16683**	455
AA	333			19,144	596
C	332			20,476	538
V	324			14,065	462
A	317			15,957	395
J	283			14,118	341
BB	262	yes		8,750	301
L	246			15,478	529
T	220			11,313	284
F	213	yes		7,675	267
G	206			14,826	334
I	199			18,829	287
D	175			9,506	347
H	150			22,750	229
M	131			10,888	206
Y	122			2,630	164
U	121			8,054	132
X	115			4,208	176
K	84			4,917	125

* Hospital data listed in order starting with greatest number of beds.

** 2010 data taken from HSE Regional Service Plan West 2011 (HSE 2011)

5.1.2. Staff profile in study hospitals

Information on staff numbers for registered nurses, healthcare assistants and medical staff, was obtained through the organisational profile questionnaire. Staff ratios were calculated from this information. Table 5.2 contains ratios calculated from total nurse and total doctor numbers, and total staff nurse and Non Consultant Hospital Doctor (NCHD) numbers. The table also contains total numbers of staff nurses and non registered nursing staff (care assistants) in both medical and surgical wards as reported by hospitals (missing data is indicated by blank cells). Where numbers of staff nurses to non-registered staff appeared very large (>10 nurses to each care assistant) the findings were re-checked with the hospital and verified to be correct at the time of data collection.

Using the RCN publication entitled Guidance on Safe Staffing Levels in the UK (Ball 2010) as a guide, staffing on medical and surgical wards as derived from the organisational profile data was examined. If "total qualified nurses" on these wards is taken to mean both managers and staff nurses the mean percentages are as follows:

- Medical wards 85% registered nurses
- Surgical wards 86% registered nurses.

If the totals are examined taking staff nurses only, excluding managers, as the total number of registered nurses the results are as follows:

- Medical wards 83%
- Surgical wards 85%.

Table 5.2 Staff Ratios obtained from organisational profile data

Hospital ID	Total nurse to total doctor ratio	Staff nurse to NCHD ratio	Medical Wards staff nurse to non reg staff ratio	SURG staff nurse to non reg staff ratio
A	2.6	5.5	32.2	28.3
B	2.8	3.5	9	4.6
C	3.4	3.6	3.4	2.1
D	4.4	5.2	5.5	3.8
E	2.4	3	3.5	4.3
F		4.1	3.5	3
G	3.7	3.5	2.7	1.9
H	3.4	3.9	4.3	4.8
I	3.1		6.3	3.8
J	4.3	5.2	4.8	13.5
K	4	4.4	6.1	13.7
L	3.2	3.9	5.4	6.1
M	3.7			
N	3.8	4.2	8.9	9
O	3	3.2	3.6	4.1
P	3.1	3		
Q	2.5		11.4	12
R	2.9	3.5		
S	2.4	2.8	2.5	7.8
T	3.6		2.6	3.4
U	4.3		8.4	
V	4.5			27.5
W	3.1	3.4		
X	2.5	3.2	28	26
Y	4.6	4.3	2.8	9.1
Z	3.3			
AA	3.1	3.8	5.4	5.8
BB	3.2			
CC	3		7.8	5.7
DD	3.6			

5.1.3. Hospital quality and safety data

In this section of the organisational profile questionnaire, data were gathered on the hospital approach to quality and safety. These data consisted of information on key safety personnel in the hospitals, provision of in-service safety training for staff, and safety audit practices.

5.1.3.1. Quality and safety personnel

Data were gathered on quality and safety personnel and practices. Over the last 15 years, as a result of the increased focus on quality and safety in healthcare, hospitals in Ireland have appointed safety personnel. The functions of these safety personnel in hospitals include monitoring of safety standards, education of staff, reporting of adverse incidents and investigation of such incidents to prevent recurrence. As part of this study hospitals were asked about the presence of specific safety personnel, and at which staff grade the appointment was made. The results are outlined in table 5.3.

5.1.3.2. Quality and Safety training

Hospitals were asked if regular in-service safety training for staff was carried out and if such training was mandatory. The second part of the question was not always answered as can be seen in Table 5.4.

Table 5.3 Quality and safety personnel in study hospitals

Safety Posts	Yes (n)	Assistant Director of Nursing	Clinical Nurse Specialist	Clinical Nurse Manager 2	Admin Grade 6	Admin Grade 7	Admin Grade 8	Medical Scientist	Chief Pharmacist	Senior Pharmacist	Grade not Specified
Quality Manager	22	3	1	3	1	2	6				6
Clinical Risk Manager	26	5		2		6	4				9
Haemovigilance Officer	30		7					1			22
Pharmacovigilance Officer	10								1	3	6

Table 5.4. In service safety training provided in study hospitals

Regular in-service training in the following areas:	Yes (n)	Is training mandatory?			
		Yes (n)	No (n)	Missing	Valid % yes
Clinical risk management /Patient safety	27	6	12	10	33.3%
Infection control	30	21	2	7	91.3%
Blood transfusion practice	29	22	1	7	95.7%
CPR	30	24	0	6	100%
Manual handling	30	24	0	6	100%
Adverse clinical event reporting	26	6	13	10	31.6%
Informed Consent	14	3	7	18	30%
Open disclosure for adverse clinical events	21	4	10	15	28.6%
Medication safety	26	10	6	12	62.5%

5.1.3.3. Patient safety audit practices

All hospital responders to questions about specific safety audit practices confirmed that blood transfusion practice and hospital acquired infection rates are audited in their organisations (n=29). Twenty five hospitals confirmed that other local patient safety standards are audited.

In order to further examine the organisational approach to safety, organisations were asked about the approach to the following patient safety incidents. The results for the 30 study hospitals are contained in the following table 5.5:

Table 5.5. Approach to patient safety incidents by hospitals

Organisational approach to the following	Quantify incidences	Analyse trends
Patient safety incidents	27	27
Adverse event reporting	27	27
Medication errors	28	29
Pressure sores following admission	21	24
Blood transfusion adverse events	26	29

5.1.3.4. Development of a Hospital Safety Score

The data provided by the 30 study hospitals on safety personnel, in-service safety training, and safety audit practices was examined. The number of safety personnel was summed and then added to the summed in-service training provided by hospitals. This in turn was added to the summed audits carried out. The resultant composite hospital safety score enabled examination of the hospital level data to see if variation in approach to safety across hospitals was evident. However little variation was identified $\sum$=12.32, SD = 1.97, range 6-14.

5.1.4. Comment on organisational profile descriptive findings

Presented above are the descriptive findings of the organisational survey carried out as part of this study. Differences in organisational size, activity and staffing levels are notable. However similarities in organisational approach to quality and safety are obvious in staff appointments, in-service training provision and audit practices. All findings described above are at organisational level and will be treated as such in further analysis in the next chapter.

5.2. Results of the nurse survey

Completed questionnaires were received from 1,406 nurses in general medical and surgical wards in 30 hospitals throughout Ireland. Between 2 and 6 wards per hospital participated in the study. Up to four wards per hospital were to be included. However in one case two hospitals were ultimately analysed as one hospital site. In this case the total number of wards included for the two sites is 6. All nurses involved in direct patient care within these wards were invited to participate. The response rate per ward varied greatly between 5-100%. The response rate per hospital varied also between 36-78%. The overall response rate to the questionnaire was 56%.

In this section, a profile of the nurse respondents to this survey is presented. Following this all other descriptive findings from the nurse survey are outlined including data on nurse work and workload, the work environment of nurses, and nurse burnout levels. Also reported on in this section are patient safety related data obtained through the nurse survey. Where relevant, differences in mean responses between wards and across hospitals are examined through ANOVAS and to aid interpretation they are graphically illustrated. It is acknowledged that with large samples even small differences between

groups can reach statistical significance. However this testing is run to demonstrate differences between clusters (both hospitals and wards) and as a background to multilevel analysis in the next chapter. In the ANOVAS where the effect size has been reported the largest effect size was seen between wards rather than hospitals. The effect size is a means of calculating the order of importance of the findings (Pallant, 2007, and Tabachnick and Fidell, 2007).The impact of clustering within units is explored in the next chapter through multilevel modelling.

The nurse survey results are presented below under the following headings:

- *Nurse respondents profile data*
- *Nurse work and workload*
- *Nurse work environment*
- *Nurse burnout levels*
- *Nurse-reported aspects of patient safety*

5.2.1. Nurse respondents profile data

Table 5.6 below contains a summary of demographic results obtained relating to nurse respondents.

Table 5.6 Nurse Demographics (nurse survey)

Nurse demographics	n	Valid Percentage
Age Category		
20-29 Years	436	31.9
30-39 Years	595	43.6
40-49 Years	206	15.1
50-59 Years	121	8.9
0ver 60 Years	8	0.6
Total		*100*
Specialty		
Surgical	622	44.6
Medical	670	48.1
Medical/Surgical	102	7.3
Total		*100*
Years spent working as a nurse		
<5 years	331	25.2
5-10 years	382	29.1
11-20 years	419	31.9
over 20 years	182	13.9
Total		*100*
Years spent nursing in this field		
<5 years	443	34.4
5-10 years	388	30.2
11-20 years	351	27.3
over 20 years	103	8.1
Total		*100*
Degree in Nursing		
Yes	809	60.1
No	538	39.9
Total		*100*
Basic Nurse Education in Ireland		
Yes	851	61.7
No	528	38.3
Total		*100*

As illustrated in Table 5.6, almost 62% of nurses in the study trained in Ireland. The breakdown by country of basic nurse education/ training for those who trained outside Ireland is shown in the table below.

Table 5.7 Country of nurse education, if outside of Ireland.

Country	N	Percentage
United Kingdom	274	52%
India	111	21%
Philippines	92	17%
Other European countries	9	2%
US, Australia, New Zealand	9	2%
African countries	4	1%
Others (including China)	4	1%

5.2.1.1. Nurse education levels

Sixty percent of nurse respondents had a degree in nursing. However this was not consistent across all hospitals or wards. The proportion of nurses with degrees in wards varied between 10% in one hospital and 100% in three hospitals. The following table 5.8. contains the number of wards with each percentage (based on wards with more than 5 nurse responses). The table in Appendix 4 shows the breakdown of percentages between wards within hospitals.

Table 5.8 Proportion of nurses with degrees across wards

Percentage of nurses with degrees	10%	20%	30%	40%	50%	60%	70%	80%	90%	100%
Number of units	1	4	5	9	20	25	13	13	13	3

5.2.2. Nurse work and workload

Data were obtained through the nurse survey on the workload of nurses in the study hospitals and the work carried out by those nurses on their most recent shift.

5.2.2.1. Nurse workload

The workload was calculated as the patient to nurse ratio. The overall patient to nurse ratio was calculated by using total number of patients on the ward on the last shift and total number of registered nurses. The mean nurse to patient ratio was then calculated [$\sum$=6.84, SD = 2.4]. A ward mean patient to nurse ratio was calculated for each ward.

This was found to vary between a low of 3.24 patients per nurse and a high of 11.13 patients per nurse. A significant difference was found between wards [F= 3.5, p=.000]. In the ward where the patient to nurse ratio dipped to 3.24 patients per nurse nine nurses returned questionnaires. Their individual patient to nurse ratios ranged between 2 and 5. For this reason the unit mean is accepted as accurate. The overall day shift nurse to patient ratio was also calculated by the same means, but removing the night shift responses [$\sum$= 5.93, SD = 1.0].

5.2.2.2. Percentage of registered nurses in the direct care workforce

In order to calculate the percentage of qualified nurses in the workforce from the nurse questionnaire data, data on the total number of registered nurses providing direct care on the last shift, and the total number of other nursing staff on the last shift was used. The mean over all was found to be 72% qualified nurses in direct patient care in the work force.

5.2.2.3. Work carried out by nurses on their most recent shift

Nurses were asked about the work they did on their last shift. Specifically they were asked about non nursing work carried out, and about necessary nursing work left undone.

5.2.2.3.1. Non nursing work carried out

The table below indicates the percentage responses of nurses regarding the frequency of carrying out certain tasks during their last shift which could be identified as non nursing work. Carrying out non nursing work may take nurses away from patient care and reduce the quality of care patients receive. Equally, performing non nursing tasks may reduce patient surveillance time, thus impacting on patient safety.

Table 5.9. Non nursing work carried out by nurses on the most recent shift

Item	Task	Never	Sometimes	Often
C.11.2	**Performing non-nursing care**	5%	52%	43%
C.11.7	**Filling in for non-nursing services not available on off-hours**	31%	42.5%	26.5%
C.11.9	**Answering phones, clerical duties**	1%	11%	88%

A composite score was developed for nurses with regard to the above three items measuring non-nursing work. The percentage results are contained in the following table.

Table 5.10. Frequency of nurse involvement in non –nursing work on recent shift

	n	percentage
Never	20	1.5%
Sometimes	767	57.5%
Often	546	41%

This composite was used in a one way analysis of variance to exam the differences across units in nurses involvement in non-nursing work (the above three items). No significant difference was found.

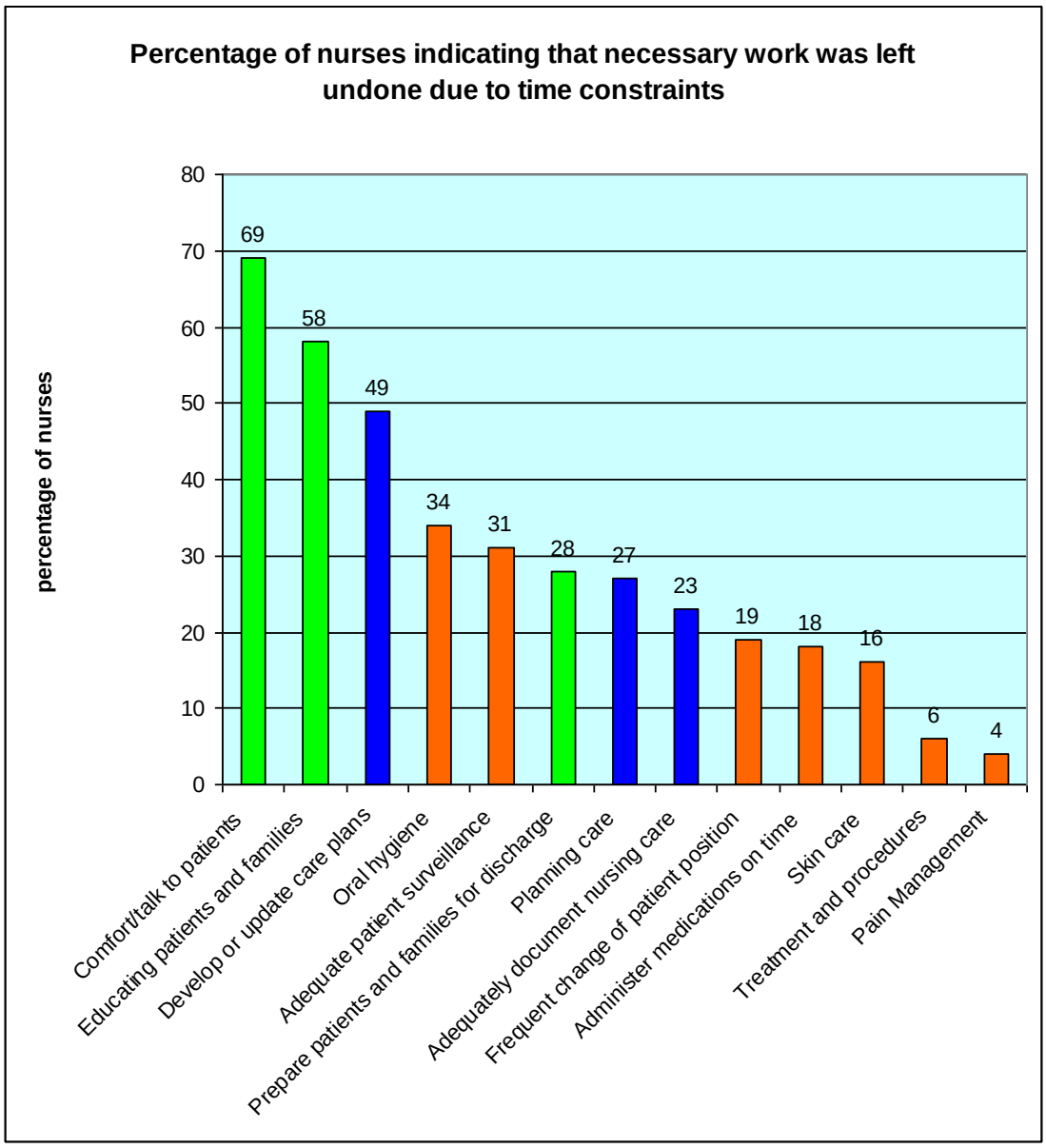
5.2.2.3.2. Nursing work left undone

In the nurse questionnaire a list of patient care activities was provided and nurses were asked to select activities which were necessary but left undone due to time constraints during their last shift. The graph below (Figure 5.5) contains the percentages of nurse respondents who indicated that they left necessary nursing work undone on their last shift. For the purposes of presentation, the necessary work left undone has been divided into three categories: Physical Care left undone, Psychological Care left undone, and Planning and Documenting Care left undone. The graph illustrates the categories of necessary work which are most frequently left undone (psychological care). It also

clearly shows the category of work which is reported as less likely to be left undone due to time constraints (physical care). Planning and documentation of care by nurses in this study was also indentified as left undone due to lack of time. Nurse-reported work left undone is relevant to this study as it has the potential to compromise patient safety. Necessary work left undone due to time constraints may be related to ward staffing levels or staff ratios within a ward or hospital, or it may be associated with nurse outcomes such as burnout levels. In previous research higher levels of emotional exhaustion in nurses have been linked to reduced quality of patient care (Poghosyan 2010).

The number of items identified as left undone by individual nurses varied considerably between 0 and 13 [$\sum$=3.75, SD = 2.9].

Fig 5.1. Percentages of nurses who indicated necessary work was left undone due to time constraints



Physical Care

Planning and Documenting Care

Psychological Care

5.2.3. Nurse work environment

The nurse work environment was measured in this study using the Practice Environment Scale of the Nursing Work Index. The Nursing Work Index can be subdivided into 5 subscales based on those identified by Lake (2002) as the Practice Environment Subscale of the Nursing Work Index. The origins of this scale and its significance in nurse research is described in the methodology chapter of this work. Below the mean responses are presented for each subgroup.

Table 5.11 Practice Environment Subscale of the Nursing Work Index

Sub-scale (the mean on each sub-scale has a potential range from 1-4, low to high, negative to positive)	**Mean**	**Standard deviation**	**Number**
Staffing and resource adequacy	2.04	0.69	1,382
Collegial nurse-physician relationships	2.74	0.61	1,372
Nurse manager ability, leadership and support for nurses	2.70	0.69	1,334
Nursing foundations of quality of care	2.89	0.51	1,273
Nurse Participation in Hospital Affairs	2.33	0.62	1,289

The breakdown of response patterns for each subscale is presented in table 5.12. Also included are the responses to the additional items included in the scale which were not originally included in Lakes five factor solution. These items were added as a result of work carried out on the NWI by Li et al (2007) and are related to the nurse physician relationship.

Table 5.12 Subscales Frequencies PES-NWI

Factor on PES-NWI		**Percentage response per item**			
Staffing and Resource Adequacy		**Strongly Disagree**	**Somewhat Disagree**	**Somewhat Agree**	**Strongly Agree**
1.	Adequate support services allow me to spend time with my patients	38.4	34.8	22.5	4.3
8.	Enough time and opportunity to discuss patient care problems with other nurses	14.6	28.6	45.9	10.9
9.	Enough registered nurses on staff to provide quality patient care	44.6	30.3	20.8	4.4
12.	Enough staff to get the work done	42.5	35.1	18.4	4.0
Nurse leadership					
3.	A supervisory staff that is supportive of nurses	13.0	28.4	42.1	16.4
10.	A nurse manager who is a good manager and leader	9.4	13.4	35.1	42.1
14.	Praise and recognition for a job well done	33.8	31.3	29.1	5.8
22.	A nurse manager who backs up the nursing staff in decision making, even if the conflict is with a physician	9.6	14.5	42.5	33.4
Nurse- Physician Relationships					
2.	Physicians and nurses have good working relationships	3.6	19.1	62.9	14.4
17	A lot of team work between nurses and physicians	9.0	30.5	48.1	12.5
26	Collaboration between nurses and physicians	7.1	28.2	55.3	9.3
Additional items from Li et al **2007(physician-related)**					
7.	Physicians value nurses' observations and judgments	6.5	22.5	56.5	14.5
13.	Physicians recognize nurses' contributions to patient care	8.3	26.8	53.6	11.4
21.	Physicians respect nurses as professionals	8.8	25.0	53.7	12.5
30.	Physicians hold nurses in high esteem	18.3	41.5	34.3	6.0

Factor on PES-NWI		Percentage response per item			
		Strongly Disagree	**Somewhat Disagree**	**Somewhat Agree**	**Strongly Agree**
Nursing foundations for quality of care					
4.	Active staff development or continuing education programs for nurses	18.1	29.0	37.9	15.0
15.	High standards of nursing care are expected by the management	2.2	4.9	33.7	59.2
19.	A clear philosophy of nursing that pervades the patient care environment	7.7	22.9	52.5	16.9
24.	An active quality assurance program	13.7	28.8	48.6	8.8
27.	A preceptor program for newly hired nurses	23.9	17.9	30.2	28.1
28.	Nursing care is based on a nursing rather than a medical model	4.8	15.4	51.3	28.6
31.	Written, up-to-date care plans for all patients	9.2	17.6	39.9	33.3
32.	Patient care assignments that foster continuity of care (i.e., the same nurse cares for the patient from one day to the next)	14.3	20.0	42.8	22.9
20.	Working with nurses who are clinically competent	2.2	11.1	48.0	38.6
Nurse Participation in Hospital Affairs					
6.	Opportunity for registered nurses to participate in policy decisions	30.6	33.2	29.4	6.8
5.	Career development/clinical ladder opportunity	27.7	36	29.4	6.9
11.	A chief nursing officer who is highly visible and accessible to staff	28.7	26.2	32.2	12.9
16.	A chief nursing officer is equal in power and authority to other top level hospital executives	12.9	27.0	41.6	18.5
18.	Opportunities for advancement	25.2	38.9	30.6	5.4
23.	Management that listens and responds to employee concerns	21.9	28.8	36.4	12.9
25.	Registered nurses are involved in the internal governance of the hospital (e.g., practice and policy committees)	23.7	32.1	36.1	8.0
29.	Registered nurses have the opportunity to serve on hospital and nursing committees	14.8	26.8	46.4	12.1

Having removed wards with less than 5 nurse responses the mean score for the NWI-PES was calculated for each ward. The overall breakdown of work environments per ward was as follows:

Table 5.13 Work environment breakdown by category

Work environment	poor	mixed	better
Percentage	13%	72%	15%
Number of wards	14	79	16

5.2.4. Nurse burnout levels

The Maslach Burnout Inventory scoring is calculated using the items as divided into three subscales (outlined below and in the methodology chapter). The means for each subscale are presented below. The percentage response rates for each item are presented below in tables 5.14, 5.15 and 5.16 below representing the three subscales.

5.2.4.1. Emotional exhaustion subscale

The mean nurse level score in this subscale was 24.81 (low = 0-16, Medium = 17-26, high ≥27). A summary of the scores of respondents for this subscale are presented in Table 10 below. Over 41% of respondents obtained a score in the high range based on the original 1981 scoring techniques (see methodology chapter).

5.2.4.2. Depersonalisation subscale

The mean nurse level score on this subscale was 6.46 (low =0-6, medium = 7-12, high ≥13). Most items in this scale were reported as "never" felt by the respondents. A summary of the scores of respondents for this subscale are presented in Table 11. Over 57% of respondents obtained a score in the low range using the original 1981 scoring (see methodology chapter, page 101).

5.2.4.3. Personal accomplishment subscale

The mean nurse level score on this subscale was 34.92 (low =0-31, medium = 32-38, high ≥39). The responses to the items in this scale were positive overall. A summary of the scores of respondents for this subscale are presented in Table 12. Over 37.9% of respondents obtained a score in the high range while 30.4% scored in the low range.

The percentages of respondents scoring in the low, medium or high ranges on the MBI using the original 1981 scoring (as outlined in the Methodology Chapter) are presented in table 5.17 below.

Table 5.14 Emotional Exhaustion Subscale of the MBI

		Percentage response per item						
Item no.	**Item**	**Never**	**≤A few times a year**	**≤ Once a month**	**Few times a month**	**Once a week**	**A few times a week**	**Every day**
1.	I feel emotionally drained from my work	2.2	15.6	16.0	23.7	12.3	18.1	12.0
2.	I feel used up at the end of the workday	2.8	8.4	8.8	16.6	14.0	24.3	25.1
3.	I feel fatigued when I get up in the morning and have to face another day on the job	6.5	12.5	11.7	19.7	14.4	19.9	15.3
6.	Working with people all day is really a strain for me	47.2	23.6	11.3	8.7	3.8	3.7	1.8
8.	I feel burned-out from my work	9.8	23.1	13.9	16.6	9.5	14.9	12.3
13.	I feel frustrated by my job	10.7	16.8	14.1	18.9	10.1	14.4	14.9
14.	I feel I'm working too hard on my job	6.3	10.9	9.9	19.3	10.7	18.4	24.5
16.	Working directly with people puts too much stress on me	40.4	29.9	11.5	8.7	3.8	4.0	1.7
20.	I feel like I'm at the end of my rope	32.0	27.8	10.2	11.2	6.2	7.4	5.3

Table 5.15 Depersonalisation Subscale of the MBI

		Percentage response per item						
Item no.	**Item**	**Never**	**≤A few times a year**	**≤ Once a month**	**Few times a month**	**Once a week**	**A few times a week**	**Every day**
5.	I feel I treat some patients as if they were impersonal objects	60.2	14.5	7.3	6.9	4.7	4.8	1.6
10.	I've become more callous toward people since I took this job	47.7	21.1	9.5	8.4	4.7	4.4	4.3
11.	I worry that this job is hardening me emotionally	32.2	27.5	11.7	10.6	5.4	5.7	6.9
15.	I don't really care what happens to some patients	84.4	8.8	2.5	2.1	1.2	0.4	0.6
22.	I feel patients blame me for some of their problems	31.7	23.4	8.7	12.7	8.5	9.2	5.8

Table 5.16 Personal Accomplishment subscale of the MBI

		Percentage response per item						
Item no.	**Item**	**Never**	**≤A few times a year**	**≤ Once a month**	**Few times a month**	**Once a week**	**A few times a week**	**Every day**
4.	I can easily understand how my patients feel about things	1.5	2.3	3.4	8.3	8.2	23.5	52.8
7.	I deal very effectively with the problems of my patients	2.6	2.0	2.9	4.4	4.6	25.8	57.7
9.	I feel I'm positively influencing other people's lives	5.7	7.0	8.8	14.9	11.7	24.3	27.5
12.	I feel very energetic	13.1	9.8	12.5	15.5	13.0	22.3	13.6
17.	I can easily create a relaxed atmosphere with my patients	3.0	3.7	5.6	8.8	9.2	29.0	40.7
18.	I can accomplish many worthwhile things in this job	1.5	4.4	7.4	11.3	10.7	29.6	35.0
19.	I feel exhilarated after working closely with my patients	6.6	9.4	10.0	15.2	14.0	26.8	18.1
21.	In my work, I deal with emotional problems very calmly	1.2	4.3	6.8	11.6	11.2	26.0	38.9

Table 5.17. Percentages of scores on Maslach Burnout Inventory by category

Score on MBI	Emotional Exhaustion	Depersonalisation	Personal Accomplishment
Low	25.4%	57.2%	30.4%
Mean	33.2%	29.4%	31.7%
High	41.4%	13.4%	37.9%

Hospital level and ward level mean scores were obtained for all three subscales. The emotional exhaustion subscale exhibited the greatest variability across wards and across hospitals. A one way analysis of variance was conducted on this subscale to examine for statistical difference across hospitals and wards. A statistically significant difference was found across hospitals [F=4.5, p =.000] and across wards [F=2.6, p=.000]. The effect size varied however with a medium effect across hospitals (eta squared =0.09) and a large effect across wards (eta squared =0.20).

In this study the Emotional Exhaustion subscale is used as an independent variable in later stages of analysis. No country specific norms for any of the three subscales exist for Ireland. As described in the methodology chapter concern has been expressed around the validity of American norms within a European context. This particularly applies to the Depersonalisation and Personal Accomplishment subscales. In a European context the Emotional Exhaustion subscale is seen as the most robust and is sometimes used as a proxy for burnout levels.

5.2.5. Nurse-reported aspects of patient safety

In this section, aspects of patient safety were reported on by nurses through the nurse survey. This included nurse perceptions of safety within their wards and organisations, and also their attendance at in-service safety training and adverse event reporting.

5.2.5.1. Frequency of adverse event occurrence

A list of adverse events was provided in the nurse questionnaire and nurses were asked to indicate how often each occurs involving themselves or their patients. The results are contained in the next table (table 5.18).

Adverse event occurrence

Nurses were asked to indicate the frequency of adverse event occurrence involving either patients or themselves. The results are presented in the next table.

Table 5.18. Nurse-reported frequency of adverse event occurrence

How often would you say each of the following incidents occurs involving you or your patients?		Percentage response per item						
Item no.	Item	Never	≤A few times a year	≤ Once a month	Few times a month	Once a week	A few times a week	Every day
7.1	Patient received wrong medication, time, or dose	27.7	56.2	8.5	4.4	1.2	1.2	0.7
7.2	Pressure ulcers after admission	28.1	62.4	7.3	1.5	0.3	0.4	0.1
7.3	Patient falls with injury	10.1	54.6	22.0	9.3	2.3	1.5	0.2
7.4.1	Urinary tract infections	14.4	48.7	19.5	12.4	2.8	1.9	0.2
7.4.2	Bloodstream infections	26.2	50.9	13.7	7.4	1.0	0.7	0.1
7.4.3	Pneumonia	18.4	50.0	18.8	9.8	2.1	0.7	0.2
7.5	Complaints from patients and their families	7.8	45.2	21.0	13.1	4.8	4.7	3.4
7.6.1	Verbal abuse towards nurses by patients or families	2.6	30.6	18.2	20.8	8.7	12.0	7.2
7.6.2	Verbal abuse towards nurses by staff	39.3	39.8	8.2	6.6	2.8	2.4	0.7
7.7.1	Physical abuse towards nurse by patients or families	23.7	44.7	12.4	9.4	3.6	4.1	2.0
7.7.2	Physical abuse towards nurses by staff	88.2	8.8	1.2	1.1	0.4	0.4	0
7.8	Work related physical injuries to nurses	20.2	61.9	8.4	5.3	1.5	1.8	0.9

A one-way analysis of variance (ANOVA) was carried out to look at differences across hospitals in the mean responses to nurse-reported frequency of adverse event occurrence. There was a statistically significant difference between the mean hospital level responses: F= 4.74, p = .000. In order to calculate the effect size of this result the eta squared was calculated. The result gave an effect size of 0.10 which indicates a medium sized effect. A further one-way ANOVA examined differences across wards and a statistically significant difference was found F= 3.03, p = .000, the effect size of this difference was found to be large (eta squared =0.23).

5.2.5.2. Number of formal adverse incident reports submitted

The formal reporting of adverse events is critical to current patient safety strategy. Integral to the nurse's role in patient safety is the formal reporting of adverse incidents. The systems approach to patient safety is largely dependent on such reports from clinical staff. Data were collected within this study on nurses formal reporting practices over the previous 12 months. It is widely acknowledged, as described in the literature review, that under reporting of adverse events is widespread. Good practice guidelines suggest that all adverse events should be reported. In this research formal reporting of adverse events is seen as a positive patient safety outcome.

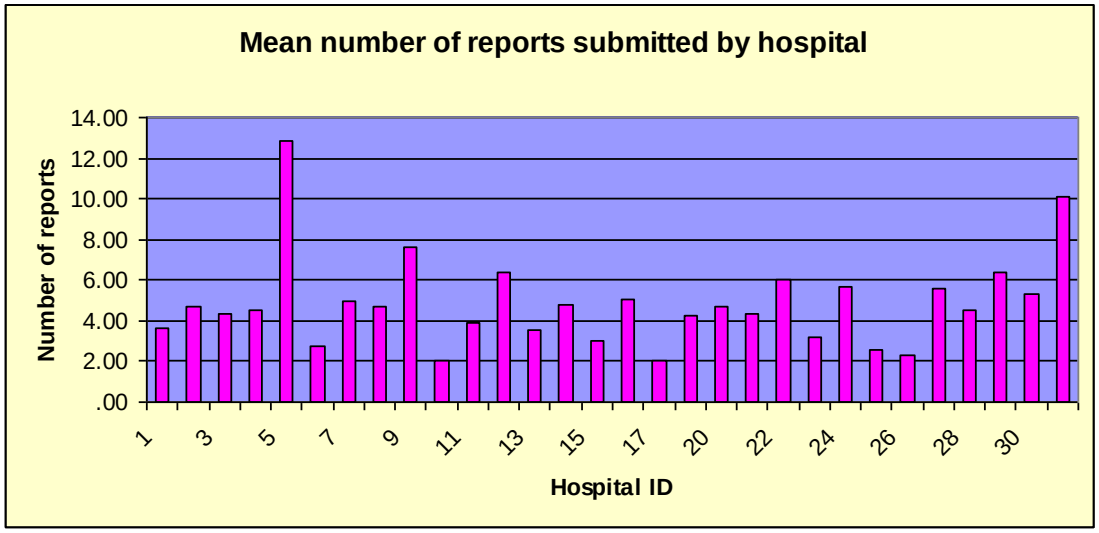
The following table 5.19 contains a summary of total numbers of reports submitted by individual nurses including risk management report forms, blood transfusion report forms and Irish Medicine Board reports (either forms or online).

Table 5.19 Total numbers of formal reports submitted by nurses in past year

Number of reports Submitted	n	Valid Percentage
Fewer than 1	414	32.7
1-3	331	26.1
3-5	211	16.7
More than 5	310	24.5

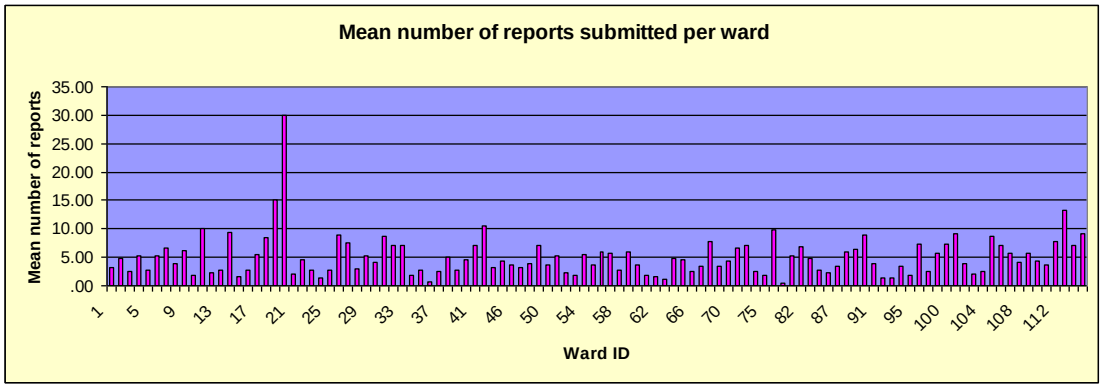
Some significant differences [F=2.6, p =.000] were evident between hospitals in the mean number of formal reports submitted by nurses. For each hospital the mean number of reports submitted by nurses in that hospital was calculated. Figure 5.2 below illustrates these differences.

Figure 5.2. Mean number of reports submitted by hospital



Significant differences [F= 4.1, p = .000] were also evident between wards as illustrated in Figure 5.3. Again the mean response from nurses in each ward was calculated to examine the variation between wards in reporting patterns.

Figure 5.3 Mean number of reports submitted per ward



5.2.5.3. Ward Safety Grade

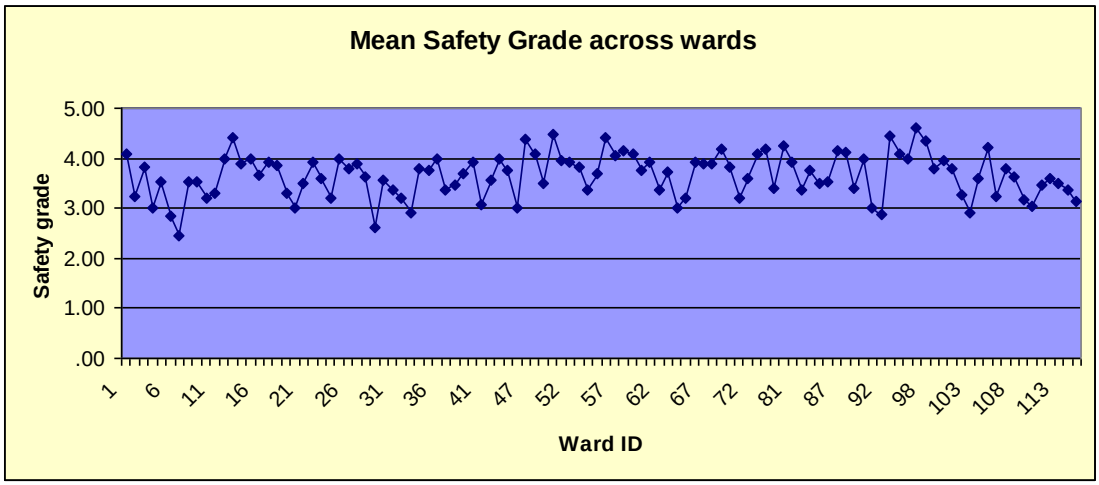
Nurses were asked to provide an overall safety grade for their units (wards). The nurse level results are as follows:

Table 5.20 Overall ward safety grade

Overall grade on patient safety	n	Valid percentage
Failing	22	1.6%
Poor	95	6.9%
Acceptable	425	30.7%
Very good	630	45.5%
Excellent	213	15.4%

A significant difference was found between ward mean safety grade (F=3.6, p=.000) and Figure 5.4 below illustrates this difference.

Figure 5.4 Mean safety grade across ward



1= Failing, 2= Poor, 3=Acceptable, 4= Very good, 5= Excellent

In this research nurse-graded ward safety is treated as a patient safety outcome in later analysis.

5.2.5.4. Nurse-reported adverse event reporting culture

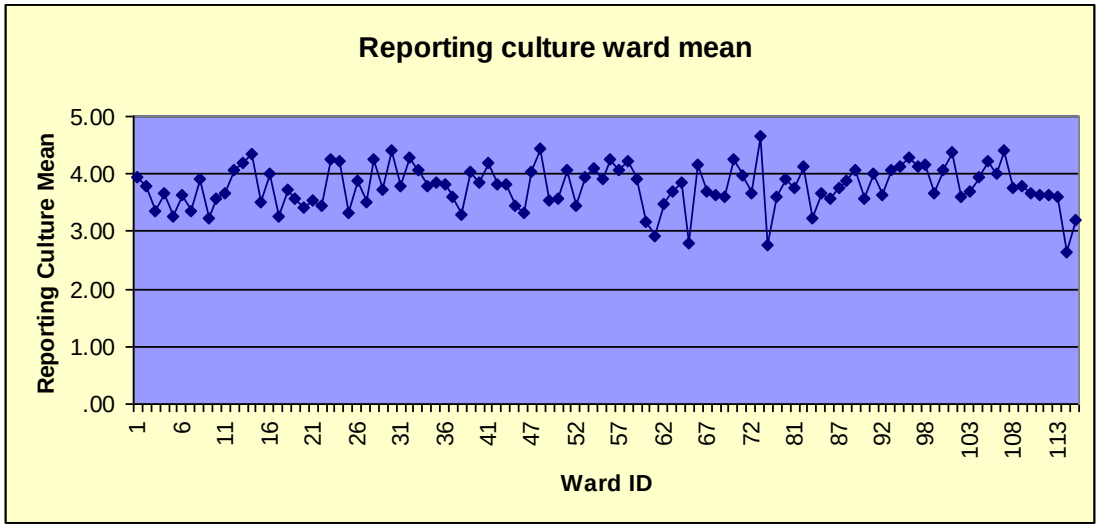
Nurses were asked to report their perceptions of adverse event and near miss reporting practices within their wards. Only 28.6% of respondents reported that near misses are always reported, 31% that errors made with no potential for harm are always reported, and just 52% of respondents reported that mistakes with potential for harm, although no harm occurred, are always reported. The following table 5.21 contains a summary of these results.

Table 5.21 Adverse event reporting culture

		Percentage response per item				
Item no.	**Item**	**Never 1**	**Rarely 2**	**Sometimes 3**	**Most of the time 4**	**Always 5**
E4A	When a mistake is made but is caught and corrected before affecting the patient, how often is this formally reported	6.2	20.4	18.8	26.1	28.6
E4B	When a mistake is made but it has no potential to harm the patient, how often is this formally reported	5.3	15.1	20.6	27.3	31.6
E4C	When a mistake is made that could harm the patient but does not, how often is this formally reported	2.9	5.7	12.9	26.0	52.5

A per-nurse score was obtained across these items. The mean score was 3.78 (scored 1-5), std dev 1.01. This would indicate that adverse events and near misses are reported between "sometimes" or "most of the time". The range for the ward mean was between 2.63 and 4.67. A significant difference was found between ward means (F=1.7, p=.000) which is illustrated in Figure 5.5 below.

Figure 5.5 Reporting culture ward mean



1= never, 2= rarely, 3= sometimes, 4= most of the time, 5= always

5.2.5.5. Nurse-reported safety culture

As outlined in the literature review chapter it is widely acknowledged that the safety culture of an organisation, or of units within an organisation, is directly linked to safety outcomes. In this study, within the nurse questionnaire, a number of items (B6.1-B6.7) relating to safety culture were drawn from different sections within a larger questionnaire used to measure hospital safety culture. This questionnaire was entitled the Hospital Survey on Patient Safety Culture (Agency for Healthcare Research and Quality 2007). Within this study the question as to whether these items, originating as

they did from different sections of the larger questionnaire, could be viewed as a scale for measuring safety culture was considered. Factor analysis was carried out on the items as detailed below.

5.2.5.5.1. Factor analysis of Safety Culture Items

Factor analysis was carried out on the items contained in B6 of the nurse questionnaire. Principal Component Analysis was carried out on all seven items of the scale contained in B.6.1.-B.6.7. Initially two factors were identified.

Table 5.22 Initial Pattern matrix (Factor Analysis)

	Component	
	1	2
B66. We are given feedback about changes put into place based on event reports	.850	
B65. In this unit, we discuss ways to prevent errors from happening again.	.748	
B67. The actions of hospital management show that patient safety is a top priority.	.732	
B64. Staff feel free to question the decisions or actions of those in authority	.605	
B62 Important patient care info is lost		.887
B63 Things "fall between the cracks"		.882
B61 Staff feel mistakes held against them		.484

Extraction method: Principal Component Analysis
Rotation method: Oblimin with Kaiser Normalisation

All items loaded strongly onto a single one of the two factors except item B61. The resultant communalities were all above .350 except for item B61. The total variance explained was 57%. The process was repeated having removed item B61. The loadings which resulted were very strong again, with the remaining items loading onto the same two factors. In this case the resultant communalities were all above .55 except B64 which was .370. The total variance explained this time was 63%.

The process was repeated again removing B64. The resultant loadings were very strong as presented below:

Table 5.23 Third Pattern Matrix (Factor Analysis)

	Component	
	1	**2**
B66. We are given feedback about changes put into place based on event reports	.850	
B65. In this unit, we discuss ways to prevent errors from happening again.	.748	
B67. The actions of hospital management show that patient safety is a top priority.	.732	
B64. Staff feel free to question the decisions or actions of those in authority	.605	
B62 Important patient care info is lost		.887
B63 Things "fall between the cracks"		.882
B61 Staff feel mistakes held against them		.484

The communalities in this case were very strong (all above .6) and the total variance explained was 72%.

As the number of items in this scale was low, the possibility of a one factor solution was explored. Initially this was carried out with 6 items including B64 where a one factor solution was forced. The communalities in this case were between .263 and .534, and the total variance explained was 41%. This process was repeated following removal of B64. The resultant loadings were improved at between 0.575 and 0.732. The communalities for this solution ranged between .331-.535, but the total variance explained was just 45%.

Due to the resultant communalities, strong loadings and variance explained, a two factor solution using 5 items from the scale (B6.2, B6.3, B6.5, B6.6, B6.7) was identified as the most useful (see Table 5.21 above). In this case the communalities were strongest, and the total variance explained was also highest at 72%.

Safety Culture Composite

A total safety culture score for each nurse was obtained using the 5 items related to safety culture identified as a scale above. The mean nurse level score was 3.28 (scored 1-5) standard deviation was 0.76. The ward mean safety score ranged from 2.55 to 4.08 and significant differences were found across wards (F= 2.75, p=.000). This composite includes items which measure both local ward safety culture and wider hospital safety culture. In this study the safety culture composite is interpreted as an organisation wide measurement.

5.2.5.6. Nurse confidence that management will act to resolve problems reported

Nurses were asked about their level of confidence in management to resolve problems in patient care which they report. Just 37% described their level of confidence as "confident" or "very confident". The mean response was 2.24 (scored 1-4, 1= not at all confident, 2= somewhat confident, 3= confident, 4= very confident), SD 0.863. A statistically significant difference was found between hospital mean scores (F=6.96, p=.000) and ward mean scores (F=3.16, p=.000). Again the effect size between wards (eta squared =0.21) was larger than between hospitals (eta squared = 0.13).

5.2.5.7. Nurse attendance at safety related in-service training

The organisational profile questionnaire yielded information about the provision of in-service safety training (page 132). However the nurses were also asked in the nurse questionnaire to indicate which training sessions they attended in the previous year. As expected those with the highest percentages of attendance are the training sessions which were highlighted in the Organisational profile as mandatory (see table 5.24).

Table 5.24 In-service safety training nurse attendance (nurse-reported)

INSERVICE TRAINING SESSION	Yes %	Mandatory in >90% of hospitals
Clinical risk management/ patient safety	47.3	
Infection control	80	Yes
Blood transfusion practice	71.6	Yes
CPR	77.4	Yes
Manual handling	64.2	Yes
Adverse event reporting	26.4	
Informed consent	21.9	
Open disclosure	15.4	

Presented above were the descriptive findings of the nurse survey carried out as part of this study. The results were presented mainly at nurse level, with variation in hospital and ward means also noted. In the next chapter notable relationships between the variables presented above will be explored. In the next chapter also the study hypotheses will be outlined and modelling will be carried out to address these hypotheses. In some cases the nurse level results presented here will be aggregated to ward level for the purpose of multi-level modelling where the impact of the ward cluster will be examined.

5.3. Results of the patient survey

Two hundred and eighty five patients in 10 hospitals responded to the questionnaire. The response rate varied between hospitals ranging from 83%-100% of patients approached. The overall response rate was 93%. Between 25 and 30 patient surveys were conducted in each of the 10 hospitals. All were linked with wards for which nurse

data was also available. The ward specialty breakdown for patient respondents can be found in the following table

Table 5.25 Ward specialty breakdown

Specialty	n	Percentage
Surgical	153	53.7
Medical	113	39.6
Mixed Med/Surg	19	6.7

Much of the patient data relates to aspects of patient safety i.e. communication between staff and patients, pain control, assistance when needed, and ward cleanliness, and as such is of interest to the study. However, only the questions regarding medication safety, and the patient overall rating of the hospital, will be included in further analysis in Chapter 6. Descriptive results of the patient survey are presented below.

5.3.1. Care received from nursing and medical staff

This section relates to the patients' experiences of care received from nursing and medical staff during their hospital stay. The breakdown of responses is contained in the following tables 5.26 and 5.27.

Table 5.26 Patient satisfaction with care received from nursing staff

	Percentage response				
Question	Never %	Sometimes %	Usually %	Always %	Mean rating (1-4)
1. During this hospital stay, how often did nurses treat you with courtesy and respect?	0.4	3.2	10.6	85.9	3.82
2. During this hospital stay, how often did nurses listen carefully to you?	1.4	5.3	23.1	70.1	3.62
3. During this hospital stay, how often did nurses explain things in a way you could understand?	2.8	8.1	22.9	66.2	3.52
4. During this hospital stay, after you called for assistance, how often did you get help as soon as you wanted it?	2.2	11.0	27.6	59.2	3.44

Table 5.27 Patient satisfaction with care received from medical staff

	Percentage response				
Question	Never %	Sometimes %	Usually %	Always %	Mean rating (1-4)
1. During this hospital stay, how often did doctors treat you with courtesy and respect?	2.1	7.1	14.8	76.0	3.65
2. During this hospital stay, how often did doctors listen carefully to you?	2.8	14.8	18.7	63.7	3.43
3. During this hospital stay, how often did doctors explain things in a way you could understand?	4.6	17.6	18.7	59.2	3.32

A 10% difference existed between those who feel nurses and doctors "always" treat them with courtesy and respect, this difference reduced to 6% and 7% when asked about listening and explaining skills. Small differences in mean scores for nurses and doctors can be seen in the following Table 5.28:

Table 5.28 Comparison of patient satisfaction of nurse and doctor mean scores

Question	**Nurses Mean Score**	**Doctors Mean Score**
1.During this hospital stay, how often did nurses/doctors treat you with courtesy and respect?	3.82	3.65
2.During this hospital stay, how often did nurses/doctors listen carefully to you?	3.62	3.43
3.During this hospital stay, how often did nurses/doctors explain things in a way you could understand?	3.52	3.32

5.3.2. The hospital environment

This section relates to the patients' satisfaction levels with the hospital environment during their inpatient stay. Patients were asked how often their room and bathroom were kept clean. Almost 80% of patients said their environment was always kept clean. When rating the quietness of the ward at night, many patients qualified their answers by saying they expected some level of noise. However 50% of the patients said the area was always quiet at night.

5.3.3. Inpatient experience

This section relates to patient satisfaction with several aspects of the inpatient experience.

Bathroom needs:

Forty eight percent (n = 136) of respondents indicated that they required help getting to the bathroom or using a bedpan at some time during this hospital stay. Sixty five percent of these (n = 93) indicated that they "always" received help as soon as they wanted it. A further 23% (n = 33) "usually" received help as soon as they wanted it.

Pain control:

Sixty nine percent (n = 195) of patients required medicine for pain during this hospital stay, 31% (n = 86) did not. For those who did the following Table 5.29 contains a summary of their level of satisfaction with pain control during their stay.

Table 5.29 Patient Satisfaction with pain control during their stay

	Percentage response			
Question	Never %	Sometimes %	Usually %	Always %
1. During this hospital stay, how often was your pain well controlled?	3.1	8.7	23	65.3
2. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?	2	10.7	18.3	69

5.3.4. Patient satisfaction with medication safety practices

To address the question of patients' satisfaction with medication safety the following data were obtained. Sixty seven percent of respondents (n = 189) said they were given medicine during this hospital stay which they had not taken before. The following table (Table 32) contains their responses to two follow on questions. Almost 60% of patients were "always" told the reason for new medications, 50% of them say they were "never" told of the possible side effects.

Table 5.30 Patient satisfaction with medication safety

	Percentage response				
Question	Never %	Sometimes %	Usually %	Always %	Mean rating (1-4)
1. Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?	10.8	15.5	13.9	59.8	3.23
2. Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?	49.7	13.3	5.1	31.8	2.19

Although many other questions in the patient survey relate to patient safety (communication between staff and patients, cleanliness, getting help when needed, pain control) this research will focus on the above two questions only as safety outcomes. Medication safety is of concern to hospitals and healthcare workers currently and in this study patient satisfaction with medication safety will serve as a proxy for patient satisfaction with other patient safety issues.

5.3.5. Discharge plans

All respondents were asked to estimate how many more days they expected to be in hospital. Responses varied greatly but the mean response was 7.4 days. When asked if doctors, nurses or other staff talked with them about their care after discharge, 46% answered “yes” (n = 129) and 54% answered “no” (n = 152). When asked if they had received written information about symptoms or health issues to look out for after discharge, 86% answered “no”(n = 238).

5.3.6. Overall rating of hospital

Two hundred and eighty three patients responded to this question. Patients were asked to rate the hospital out of 10, with 0 being the worst hospital ever, and 10 being the best possible hospital. The mean response was 8.67. In general the responses were very positive with 82% (n = 233) rating the hospital at 8 or above. Forty five percent of respondents rate the hospital at 10 (n = 126).

The mean hospital rating was very high and 45% of respondents rated the hospital as the best hospital possible. The question of whether the respondent would be happy to recommend the hospital to their families and friends is often seen as an important indicator of quality of care. In this survey 74% (n = 206) of patients said they would "definitely" recommend the hospital. A further 21% (n = 58) said they would "probably" recommend it. The mean response to this question was 3.67 (Range 1-4).

5.3.7. Respondent health status

Respondents were asked to rate their own health on a scale. Almost 20% rated their health as very good or excellent, a further 39% rated it as good. The remaining 41% rated their health as fair or poor.

5.3.8. Patient demographics

Respondents were also asked about the highest level of school that they completed. The responses were as follows:

Table 5.31 Highest level of school completed by patients in survey

Level or Grade	N	Percentage
Primary School	110	40%
Some secondary school but not leaving cert	81	29.5%
Competed leaving cert	45	16.4%
Some college	19	6.9%
College graduate (degree)	19	6.9%
More than primary degree	1	0.4%

Presented above were the descriptive findings of the patient survey carried out as part of this study. The results were presented at patient level. In this study ward means for variables associated with patient satisfaction with medication safety will be imported into the nurse data and used as outcomes in modelling. In the next chapter these models will be developed and presented.

5.4. Exploration of relationships between descriptive variables

In this chapter the descriptive findings of the three study surveys have been reported. In this section clarification of the relationships between certain descriptive variables is established. This process aims to clarify the importance of certain variables to achieving the objectives of the study. It provides a more comprehensive picture of variables of interest to the study such as those measuring nursing factors. The analyses in this section are carried out at nurse level only, no consideration is given to the clustering of nurses with wards in this section.

5.4.1. Differences in patient outcomes between nurses with degrees and those without degrees

Previous research by Aiken et al (2003) clearly indicated that a more highly educated nurse workforce leads to improved patient outcomes. An important patient safety outcome in this study was nurse-reported frequency of adverse event occurrence. It was of interest in the early stages of this study to ascertain the influence of the education

levels of Irish nurses on a composite developed to measure this outcome. The frequencies for this patient outcome were reported earlier in this chapter (p149). The adverse events included in the composite used for this nurse level test are those for which responses were closest to normal distribution. These include medication errors, falls with injury, UTIs, bloodstream infections and pneumonia, complaints from patients or families, verbal abuse towards nurses by patients, families or staff, physical abuse of nurses by patients or families and work related injuries to nurses. Pressure ulcers following admission and physical abuse towards nurses by staff were not included in the composite due to lack of variability.

An independent-samples t-test was carried out to compare the mean responses to the adverse event composite by the nurse respondents who held a baccalaureate degree and those who did not. This demonstrated a significant difference between the two groups. Those who had a degree reported a higher level of adverse event occurrence than those who did not have a degree [those who had a degree $\sum$(mean)= 15.316, SD = 7.633 and those who did not have a degree $\sum$=13.308, SD = 6.725, t= 4.22, p=0.000 (two-tailed)]. This test did not take into account that the nurses were clustered within units, however it examined the relationship between the individual nurse's education level and his/her reported frequency of adverse event occurrence. As a nurse level test it indicates that the variable which examines nurse education levels should be included in further analysis of patient outcomes. Aggregated to ward level, the impact of the proportion of nurses holding a degree on patient outcomes will be examined in multi-level analysis in chapter 6.

5.4.2. Differences in patient outcomes between nurses trained in Ireland and those trained elsewhere

The descriptive findings reported earlier in the chapter indicate that 38% nurse respondents to the nurse survey trained outside of Ireland (p135). The influence of this movement of nurses on nurse-reported frequency of adverse event occurrence was examined through an independent-samples t-test. A significant difference was found between the two groups, with those trained within Ireland reporting a higher level of adverse event occurrence than those who trained outside of Ireland [those who trained in Ireland ∑=15.2959, SD = 7.416 and those who trained outside of Ireland ∑= 13.11, SD = 7.19, t = 4.99, p = .000 (two-tailed)]. This nurse level test confirmed the importance of the variable measuring country of nurse education when considering the impact of nursing factors on patient safety outcomes.

5.4.3. An examination of the factors contributing to levels of work left undone by nurses

Earlier in the chapter, the number of activities identified as left undone by individual nurses due to time constraints was found to vary considerably between 0 and 13 [∑=3.75, SD = 2.9] (p138). This variable was of interest to this study as these necessary activities when left undone have the potential to compromise patient safety. The factors which contributed to the variation in responses were of interest, particularly if impacted by the nurse skill mix. The following correlations examine relationships between levels of work left undone and factors identified as possible contributors.

5.4.3.1. Examining the relationship between necessary work left undone by nurses and percentage of staff nurses in the direct care work force

A ward mean for total work left undone was entered into a correlation matrix to investigate if the percentage of registered nurses in the total direct care work force (registered nurses and HCAs) contributed to amounts of work left undone.
However only a very weak correlation was found between these ward level variables, the total work left undone (ward mean) and the percentage of staff nurses in the unit in the direct care work force(r=0.106, n=1397, p<.0005).

5.4.3.2. Examining the relationship between amount of planning and documenting of care left undone and the total number of formal adverse event reports submitted

Care-planning and documentation of nursing care was reported as work left undone by nurses. The ward mean for this category of work left undone and the ward mean for total number of formal adverse event reports submitted was entered into a correlation. However again only a very weak correlation was evident between planning and documentation of care left undone by nurses at the end of their shift due to lack of time, and the formal adverse event reporting patterns of nurses (r=.099, n=1397, p<,0005).

5.4.5. Exploring the impact of nurse attendance at in-service safety training on patient outcomes

Training in patient safety is acknowledged to be essential to ensure compliance with the systems approach by staff, and to improve the level of safety of care provided to patients. An independent-samples t-test was carried out to compare the mean responses to how often adverse events occur as reported by the nurse respondents who attended clinical risk management training in the past year and those who did not. A significant difference is found between the two groups. Those who attended the training reported lower occurrence rates than those who did not attend the training [those who attended

the training ∑= 13.944, SD= 7.219, those who did not attend the training ∑= 15.25, SD= 7.402, t (1149) = -3.021, p=0.003 (two-tailed)]. This finding is confirmed with slightly higher mean scores for nurse-reported adverse event occurrence rates from nurses who have not attended in-service training in infection control, blood transfusion or adverse event reporting in the past year, than from those did attend the training.

5.4.6. Exploring the impact of ward type (surgical or medical) on nurse-reported frequency of adverse event occurrence

Nurse-reported frequency of adverse event occurrence was collated through the nurse questionnaire. The descriptive results are reported above on page 154. In this study a composite for nurse-reported frequency of adverse event occurrence was developed for use as a patient safety outcome in further analysis. Not all items (adverse events) listed in the nurse questionnaire were included in the composite. Variability for the items varied and therefore some items were eliminated. To aid this decision a T test was run on each variable to look for differences between Surgical and Medical wards. Table 5.32 below contains the results indicating for each variable if a significant difference is found between the two groups. The last columns show where a significant difference is found between the groups which group has a higher mean.

Table 5.32 Comparison for nurse-reported adverse event occurrence in medical and surgical wards

	Adverse event	*Difference between Medical and Surgical wards*	*If sig. where is highest mean?*	*Med Ward mean*	*Surg Ward mean*
B7.1	Patient receiving wrong meds, time or dose	Not sig (p=0.96)			
B7.2	Pressure ulcers after admission	Not sig (p=0.614)			
B7.3	Patient falls with injury	Sig (p=0.000)	Medical wards	1.65	**1.21**
B7.4.1	Healthcare associated UTI	Sig (p=0.033)	Medical wards	1.55	**1.42**
B7.4.2	Healthcare associated Bloodstream infection	Not sig (p=0.311			
B7.4.3	Healthcare associated pneumonia	Sig (p=0.000)	Medical wards	1.46	**1.18**
B7.5	Complaints from patients or families	Sig (p=0.000)	Medical wards	2.10	**1.70**
B7.6.1	Verbal abuse of nurses by patients or families	Sig (p=0.000)	Medical wards	3.01	**2.34**
B7.6.2.	Verbal abuse of nurses by staff	Not sig (p=0.574)			
B7.7.1	Physical abuse towards nurses by patients or families	Sig (p=0.000)	Medical wards	1.82	**1.11**
B7.7.2	Physical abuse towards nurses by staff	Not sig (p=0.781)			
B8	**Work related physical injuries to nurses**	**Sig (p=0.000)**	**Medical wards**	**1.27**	**1.05**

On this basis the seven variables for which significant differences were found between medical and surgical wards, were included in the composite developed for inclusion in further multilevel analysis. Co-incidentally these variables were those which lacked variability in the overall data.

5.5. Chapter conclusion

This chapter contains descriptive results from data collected during the three study surveys. The Organisational Profile findings presented offer a brief picture of Irish acute hospitals, of nurses working in general wards within these hospitals and of patients cared for within these wards. They highlight the diversity within the acute hospital sector, with notable differences in hospital size and activity, and acknowledge the ongoing structural changes such as mergers and closures. Data gathered on clinical staff numbers (medical, registered nurses and healthcare workers) enabled the calculation of staff ratios which will be included in further analysis in the next chapter. Hospital level

data collected through the hospital survey will be used to contextualise nurse data in the next phase of the analysis. Hospital level variables will be imported into the larger nurse data set and all nurses in a hospital will have the same value for these variables.

The nurse survey descriptive results present an overview of the nurse in a general ward setting in Ireland. This overview includes not only demographic data on age profile, country of training and education levels attained, but also up-to-date data on the workload of these nurses and the work carried out by them on a daily basis. All of these findings are framed within the picture presented of current hospital structures through data obtained in the organisational survey. Of the nurses who responded to the questionnaire almost 60% of them have a degree, although the proportions vary from ward to ward; 99% report that they do non-nursing work (page 137), while necessary nursing work remains undone; 13% of wards in this study had the work environment described as "poor" by nurses who work there, with only 15% of wards described as "better"; the work environment subscale rated most poorly was that which measured the staffing and resources, but nurse participation in hospital affairs and nurse leadership would also benefit from improvement; 41% of nurses report high levels of emotional exhaustion; over 60% of nurses graded safety on their ward as very good or excellent, nevertheless only 37% were confident or very confident that management would respond to issues they raised. The findings of this survey help to depict the experiences of nurses currently working within these hospitals. Internationally nurses are described as key players in patient safety and these findings enable an examination of the Irish nurse's experience of patient safety in the current healthcare environment. They enable an examination of the relationship between factors which enable the nurse to deliver safe patient care in a fiscally constrained health service. Through the exploration of

some of these relationships between nurse level variables which has been conducted in this chapter, variables have been identified for further examination in the next chapter. These include education levels of nurses, country of training, attendance at safety training and nurse-reported adverse event occurrence. T-test suggest that nurses' formal reporting of adverse events is not linked to the tendency to leave documentation work undone when short on time, therefore other factors may be involved. Aggregation of nurse survey results to ward level in the next chapter enables examination of the influence of ward clusters on patient safety outcomes.

The patient survey descriptive results presented above demonstrate overall high levels of satisfaction with the care currently received by patients in general wards in Irish hospitals. In this study the key findings for patient satisfaction will be levels of satisfaction with medication safety, examined in the next chapter. Patient level data will be aggregated to ward level for further analysis to examine the effect of ward clusters on patient satisfaction.

Chapter 6 MULTILEVEL MODELLING

The objectives of this study, conducted in acute hospitals in Ireland, are to examine the impact of nursing factors and organisational factors on patient safety outcomes, and to identify factors which enable nurses to fulfil the reporting function of their role in patient safety. In order to address these objectives three surveys have been carried out: an organisational profile survey of acute hospitals, a nurse survey on general wards in these hospitals and a patient satisfaction survey.

In the preceding chapter descriptive results for three surveys are presented. These results provide safety profile details of the acute hospital sector in Ireland and of its current challenges. They also provide a demographic profile of the nurses working within that sector on general wards, and an understanding of their work and workload, and of their work environment and experiences of patient safety. Additionally the patient survey results provide a summary of patient satisfaction with care they received in these wards, including their levels of satisfaction with medication safety.

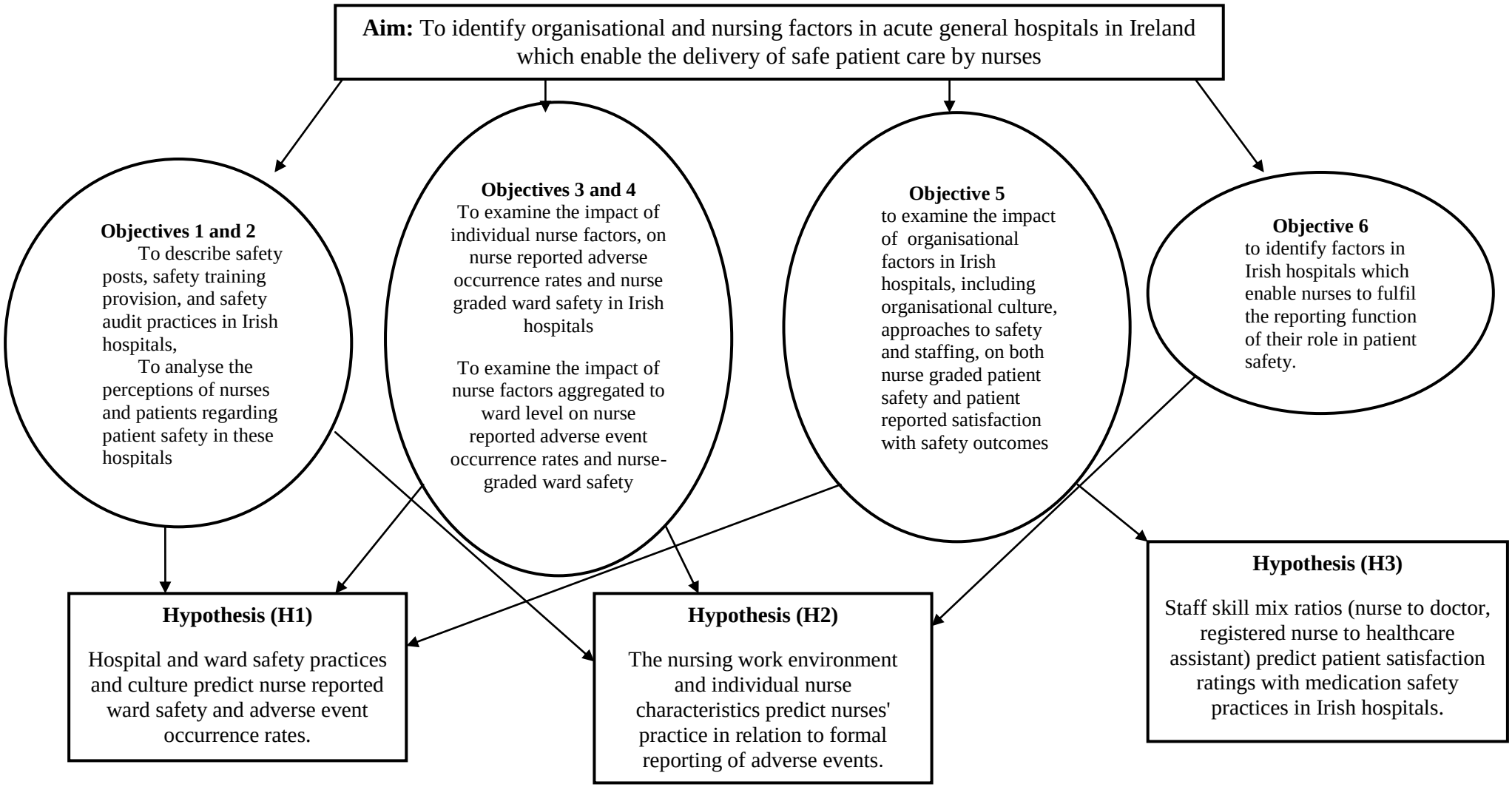
As outlined in the methodology chapter (Chapter 4 above) and in the descriptive results (Chapter 5 above) the data in this study are clustered. This implies that the data are organised at more than one level i.e. at hospital level, at ward level and at the level of the individual nurse. For this reason multilevel modelling is employed as an analysis technique in this study and is reported on in this chapter.

6.1. Development of study hypotheses

The descriptive results of all three surveys provide a context for further analysis to advance the overall aim and objectives of the study. To advance the analysis process

three study hypotheses have been developed. These hypotheses have emerged from the original objectives of the study. The following diagram (Figure 6.1) illustrates the links between the study aim, its objectives and the resultant hypotheses.

Figure 6.1. Diagram of Aim, Objectives and Resultant Hypotheses



6.2. Hypothesis testing

In this section the hypotheses, as linked to the objectives above, are examined and reported on. The clustered structure of the data in this study implies that a multilevel approach to analysis is required. Multilevel modelling techniques acknowledge the clustered structure of the study data (nurses and patients within units, within hospitals). In this section multilevel and regression models are used where appropriate. Where multilevel modelling is used the analysis takes place at the level of the individual nurse (level 1) and ward level (level 2) only. This examines the influence of ward clustering of nurses on the patient safety outcomes. A decision has been taken to examine nurses in wards, with the ward at the highest level of the analysis rather than the hospital, for a number of reasons:

- data from 112 wards were available for analysis, rather than 30 hospitals,
- in the early stages of analysis, as reported in chapter 5, the effect of the ward appears to be greater than the effect of the hospital,
- the influence of ward level variables on patient safety outcomes is of interest to the study, and critical to the testing of the hypotheses e.g. the nurse work environment, nurse workload, emotional exhaustion levels, nurse education levels and experience, the safety culture, the unit safety grade, adverse event occurrence rates, patient satisfaction, and adverse event reporting rates,
- available evidence, as outlined in the literature review, suggests that the nurses' work environment is important to improvements in patient safety and that the culture or climate of safety is influential in how professionals carry out their roles in patient safety.

The descriptive results, and the examination of relationships between certain variables of interest to the study, has contributed to choices made around inclusion of variables in

hypotheses testing. The hypotheses are again outlined below with a guideline to subsequent analysis procedures.

H1. Hospital and ward safety practices and culture predict nurse-reported ward safety and adverse event occurrence rates.

The first premise of this hypothesis is that hospital factors predict patient safety outcomes. In this study hospital level variables have been established through the organisational survey. These variables, when imported into the nurse data set for analysis purposes, remain at hospital level. As such multi-level modelling is not possible to test this premise as subdivision to ward level of these variables is not achievable. In this case regression analysis has been used and is reported on in this section.

The second premise contained in this hypothesis is that ward factors predict patient safety outcomes. A multilevel modelling approach has been used to test this premise and is presented in this section. Two models have been constructed using two different patient safety outcomes: nurse-reported adverse event occurrence, and nurse-graded ward safety.

H2. The nursing work environment and individual nurse characteristics predict nurses' practice in relation to formal reporting of adverse events.

This hypothesis is tested in one multilevel model which combines both the nurse work environment variable, and some of the individual nurse characteristics aggregated to ward level. The patient safety outcome included in this model is the number of formal reports submitted by the nurse over the past year.

H3. Staff ratios (nurse to medical staff, registered nurse to healthcare assistant) predict patient satisfaction ratings with safety practices in Irish hospitals.

In order to test this hypothesis, data from only 10 of the original 30 hospitals are used. The patient survey has been carried out in these 10 hospitals. The outcomes used in this analysis are the patient satisfaction ratings with medication safety during their stay in hospital. As the data on staff ratios are available only at hospital level and subdivision to unit level is not possible, multilevel modelling is not suitable for testing this hypothesis. Regression analysis is used here and is reported on in this section.

6.2.1. Hypotheses testing through multilevel modelling

The patient safety outcomes from the nurse questionnaire which are utilised in model construction are as follows:

- Nurse-reported frequency of adverse event occurrence (composite which includes the seven items identified in chapter 5 page 169)
- Total number of formal adverse event reports submitted in the past year (summed responses to E.5.a.-E.5.c. of the nurse questionnaire)
- Nurse overall safety grade for ward (single item from nurse questionnaire)

A multilevel modelling approach has been taken to examine H1 and H2. This approach recognises that individual nurses are clustered in units. The effect sizes of statistically significant differences detected across wards in this sample are larger than the effect sizes across hospitals. Therefore this suggests that investigating the difference across wards would be of greater practical importance. For this stage of analysis, all wards with fewer than 5 nurse responses have been removed from the dataset in order to increase the reliability of the findings. Reliability testing is conducted prior to modelling and is reported on below.

6.2.1.1. Multi level Model A to test H1

Step 1: Constructing the Null Model

This step is carried out to examine the variance in the outcome, within and between wards. A composite has been developed of seven nurse-reported adverse events which showed the greatest variability (Nurse questionnaire question B.7). Multilevel modelling enables assessment of how much of the variance in nurse-reported frequency of adverse event occurrence (summed B7.3, B7.4.1, B7.4.3, B7.5, B7.6.1, B7.7.1, B8) lies between wards. The intercept or grand mean is estimated at 11.023.

Table 6.1 Null Model indicating variance in Multilevel model A construction

Estimates of Covariance Parameters							
Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		27.364	1.169	23.406	.000	25.166	29.754
Intercept [subject = UNITID]	Variance	5.048	1.065	4.739	.000	3.338	7.634

Using the above results, the variance in nurse-reported frequency of adverse event occurrence between the wards has been found to be 16% (ICC) suggesting that multilevel modelling is warranted. The average nurse-reported adverse event occurrence shows significant variance within wards (Wald Z = 23.406, p <.001). The intercepts vary significantly across wards also (Wald Z = 4.739, p < .001).

As the number of nurse responses per ward varies significantly (from 5 to 24) it is likely in multilevel modelling that reliability would vary across units due to differences in unit sizes. Reliability checking has been conducted and the results are as follows:

Table 6.2 Reliability testing for varying ward response rates multilevel model A

Ward size	Reliability
n= 5	0.48
n= 24	0.82

Step 2: Constructing the Level 1 model

In this step the nurse level variable of necessary work left undone is introduced as a predictor. This variable has been selected following a review of the work by Lucero et al (2010a and 2010b). In that work a clear link is demonstrated, through regression analysis, between nursing work left undone and the nurse-reported frequency of adverse event occurrence. It is likely that multilevel modelling would strengthen any findings. The large F value (F=792.581, p <.001) obtained indicates that work left undone by the nurse is significantly related to summed nurse-reported adverse event occurrence. The average ward mean for nurse-reported adverse event occurrence adjusted for work left undone is 9.14 with a standard error of 0.325 (the unit mean in the null model was 11.023, standard error .268).

The addition of the within ward (or nurse level) predictor of work left undone reduces the within ward variability from 27.364 to 25.597. These figures are used to calculate that 7% of the variability within wards, of summed nurse-reported frequency of adverse event occurrence, is accounted for by the work left undone by individual nurses. However the reduction in variance between wards from 5.048 to 4.347 implies that within ward work left undone accounts for 14% of the between ward variability in the summed nurse-reported frequency of adverse event occurrence. The Interclass Correlation (ICC) at this point in the process is 15%. The ICC indicates the total variability in the outcome that is attributable to the grouping i.e. the ward. There is still significant variability to be explained both within (Wald Z =23.329, p <.005) and

between wards (Wald Z = 4.585, p<.005) following the introduction of the nurse level variable of total work left undone. This supports the introduction into the model of further ward level variables (predictors).

Step 3: Constructing the Level 2 model

Ward level variables from the nurse questionnaire, are added to the model in order to explain the variability across wards. Three important ward level variables reach significance in the model. These are:

- the ward level nurse experience in the relevant field (medical or surgical) for current ward,
- the ward mean for nurse-graded patient safety in the ward
- the ward mean for nurse confidence in hospital management to resolve problems in patient care reported by nurses.

The nurse "experience in the relevant field" variable has been chosen to check the influence of relevant experience on adverse event occurrence. Most studies have taken a nurse experience measure as the number of years the respondent spent working as a nurse. However the data collected for this study suggests that nurses, particularly those early in their career, move between areas. Differences are evident between time spent working as a nurse and experience in the relevant field (see table 5.6 p135). The work of Benner (1984) suggests that when such movement takes place, years experience cannot be taken as a measure of expertise. Therefore for this study "experience in the field" is used to reflect expertise. The confidence in management variable can be seen as an item which could be used as a simple measure of safety culture. The belief that management is supportive of patient safety initiatives has been shown (see literature review p44) to influence patient safety throughout the organisation and to be of great importance in

terms of how staff perceive safety levels in the organisation. Nurse-rated patient safety has been used in several studies as a patient safety outcome. In later models in this study it is used in this way, however in this case this variable is used as a measure of patient safety at ward level and a predictor of adverse event occurrence.

The nurse work environment aggregated to ward level and other ward level nursing variables have failed to reach significance in this model. These ward level variables include staffing variables (nurse to patient ratio and the ratio of registered nurses to HCAs), the proportion of nurses educated to degree level, the mean emotional exhaustion level and the culture of safety (as measured by the composite developed on p155). The safety culture composite for individual nurses measures their perceptions of the organisational-wide culture of safety i.e. what value is given to safety in the organisation. Aggregated to ward level, the mean culture of safety score reflects how the nurses within a ward community perceive the culture of safety throughout the organisation. It takes into account the influence of the ward group on nurses' perceptions and of the environment in which nurses work. In this model the simple one-item measure of safety culture, nurse confidence levels that hospital management will act to resolve problems in patient care which are reported, does reach significance.

Table 6.3 Multilevel model A constructed using nurse-reported adverse event occurrence as a safety outcome

Estimates of Fixed Effects							
Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	24.818	2.332	117.165	10.644	.000	20.201	29.436
Nurse Experience (ward level)	-3.585	.665	109.799	-5.395	.000	-4.903	-2.269
Ward safety grade (ward level)	-1.422	.646	109.872	-2.200	.030	-2.703	-.141
Confidence in hospital management (ward level)	-1.437	.693	109.196	-2.074	.040	-2.810	-.064
Total care undone (nurse level)	.471	.054	1186.554	8.700	.000	.365	.577

Interpreting the above, the following factors predict higher levels of nurse-reported adverse event occurrence:

- lower nurse experience levels
- lower nurse-graded ward safety
- lower ward mean for confidence in hospital management to resolve problems reported to them
- higher levels of total care undone by individual nurses

The results contained in the table 6.4 below suggest that nurse level work left undone and three ward level (level 2) predictors reduce the variance at ward level from 5.048 to 2.380. This level 2 model confirms the findings of the level 1 model that the individual nurse's total care left undone accounts for 7% of the difference in the summed nurse-reported frequency of adverse events within wards.

Table 6.4 Multilevel model A level 2 variance

Estimates of Covariance Parameters							
Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		25.523	1.091	23.396	.000	23.472	27.753
Intercept [subject = Ward ID]	Variance	2.380	.660	3.608	.000	1.382	4.097

The addition of the ward level predictors reduces the variance from 5.048 to 2.380. This is a 53% reduction in variance between the model at level 1 and the level 2 model. Fifty three percent of the variance between wards in nurse-reported frequency of adverse event occurrence can be explained by this model.

Factors aggregated to ward level, such as mean experience level of nurse workforce, ward confidence in hospital management and ward safety score predict nurse-reported frequency of adverse event occurrence.

Figure 6.2. Illustration of Multilevel Model A

Nurse level	Ward level	Patient safety outcome
Necessary work left undone	Mean nurse experience level Mean nurse-graded safety on ward Mean confidence in hospital management	Nurse-reported adverse event occurrence

6.3.1.2. Multi level Model B to test H1

Further testing of H1 has been carried out using nurse-reported ward safety as the patient safety outcome. A two level multilevel modelling approach is taken here also.

Step 1 Constructing the Null Model

This examines the variance in nurse-graded "patient safety in the ward", between wards. The intercept (or mean overall) is 3.66.

Table 6.5 Null model indicating variance in multi level model B construction

Estimates of Covariance Parameters							
Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.630	.025	24.956	.000	.582	.681
Intercept [subject = Ward ID]	Variance	.132	.025	5.188	.000	.090	.192

The variance between wards is found to be 0.173 [0.132/(0.132+0.630)]. This is an ICC of 17% which confirms that multilevel modelling is warranted. Significant variance can be seen above within wards (Wald Z =24.956, p<.001) and across wards (Wald Z =5.188, p <.001). Due to varying nurse response number across wards, reliability checks are carried out.

Table 6.6. Reliability testing for varying ward responses multilevel model B

Ward size	**Reliability**
n= 5	51%
n= 24	83%

Step 2 Constructing the Level 1 model

Here the nurse level variable of safety culture is introduced as a predictor. This variable is used because a positive safety culture in organisations has been associated with better

safety outcomes (see literature review). This variable is a composite score for five items measuring safety culture as described earlier in the chapter 5 (page 162). The large F value obtained (F=770.076, p <.001) indicates that nurse-reported safety culture is significantly related to nurse-graded patient safety in the ward.

The addition of the predictor organisational safety culture reduces the within-ward variability from 0.630 to 0.548. This reduction is used to calculate that 13% of the within ward variability of nurse-graded patient safety in the ward, is accounted for by the safety culture as perceived by individual nurses. However, the reduction in variance between wards from 0.132 to 0.069 implies that nurse level safety culture accounts for 47% of the between ward variability in grade of patient safety. The ICC here is 11%. Again there is significant variability to be explained within wards (Wald Z = 24.752, p <.001) and between wards (Wald Z = 4.272, p<.001). This calls for the introduction of further predictors.

Step 3 Constructing the Level 2 Model

Ward level variables are added to the model at this point. Ward level nurse characteristics (proportion with degrees and emotional exhaustion levels) are introduced here as such characteristics have been linked to safety outcomes in previous work by Aiken et al (2002, 2003).

Table 6.7 Multilevel model B constructed using nurse-graded ward safety as the safety outcome

Estimates of Fixed Effects							
Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	1.599	.427	103.656	3.742	.000	.752	2.446
Safety Culture Composite (nurse level)	.336	.024	1323.891	13.783	.000	.289	.384
Proportion of nurses in the unit who have a degree (ward level)	-.004	.001	97.559	-2.444	.016	-.006	-.001
Emotional Exhaustion (ward level)	-.011	.007	97.778	-1.567	.120	-.025	.003
NWIscore5 (ward level)	.555	.129	115.455	4.310	.000	.300	.810

In this model both the education level of nurses within the ward (as measured by the proportion of nurses who have a degree) and the nurse work environment contribute significantly to the model along with the safety culture. The ward mean for emotional exhaustion levels does not reach significance.

The variability is reduced at this point in the model from 0.132 to 0.032.

Table 6.8 Multilevel model B level 2 variance

Estimates of Covariance Parameters							
Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		.549	.022	24.730	.000	.507	.594
Intercept [subject = Ward ID]	Variance	.032	.011	2.862	.004	.016	.064

This model confirms the level one model's findings that safety culture accounts for 13% of the difference in nurse-graded ward safety, within wards [(0.630- 0.549)/0.630]. However the addition of ward level predictors reduces the variance from 0.132 to 0.032. This means that 76% of between ward variance in nurse-graded ward safety can be

explained by this model. The model confirms that ward factors predict patient safety outcomes. These ward factors include the aggregated education levels of nurses within the ward and the aggregated nurse work environment as measured by the NWI –PES.

Figure 6.3. Illustration of Multilevel Model B

Nurse level	Ward level	Patient safety outcome
Nurse-reported culture of safety	Mean nurse work environment (PES-NWI total score) Proportion of nurses in a ward who hold a degree	Nurse-graded ward safety

6.3.1.3. Multi level Model C to test H2

H2 states that the "nursing work environment" and individual nurse characteristics predict nurses' practice in relation to formal reporting of adverse events. In this section the total number of formal incident reports submitted by the nurse in the last year is examined through multilevel modelling to address H2. In this case all wards with more than 5 respondents were included.

The patient safety outcome used in this model is the total number of formal adverse event reports submitted by the nurse in the last year. Current patient safety strategy depends on full and open reporting of adverse events in order to maximise learning from the incident and to prevent recurrence. Under-reporting by all staff, including nurses, is an acknowledged limitation of the systems approach to safety. For this reason information has been sought on nurses' reporting patterns as part of this study. This should enable exploration of the factors which impact on reporting.

Step 1 Constructing the Null Model

The intercept or mean of total reports submitted in the past year is estimated at 4.94. This model provides an estimated mean "total formal reports" for all wards.

Table 6.9 Estimates of Covariance Parameters Null model

parameter	estimate	Std error	Wald Z	Sig.
Residual	46.438	1.971	23.56	.000
Intercept (Ward ID)	6.909	1.675	4.12	.000

The results show the variance between units to be 13% [6.909/ (6.909 + 46.438) =.129]. This verifies that multilevel modelling was appropriate. Due to differences in ward sizes, the reliability for different sized wards is checked:

Table 6.10. Reliability testing for varying ward responses multilevel model C

Ward size	Reliability calculation	Estimated Reliability
n =5	6.909 / [6.909 + (46.438/5)]	0.426
n = 24	6.909 / [6.909 + (46.438/24)]	0.781

The null model demonstrates that 13% of the variability in numbers of formal incident reports submitted by nurses lies between wards. Table 6.10 shows that there is significant variance to be explained within wards (Wald Z = 23.560, p <.001) and across wards (Wald Z =4.122, p <.001).

Step 2: Constructing the Level 1 model

In this step of the modelling process nurse level NWI scores are introduced as a predictor of number of formal reports submitted by the nurse. The work environment of nurses has been shown in repeated studies to impact on patient safety outcomes (nurse level analysis). The F value indicates that NWI was significantly related to the number

of formal incident reports submitted by nurses (F= 41.671, p<.001). After the predictor is added the between-ward variance was reduced from 6.909 to 4.274.

Table 6.11 Variance at level 1 in construction of Multilevel model C

Estimates of Covariance Parameters							
Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		47.909	2.268	21.127	.000	43.664	52.566
Intercept [subject = WardID]	Variance	4.274	1.457	2.933	.003	2.191	8.339

Using this reduction, within ward NWI (nurse level) scores are calculated to account for 38% of the between ward variability in the numbers of formal reports submitted by nurses [(6.909 – 4.274)/6.909 =0.38]. This means that almost two fifths of the variation in means across wards can be accounted for by the NWI scores of the nurses working within the wards. The NWI score accounts for almost no variance within wards.

The ICC is reduced from 13% to 8% after controlling for nurse NWI scores [4.274/ (4.274 + 47.909). Notable however is the slight increase in within-ward variability from the null model to the level 1 model (46.438 to 47.909). This phenomenom is usually explained as the variance components of a null model may be less accurately estimated when there are no predictors (Heck, Thomas and Tabata, 2010).

There is still significant variability to be explained both within wards (Wald Z= 21.127, p <.001) and across wards (Wald Z = 2.933, p <.003). This suggests that other predictors both within and across wards might explain the variation. However the model to this stage confirms that the nurse level work environment impacts on the numbers of formal reports on adverse events nurses submit.

Step 3: Constructing the Level 2 model

Ward level variables are added to the model in order to further explain the variability. Nurse experience levels are not found to be significant at this point; however the proportion of nurses with degrees working within a ward is significant. Further ward level variables do not reach significance at this point. These include the ward mean for necessary nursing work left undone, the ward mean for nurse-graded ward safety, the ward nurse to patient ratio, and proportion of nurses in the ward who had attended either risk management training or infection control training within the previous year. Data has been collected as part of this study on in-service safety training. Risk management training, infection control training and blood transfusion training all highlight the reporting process. For this reason the proportion of nurses who had attended each of these sessions in the past year is included in analysis as continuous variables, in order to examine the impact of the training on adverse event reporting. When the following ward level variables are entered into the model the variance is reduced: the ward mean for emotional exhaustion levels, the proportions of nurses on the ward with a degree and who had attended blood transfusion training in the previous year. However the proportion of nurses who attended blood transfusion training does not reach significance in the model, although it did appear to contribute to the variance reduction.

Table 6.12 Variance at level 2 in constructing Multilevel model C

Estimates of Covariance Parameters							
Parameter		Estimate	Std. Error	Wald Z	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Residual		47.788	2.254	21.197	.000	43.568	52.418
Intercept [subject = WardID]	Variance	3.379	1.303	2.593	.010	1.587	7.195

The reduction in variance from the initial 6.91 to 3.38 is used to calculate the variance at level 2 [(6.91-3.38)/6.91]. This implies that nurse level NWI score and certain ward level predictors give rise to a variance at level 2 of 51%. This result suggests that 51% of the across ward variance in numbers of formal adverse event reported can be accounted for by this model. Only the variables NWI score (nurse level) and the proportion of nurses with a degree (ward level), contribute significantly to the model.

Table 6.13 Multi level model C constructed using number of formal reports submitted as the safety outcome

Estimates of Fixed Effects							
Parameter	Estimate	Std. Error	df	t	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Intercept	3.961	2.523	196.035	1.570	.118	-1.015	8.936
NWI score	-1.089	.500	992.454	-2.176	.030	-2.071	-.107
Proportion of nurses in the ward who attended Blood Transfusion training	-.021	.014	101.665	-1.454	.149	-.049	.008
Emotional Exhaustion ward mean	.102	.060	97.389	1.717	.089	-.016	.221
Proportion of nurses with a degree in the ward	.042	.015	94.196	2.779	.007	.012	.071

This model demonstrates that the “nursing work environment” (nurse level) predicts the formal adverse event reporting practices of nurses. Also the proportion of nurses educated to degree level in the ward predicts reporting practices. The ward mean for emotional exhaustion level, fails to reach significance in this model.

Figure 6.4. Illustration of Multilevel Model C

Nurse level	Ward level	Patient safety outcome
Nurse work environment (PES-NWI total score)	Proportion of nurses in a ward who hold a degree	Number of formal reports submitted in the past year

6.3.2. Hypotheses testing through regression modelling

Regression analysis is used in order to incorporate hospital level variables in the hypotheses testing process. The impact of hospital level variables on patient safety outcomes is examined when testing H1 and H3. H1 is partially explained through Multilevel Models A and B, but further examination is required using hospital level variables in a regression model. The results of this are presented in this section.

H3 states that staff ratios (nurse to medical staff, registered nurse to healthcare assistant) predict patient satisfaction ratings with medication safety practices in Irish hospitals (see above p174). This hypothesis is tested in this section also using regression analysis.

6.3.2.1. Regression Model A to test H1

Nurse staffing levels have been linked to patient safety outcomes in several previous studies. However in this study the ratio of nursing staff to other staff members has been examined. These included medical staff and healthcare assistants.

In this study data on skill mix have been obtained from three sources. These include data from the nurse questionnaire, the organisational profile and additional skill mix data collated locally at the time of data collection. In an effort to cross check the veracity of these data, they have been entered into a large correlation matrix.

The results of correlations conducted on the skill mix data can be summarised as follows:

There is one strong correlation ($r = \geq 0.7$) revealed

- between the ratios of staff nurses to HCAs as calculated from the organisational profile data for both *medical* and *surgical* wards in the study hospitals ($r=0.905$, $p<0.001$). This supports the findings presented in Table 5.2 above p129.

Several moderate correlations can be identified

- between the ratio of staff nurses to HCAs in *surgical wards* as calculated from the organisational profile data and the percentage of registered nurses in the direct care workforce as calculated from the additional data collected locally when distributing questionnaires ($r = 0.608$, $p<0.001$)
- between the ratio of staff nurses to HCAs in *medical wards* as calculated from the organisational profile data and the percentage of registered nurses in the direct care workforce as calculated from the additional data collected locally when distributing questionnaires ($r = 0.547$, $p<0.001$)
- between the total nurse to total doctor ratio and the staff nurse (registered nurses in direct care) to Non Consultant Hospital Doctor (NCHD) ratio, both calculated from the organisational data supplied ($r = 0.524$, $p<0.001$)
- between the ratios of staff nurses to HCAs for *surgical* wards and the ratio of staff nurses to NCHDs in the overall organisation, both calculated from the organisational profile data ($r = 0.506$, $p<0.001$)
- between the ratios of staff nurses to HCAs for *medical* wards and the ratio of staff nurses to NCHDs in the overall organisation, both calculated from the organisational profile data ($r = 0.428$, $p<0.001$)

- between the nurse to patient ratio for all shifts, and the ratio for day shifts only as calculated from the nurse questionnaire ($r = 0.4$, $p<0.001$)

Other low level correlations can be identified also. The results of the correlation matrix are contained in table 6.15 below.

Table 16.15 Skill mix correlations (ratios and percentage)

		Registered nurse to patient **ratio** Day shifts only (Nurse questionnaire)	Day shift registered nurse to HCA **ratio** Ward mean (nurse questionnaire)	**Percentage** registered nurses in total direct care workforce (staff nurses+HCAs) (Additional data)	Total Nurse to total Doctor **ratio** (Org profile)	Staff Nurse to NCHD **ratio** (Org profile)	Medical staff nurse to HCA **ratio** (org profile)	Surgical staff nurse to HCA **ratio** (org profile)	Nurse to patient **ratio**-all shifts (nurse questionnaire)
Registered nurse to patient **ratio** Day shifts only (Nurse questionnaire)	Pearson Correlation	1							
	Sig. (2-tailed)								
	N	1352							
Day shift registered nurse to HCA **ratio** Ward mean (nurse questionnaire)	Pearson Correlation	-0.294	1						
	Sig. (2-tailed)	0							
	N	1352	1352						
Percentage registered nurses in total direct care workforce (staff nurses+HCAs) (Additional data)	Pearson Correlation	-0.129	0.229	1					
	Sig. (2-tailed)	0	0						
	N	1240	1240	1259					
Total nurse- total doctor **ratio** (Org profile)	Pearson Correlation	-0.139	-0.059	0.162	1				
	Sig. (2-tailed)	0	0.034	0					
	N	1301	1301	1208	1346				
Staff Nurse to NCHD **ratio** (Org profile)	Pearson Correlation	-0.236	0.19	0.31	0.524	1			
	Sig. (2-tailed)	0	0	0	0				
	N	956	956	860	922	973			
Medical staff nurse to HCA **ratio** (org profile)	Pearson Correlation	-0.064	0.171	0.547	-0.385	0.428	1		
	Sig. (2-tailed)	0.046	0	0	0	0			
	N	960	960	880	944	791	995		
Surgical staff nurse to HCA **ratio** (org profile)	Pearson Correlation	-0.148	0.094	0.608	-0.021	0.506	0.905	1	
	Sig. (2-tailed)	0	0.003	0	0.518	0	0		
	N	973	973	893	957	791	967	1008	
Nurse to patient **ratio**- all shifts (nurse questionnaire)	Pearson Correlation	0.4	-0.087	-0.076	-0.044	-0.071	-0.032	-0.056	1
	Sig. (2-tailed)	0	0.002	0.009	0.116	0.032	0.334	0.083	
	N	1282	1282	1199	1279	923	938	959	1326

Standard multiple regression is used to examine the impact of hospital level approach to safety (Total Safety score variable), and staffing ratios, on patient safety outcomes including nurse-reported adverse event occurrence and nurse-graded patient safety. The development of the Total Safety Score is described in section 5.1.3.4. (above p132) and includes summed safety posts, training provision and safety audits. No direct relationship is found.

Using patient satisfaction with medication safety as the dependent variable with the reduced nurse dataset for the 10 patient survey hospitals the following results are obtained. Two items from the patient satisfaction survey measure satisfaction with practices around medication administration. Both the provision of information around the reasons for new medications, and the potential side effects of new medication, are associated with safe administration practices. In this study patients have been asked about their experiences of these practices.

Table 6.15 Regression Model A

Dependent Variable: Patient satisfaction with information on side effects of new medications					
Independent Variables	Beta	t	Sig.	Tol.	VIF
Total Safety score for hospital (Organisational survey)	.189	3.316	.001	.566	1.767
Mean Patient-rating for hospital (patient survey)	.567	12.069	.000	.836	1.196
Surgical ward staff nurse to care assistant ratio (Organisational Survey)	.233	3.851	.000	.504	1.985
F =79.027, p<.001 Adj. R-Square =0.432					

The results suggest that hospital level variables such as total safety score and nursing staff ratios on surgical wards impact on patient satisfaction with medication safety.

Neither the staff ratios for medical wards, nor the overall ratios reached significance in this model. The reason for this is unknown but it must be noted that the staff ratios between medical and surgical wards are very strongly correlated as can be seen in the matrix.

6.3.2.2. Regression Model B to test H3

Standard multiple regression is again utilised to answer this question. Multilevel modelling is not used here because the dataset is reduced considerably in size. Nurse and organisational data from only 10 hospitals (35 wards) is used. These hospitals are used because patient survey data is available. Between 25 and 30 patient questionnaires have been completed in each of the 10 hospitals. Wards where the nurse response rate is less than 5 nurses are removed, leaving a sample of 467 nurses in 35 wards. The ward mean scores for relevant patient satisfaction variables have been imported to the nurse data file.

The patient safety variable chosen for the Dependent Variable in this analysis is satisfaction with information given on side effects of new medications. Staffing variables are inserted as independent variables, along with the mean patient rating of the hospital. The ratio of staff nurses to NCHDs was used in this model in preference to the ratio of total number of nurses to total number of doctors in the hospital because these staff grades are more involved in medication administration than others. The total nurse number includes all management grades and specialist nurses who do not administer medications, and the total doctor number includes all hospital consultants, who are less likely to be involved in prescription of medications and communication with patients around the prescription of new medications.

Table 6.16 Regression model B

Dependent Variable: Patient satisfaction with information on side effects of new medications					
Independent Variables	Beta	t	Sig.	Tol.	VIF
Mean patient rating for hospital (patient survey)	.549	11.321	.000	.747	1.339
Staff nurse to NCHD ratio (Organisational Profile)	-.134	-2.915	.004	.833	1.200
Surgical wards staff nurse to HCA ratio (Organisational Profile)	.108	2.431	.016	.886	1.128
F = 82.130, p<.001 Adj. R-Square =.427					

When Medical ward staff ratio is replaced by surgical ward ratios in the above model the adj. R-Square is reduced to .419 and the F value was 79.459. However the medical ward staffing ratio does not reach statistical significance although the two ratios are very strongly correlated and this must be considered.

Replacing the DV with the variable from the patient survey which measured patient satisfaction with information on reasons for new medications, the following results are obtained:

Table 6.17 Regression Model C

Dependent Variable: Patient satisfaction with information on reasons for new medications					
Independent Variables	Beta	t	Sig.	Tol.	VIF
Mean patient rating for hospital (patient survey)	.508	8.968	.000	.747	1.339
Staff nurse to NCHD ratio (Organisational Profile)	.185	3.451	.001	.833	1.200
Surgical wards Staff nurse to non-registered nurse ratio (Organisational Profile)	-.333	-6.415	.000	.886	1.128
F =31.345, p<.001 Adj. R-Square =.22					

Again replacing the surgical ward ratios with the medical ward ratios the F value is increased to 34.685 and the Adj. R-Square =.24. *In this case the medical ward staff nurse to HCA ratio is significant (p<0.001)*, however the staff nurse to NCHD ratio is *no longer statistically significant* when included in a model with the ratio from medical wards.

These results of regression analysis confirm that staffing ratios (both staff nurse to NCHD and registered nurse to HCA) derived from the organisational profile data predict patient satisfaction on important patient safety markers (medication safety). As such this analysis relates to both H1 and H3.

6.4. Chapter summary

This chapter contains the results of multivariate analysis, including multilevel modelling, conducted on the study data. In the previous chapter a picture is presented of nurses working in general wards in acute hospitals in Ireland. This includes aspects of the characteristics of that workforce, but additionally it includes information on the

work and workload of these nurses, and some of their experiences in the workplace. Information on the levels of patient satisfaction with care received within these wards is presented, along with a profile of the study hospitals. In this chapter the data sources are linked. Through this process each nurse response can be analysed in the context of the ward in which he/she works, and at a higher level in the hospital in which he or she works. Similarly for the patient data, it has been linked to the ward in which the patient was cared for and in which the nurse worked, and therefore to the hospital.

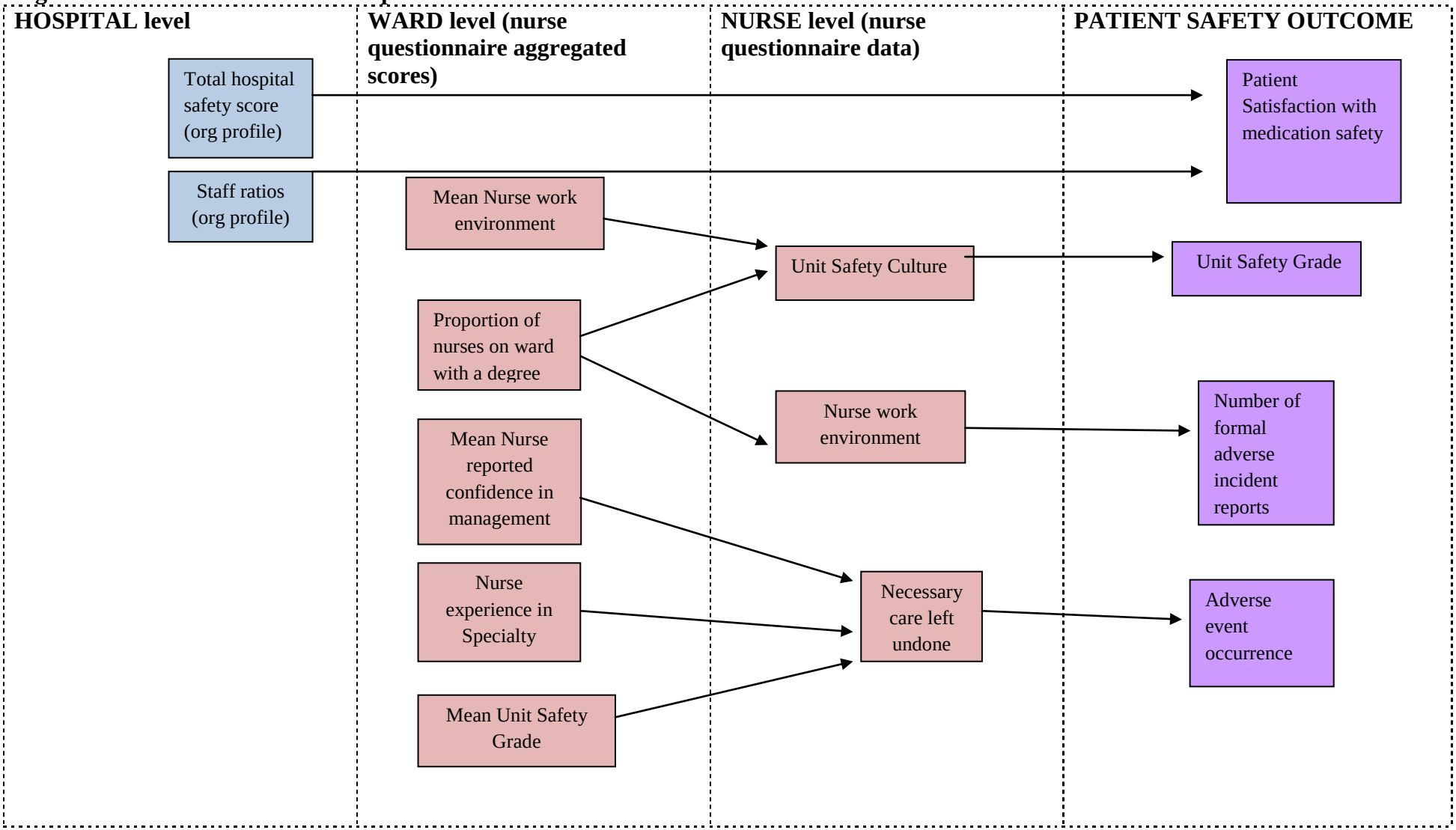
The clustered structure of the data points towards the use of multilevel modelling when testing the study hypotheses. The impact of the ward cluster is underlined through the use of variables aggregated to ward level and included in multilevel models. The nurse level variables have been selected for inclusion in the models based on previous research findings. Other variables have been aggregated to ward level to examine if relationships previously identified at nurse level remain relevant at ward level. Variables measuring the "nurse work environment" (at both nurse level and aggregated to ward level), and aggregated means for nurse characteristics such as the proportion of nurses with degrees, and the experience of nurses in the speciality, along with the nurse-graded ward safety and nurse confidence in hospital management are seen to predict patient safety outcomes through multilevel modelling. The multilevel analysis takes into account the influence of the ward cluster on nurse perceptions.

While nurse and ward level data are analysed using multilevel modelling, hospital level data are not amenable to this method because of the small number of hospitals in the study (n=30). Therefore in order to test the impact of hospital level factors on safety outcomes, regression analysis has been used. This analysis provides evidence that not

only are nurse staffing levels predictive of patient safety, but the ratio of nurses to other staff members is also of importance. The hospital ratios of staff nurses to Non Consultant Hospital Doctors and of staff nurses to HCAs in general wards have been found to predict patient satisfaction with medication safety. Similarly the overall hospital approach to safety as measured by the safety score has been seen to be of significance in predicting patient satisfaction. The diagram below (Figure 6.5) illustrates relationships found in this chapter. In this diagram PES-NWI is included as a variable measured at *nurse level* and at *ward level* in different analyses to confirm previous research findings and to extend these findings by examining if relationships found at nurse level remain true at ward level. "Nurse-graded ward safety" is included both as a *ward level independent variable* and as a *patient safety outcome* in different analyses. It has been used in previous research as a safety outcome, but its use is extended in this study to examine if nurse perceptions of safety within the ward impact on other safety outcomes.

The next chapter will contain a discussion of results from both this chapter and the previous chapter.

Figure 6.5 Illustration of relationships found



Chapter 7 DISCUSSION

Healthcare in Ireland and internationally is experiencing a period of rapid and ongoing change. In Ireland reduced funding in the health service is an enormous additional challenge. For hospital based care provision, increased demands on the service include an aging patient population, more acutely ill patients, and shorter hospital stays. All of these are set to increase in the coming years both in Ireland and internationally. In 2008 11% of the Irish population was over 65 years old, but this is expected to increase to 25% by 2036 (HSE 2008). Statistics provided by the Department of Health and Children confirm a rapid increase in acute hospital bed usage by patients aged 65 and older (DoHC 2011) and with a confirmed aging population this trend is likely to have a greater impact on acute services, and those who work in these services. These predictions, in conjunction with reduced funding, are likely to pose challenges for those who aim to enhance safety in Irish hospitals. Currently, cost containment is an increasing feature of service planning in Irish healthcare. As such it cannot be excluded from any discussion or recommendations for the future of patient safety in Irish hospitals.

The results of this study are presented in chapters 5 and 6 above with key factors identified which are found to impact on patient safety in Irish acute hospitals. In this chapter these results will be discussed under the following headings:

- The current position of patient safety in Irish hospitals
- Key workforce factors associated with patient safety
- Associated nursing factors impacting on patient safety

7.1. The current position of patient safety in Irish hospitals

In order to improve patient safety in acute hospitals, it is first necessary to examine the current position of patient safety in these hospitals. As a result of this research study, a picture has emerged of the existing state of patient safety in acute hospitals in Ireland. This includes details on the approaches taken by these organisations to patient safety, and the perceptions of nurses regarding the approaches taken by management. Additionally the study provides details of measurable patient safety outcomes. These included the nurse-reported rate of adverse event occurrence in wards included in the study, the nurse-reported safety grades on the wards, and the patient satisfaction rates with certain limited aspects of patient safety. Fundamentally this study enabled identification of factors, related both to nursing and to the organisation, which impact on patient safety outcomes. Recognition of these factors, and integration of findings into planning at ward, hospital, and national level, has the potential to enhance patient safety in acute hospitals in Ireland.

7.1.1. Patient safety in study hospitals

This study provides a picture of patient safety in acute hospitals in Ireland as presented by hospital management, in addition to nurse and patient data. The role of management within organisations in relation to safety is frequently discussed. Effective leadership within organisations has been consistently linked to enhanced patient safety, and lack of leadership has likewise been linked to failures (Government of Ireland 2008, DoHC 2006, IoM 2004, and Dept of Health (UK) 2001). A recurrent theme in the findings of inquiries or investigations into patient safety failures is that of inadequate leadership. Inadequate leadership can be from either hospital management or clinicians, but is frequently both. Leadership for patient safety within hospitals must come initially from

senior hospital management. How patient safety initiatives are developed and supported by management, is known to be influential in how they are received, and played out, throughout the organisation. *Safer Better Care,* as published by the Health Information and Quality Authority (HIQA 2010), also reiterates the need for leadership around patient safety to bring about a positive patient safety culture in Irish hospitals.

7.1.1.1. Co-ordination of safety in hospitals

It is evident from the study data that the responsibility for everyday patient safety co-ordination is devolved to someone other than the Chief Executive. The report from the Commission on Patient Safety and Quality Assurance (Government of Ireland 2008) recommends that the Chief Executive or General Manager of a hospital takes overall responsibility for safety. However, safety officer roles are present in all hospitals, as reported in the findings of this study above p131, to co-ordinate safety initiatives in hospitals. These roles entail responsibility for training staff, adverse event investigation, risk management, practice and policy development, and essentially provide leadership and guidance on safety issues. In Ireland this role has been in place to varying degrees in acute hospitals since the 1990s.

The Finlay Tribunal of Inquiry (Government of Ireland 1997) into the infection of women with hepatitis C through Anti D injections had an enormous impact on transfusion safety in Ireland. In the aftermath of the tribunal all acute hospitals appointed a haemovigilance officer (HVO) to improve safety around the blood transfusion process at hospital level. HVOs are generally appointed at Clinical Nurse Specialist grade or Clinical Nurse Manager 2 (CNM2) grade, and they work closely with consultant haematologists and hospital transfusion committees in all cases. They

take a leadership role in blood transfusion safety within hospitals. The role is recognised as essential to the development of safe clinical practice (National Haemovigilance Office 2010), and is instrumental in the implementation of the European Commision Directives on transfusion safety, and mandatory reporting of serious adverse blood transfusion incidents. The role of the consultant haematologist in hospital based haemovigilance is one of clinical leader which is a system similar to that seen in UK clinical directorates. The Commission on Patient Safety and Quality Assurance recommends the widespread establishment of Clinical Directorates in Ireland (Government of Ireland 2008), where lead clinicians would be responsible for patient safety within those directorates. In the UK the clinical directorate initiative led to the development of hybrid roles, where lead clinicians had both clinical and managerial functions. Although the introduction of such roles in the UK has raised issues around leadership and management training deficits for clinicians, ultimately it has resulted in named clinical leaders who take responsibility for patient safety within a defined area. HVOs in Ireland, appointed mainly as Clinical Nurse Specialists, are supported by clinical leaders who have increased access to senior management.

However, the posts of clinical risk manager and quality manager are even more significant for the advancement of safety in hospitals. The remit of these posts is broader than that of the HVO, encompassing wider safety and quality concerns. These roles do not benefit from direct links to a medical consultant as clinical leader, and are not required to comply with European legal requirements as in the case of haemovigilance roles. Inconsistencies across hospitals can be identified, through this study, in the grading of these posts. Grades vary between middle management nursing grades (CNM2) and senior administrative grades (grade 8). Although organisational

data have not been supplied by all respondents to the organisational survey with regard to grading, it appears that these inconsistencies are across the range of hospitals. Such inconsistencies may be indicative of the value placed in the role by hospital management. Less senior appointments, either nursing or administrative, could be interpreted as management filling a post to comply with patient safety guidelines, rather than truly acknowledging the leadership value of the role or its potential influence on patient safety. A clinical risk manager appointed at CNM2 level has many more management levels to negotiate in order to bring attention to safety concerns, than one appointed at Grade 8 who reports directly to the CEO. Lower graded posts are unlikely to give rise to the type of leaders recommended by the Report of the Commission on Patient Safety and Quality Assurance (Government of Ireland 2008). The report identifies that leaders..

> …..need to ensure safety and quality, lead the professional change in attitudes and behaviours required and ensure dissemination of knowledge and adoption of best practice (p88).

The report of the Commission on Patient Safety and Quality Assurance recommends that a clear system of accountability be established, linking all those with responsibility for safety in a hospital to the top management of the hospital. Such a system of accountability is more visible in some hospitals than others. As evident in the organisational data, grading of posts is not consistent across hospitals. The Institute of Medicine (IoM 2004) suggests that patient safety requires leadership that is capable of transforming the environment in which care is provided for patients, and more significantly the beliefs and practices of staff and management. Such requirements suggest that the grading of clinical safety posts should reflect the importance of the role,

and the influence required to fulfil its functions. Appointments at lower grades may fail to lend the authority to the role which is required to carry out the functions of the role effectively.

Frequently appointees to these posts have a nursing background, as clinical experience is often a prerequisite, and the skill set of nurses as co-ordinators, and communicators, makes them suitable candidates. However it is possible that it is their nursing background which prevents appointment at a higher level in some cases. The value attached to nursing in some hospitals, and the resultant influence of nursing within those organisations may be less than in others. The Report of the Commission on Patient Safety and Quality Assurance (Government of Ireland 2008) indicates that the Chief Executive or its equivalent must be responsible for patient safety in healthcare organisations. Thus appointments to safety posts with direct accountability to the Chief Executive seem essential. Less senior appointments, particularly nursing grades, may result in divided responsibilities, through the nursing managerial system, with little access to hospital management except through senior nurses. In the absence of clinical leaders working within defined directorates, those appointed at less senior grades will have difficulty bringing attention to safety issues.

7.1.1.2. Provision of in-service safety training

The evidence from this study suggests a high level of safety training provision in Irish hospitals, as reported in the Organisational Profile data by nurse management, and by nurses in the nurse survey. This is a very positive finding as the provision of safety training for staff is linked to improved safety practices in organisations as evident in the literature review (above p40). Safety training for relevant staff is also recommended by

the Commission on Patient Safety and Quality Assurance report (Government of Ireland 2008). Such training is normally co-ordinated and delivered by those appointed to safety posts in hospitals. In Ireland however, there appears to be little consensus on the curriculum content for safety training in hospitals (Government of Ireland 2008), and it is open to interpretation by hospitals and safety staff. There is no way of establishing from the data what kinds of education programmes exist, and how they are conducted, as respondents were asked to indicate only if training is provided. Although based on the experiences of the haemovigilance services in Ireland, it is likely that some differences exist between hospitals and approaches. The time given to training, the frequency of sessions, the recommended intervals between re-training, the professional groups targeted, in addition to the post holder's interest in the training element of the role, are all known variables in the provision of blood transfusion safety training. A recent report from the Department of Health and Human Services in the USA (Levinson 2012) which looks at 195 hospitals suggests that 86% of adverse events which occur to patients in hospital go unreported. Confusion over what constitutes a reportable incident is identified as common cause of under reporting. Effective in-service safety training could help reduce this confusion. While the Report of the Commission on Patient Safety and Quality Assurance (Government of Ireland 2008) recommends review and consensus on safety training curricula in hospitals, it is unspecific about who should conduct this review.

However it does highlight the Patient Safety Education Project, established in 2006, and its guidelines (PSEP 2008), as a suggested core curriculum for organisations. Also recommended is a review of current levels of patient safety training in the basic education of health professionals. Co-incidentally the World Health Organisation

(WHO 2011) has recently produced guidelines for university departments and schools of medicine and nursing on curriculum recommendations for patient safety in the training of professionals. The uptake of either set of guidelines has yet to be evaluated in Ireland or internationally. The findings of the organisational profile suggest a willingness on the part of hospitals to provide safety training for staff, nonetheless inconsistencies in approach may reduce the overall impact of such training throughout the acute hospital sector.

Nurse attendance at safety related in-service training has been reported by nurses through the nurse survey. By including this as a measurement in the questionnaire it has been possible to link such training with patient safety outcomes. The survey shows the highest nurse attendance rates at the mandatory sessions of infection control, blood transfusion practice and CPR. Unsurprisingly this suggests that deeming sessions to be mandatory improves attendance rates. According to the study data, nurses who attended safety training within the year prior to data collection report lower adverse event occurrence rates. This finding is consistent with the experience of the aviation industry and others where safety training programmes have been seen to enhance safety practices (Looseley 2009). However clinical risk management training is frequently not reported to be mandatory in Irish hospitals. Regular updates (mostly annually) take place for blood transfusion practice training and CPR training. Mandatory yearly training for clinical risk management programmes could increase attendances, and thereby increase patient safety.

7.1.1.3. The practice of safety audits

The safety training activity reported by hospitals through the organisational survey is supported by a high level of safety audit activity, as reported by the hospitals. Both initiatives comply with the recommendations made by the Commission on Patient Safety and Quality Assurance (Government of Ireland 2008). However, at present in Ireland, audit practices at hospital level are un-standardised. Thus it cannot be established from the data, what types of audits are being carried out in relation to safety issues. It is likely that audit practices vary considerably from hospital to hospital. Guidelines for clinical audit are currently being developed (Health Service Executive 2010) which will enable comparison and evaluation. The guidelines will enable standardisation of safety audit practices which, in turn, will contribute to the advancement of patient safety in acute hospitals.

7.1.1.4. Differences across hospitals

The findings of the organisational profile data indicate that acute hospitals in Ireland have addressed the issue of patient safety in varying ways. However, very little variation is evident in hospital safety scores as developed as part of this study. This, on the surface might suggest that hospital management appear to have a consistent approach to patient safety. However the Health Information and Quality Authority, highlights an un-standardised approach across hospitals to patient safety, and has produced a consultation document *Safer Better Care* (HIQA 2010). While this document highlights the core requirements of effective patient safety, it does not address current discrepancies in the acute hospital sector. Although the safety score which has been developed for this study has been useful, it does not allow for inclusion of variations that are likely to exist, such as those in training provision and audit, or in

grading of safety posts. The safety score does not include the grading differences because of difficulties matching nursing and administrative grades in categories. It is likely that its inclusion would have given rise to a greater variability in hospital safety scores and subsequently further interesting results. An objective of this research is to examine if the organisational approach to safety impacts on patient safety outcomes. **The total safety score developed from the organisational profile data was shown through regression analysis to be a significant predictor of patient satisfaction with limited aspects of medication safety.**

7.1.2. Patient safety culture

In the MLM analysis conducted for this study, **safety culture as perceived by nurses was shown to be a significant predictor when nurses were asked to assess patient safety in their units**. This reaffirms the notion of an effective organisational safety culture as a prerequisite for enhanced patient safety. It confirms that in an Irish context an effective patient safety culture, developed throughout an organisation, will result in safer patient care in wards, as perceived by nurses working in those wards. This has implications for those responsible for patient safety both at organisational level, and at ward level, where the creation of an effective safety culture must be an ongoing priority, in order to enhance the safety of care provided to patients. A composite for the scale measuring safety culture has been derived from a larger questionnaire used to measure safety culture (AHRQ 2007). In general in this study, ward means for the composite have been found to be above the midpoint, therefore favourably assessed by nurses in terms of safety culture. This finding suggests that in acute hospitals safety culture, as measured by this scale, is positive.

Nevertheless nurses have responded to a single item measuring nurse "confidence in management to resolve problems in patient care" less favourably than to the scale measuring safety culture. Just 37% of nurses describe themselves as confident or very confident. As a measurement of nurses' views of the culture of safety within the hospital this item is very useful. An effective safety culture in an organisation implies an organisation-wide commitment to patient safety. This commitment should begin with management. Without doubt, the findings of the organisational profile questionnaire in relation to safety interventions such as in-service training and audit practices, indicate that hospital management is confident that safety is a priority in the organisation. This single item variable in the nurse questionnaire shows, how staff within the organisation, interpret the commitment of management to the safety process. How staff members view the support of management is of utmost importance to creating a culture of safety. As described in the literature review however, a gap sometimes exists between the approach the management of an organisation espouses and that experienced by staff. Such a gap between organisational rhetoric and staff experience is acknowledged to undermine efforts to improve safety. However if, as the career grade level of safety staff in this study suggests, posts are sometimes filled without due attention being given to the autonomy required to carry out the job, it is possible that hospital staff react to the perceived attitude of hospital management to patient safety.

Organisational leadership has been shown to be one of the greatest influences in determining staff perception of safety culture (O'Toole 2002). These findings from the organisational survey and the nurse survey in this research support the view of Carroll et al (2002) that an assumption can exist in healthcare that the value of error management lies in the approach itself, with a tendency to overlook the context into

which it is introduced. The organisational survey findings demonstrate the interventions put in place by hospital management to support patient safety and present a commitment by management to well recognised methods of improving safety in organisations: leadership through safety posts, in-service training provision and safety audits. Nonetheless 60% of nurses do not describe themselves as confident of the support of management when highlighting issues of patient safety. The approach taken by management to patient safety must be trusted by staff throughout the organisation to avoid management being viewed as isolated from reality. Gaba et al (2003) as outlined in the literature review of this study (above p44) suggest that commitment at management level to safety is not always translated into a positive safety climate as perceived by staff. Cooke's concept of a mock safety culture (2006) may be applicable in some organisations in this study where the hospital management espouses a commitment to safety by addressing certain recommendations (safety posts, audit, training) but fails to convince staff throughout the hospital of its commitment to the process.

Nurse "confidence in management to resolve issues reported to them" predicts adverse event occurrence in a model developed for this study, although the scale measuring patient safety culture fails to reach significance in that model. Lower confidence results in higher nurse-reported adverse event occurrence. The single item measure is useful in this case indicating the perceptions of nurses of management's commitment to patient safety. This indicates that frontline staff remain to be convinced of the organisation's commitment to safety. Nurse perceptions of management's commitment to safety is suggestive that in acute hospitals in Ireland due attention may not have been paid to the introduction of the systems approach to safety, leaving nursing

staff at least, suspicious of the motives of the organisation. The experience of the aviation industry suggests that ongoing surveys of the safety culture in an organisation can detect problems or declining standards (Helmreich 2000). These surveys of staff perceptions of the culture of safety in aviation are conducted regularly and measure pertinent aspects of safety such as team function, management approach and the ability of junior members of staff to challenge authority. Such measures may be appropriate in the Irish health service where regular audit would highlight changes and focus attention on areas where intervention is required. Safety audits are an important facet of advancing patient safety. The introduction of a standardised audit of safety culture would enable comparison throughout the acute hospital sector.

7.1.3. Nurse perceptions of patient safety

The table presented above on p149 of the frequencies related to nurse-reported frequency of adverse event occurrence is interesting. Over a quarter of nurses say the following adverse events never occur: patients receive wrong medication, wrong time or dose, pressure ulcers after admission, and bloodstream infections. Although it is possible that the nurses surveyed have never been aware of an incident where the wrong medication or the wrong dose was administered to a patient, it is unlikely that they were not aware of medication being administered at an alternative time to that at which the medication was prescribed. Conversely, contradicting the findings of the item relating to medication errors, 18% of nurses said they had not administered the medication on time due to lack of time on the last shift. This suggested that on a daily basis almost a fifth of nurses administered medications at the wrong time due to lack of time. This finding casts doubt over responses to the question on frequency of occurrence of medication errors. It is possible that nurses misread the item when completing the form, but there is

no evidence to support this. This item was excluded from the adverse event composite developed for this study.

Nurse responses to the item related to pressure ulcers after admission were also questionable. While pressure area care has improved in Irish hospitals, vulnerable patients still suffer low grade redness or breaks to the skin which, without intervention, would develop further. In contrast to the responses to this question of pressure ulcer occurrence, in response to the question related to necessary work left undone by nurses, 19% of nurses report that patients under their care did not have their position changed regularly on the last shift due to lack of time. Sixteen percent also admit to leaving skin care left undone due to time constraints.

It cannot be interpreted from the data why nurses appear to deny the occurrence of medication errors or pressure ulcers. It is possible that as these incidents are linked directly to what nurses see as truly nursing responsibilities, to admit to making such errors in these areas would be to admit to poor nursing. Nurses have been described as "harm absorbers" (Reason 2004) with a tendency to fix things that are wrong (Tucker and Edmondson 2003). Nurses education and socialisation frequently focuses on ensuring errors do not occur and the culture of the profession expects perfection (IoM 2004, Johnstone 2007). Reason (2000) and IoM(2004) recognised that if nurses, who are acknowledged to be the best reporters of adverse events, highlight nursing errors they put themselves at risk of receiving a disproportionate share of blame. It is possible that nurses, if not fully convinced of management's support of patient safety initiatives as demonstrated previously, will not draw attention to errors which could be attributable to nursing alone. Nurses are also accountable to professional bodies and may fear

professional repercussions if nursing mistakes are highlighted. Such repercussions can sometimes be more severe than legal outcomes as described in the literature review. Other items such as falls, UTIs, pneumonias, or complaints may be interpreted by nurses as having less of a direct link to nursing. Traditionally, health care culture has been one of apportioning blame. Such a culture encourages staff to deny errors and promotes silence around incidents. It is possible that the findings of the nurse questionnaire relating to nursing errors is an indication of this silence.The mean for nurse-reported adverse event occurrence is significantly higher across medical wards than surgical wards. This may be due to different factors which cannot be identified in the nurse data. However nursing staff ratios (or skill mix), as reported in the organisational survey, vary between these two areas, and these ratios are shown to be significant in determining patient satisfaction with medication safety. It is acknowledged that the patient profile between the two areas is likely to differ, but the impact of staffing ratios cannot be ignored and requires further investigation.

It is interesting to note that nurses with a degree reported higher levels of adverse event occurrence than those without a degree. The reason for this cannot be definitively determined from the study data. It is possible that a higher education level enables the nurse to understand the importance of acknowledging adverse events openly, with a view to enhancing organisational learning. It seems improbable to suggest that more highly educated nurses work in areas where higher levels of adverse events occur. Nurses who have not attained a degree in nursing may be less informed on changes to approaches to safety. Or they may be impeded by a punitive history in relation to adverse event occurrence, from acknowledging such events. Nurses who trained in Ireland reported a higher level of adverse event occurrence, than those who trained

outside of Ireland. The majority of nurses who trained outside of Ireland trained in the UK, and 64% of these did not have a degree, along with almost half the nurses who trained in India. In light of the findings of this and previous studies linking nurse education levels and patient safety, it is likely that the education level of nurses is the factor to be considered here more than country of training.

In this study the nurse-perceived level of ward safety predicted nurse-reported adverse event occurrence thus suggesting that nurses working within wards are accurate reporters of patient safety in those wards. The organisational features of hospitals have commonly been measured by aggregating nurse reports. This is recognised as a methodologically sound means of looking at the traits of organisations (Aiken et al 2011). "Nurse-reported patient safety" is frequently used as a patient safety outcome, but its use in this model demonstrates its effectiveness as a predictor also. While most nurses describe safety on their wards as "very good" or "excellent", almost 9% of nurses in the current study describe safety on their ward as either "poor" or "failing". While this appears to be a relatively low proportion of respondents, it is important to point out, that in the context of the wider RN4CAST study, Ireland has one of the highest proportions of nurses grading safety in their unit as "poor" or "failing" (Aiken et al 2012). Ireland's results take fourth place to Greece, Poland and Sweden. This finding is significant as it could be easily over shadowed by the high numbers who reported excellent care. In the context of the European findings, nurse perceptions of safety in wards in Ireland are worthy of further investigation. The midpoint "acceptable" was chosen by 31% of respondents and although this indicates that the nurses feel safety practices are adequate on their wards, it is of interest that they did not

describe them as better than that, indicating that a total of 40% of nurses feel that safety at ward level could be improved to achieve a rating of "very good" or "excellent".

A study by Ramanujam et al (2008) referred to in the Chapter 2 (p18) suggests that nurse perceptions of safety decreases as workload increases. In light of predicted changes to nursing workload, this possibility must be acknowledged by those planning cuts to staffing levels or changes to skill mix, as nurse perceptions of safety in their wards, have been found to predict patient safety outcomes in this study.

7.1.4. Patient satisfaction with aspects of safety in hospital

The overall findings of the patient survey are positive, which appears to reflect well on Irish hospitals and care provision. Patient satisfaction is an important measurable outcome in healthcare (Aiken and Patrician 2000, Avis et al 1995). In this research while nurses report some high levels of necessary work undone due to lack of time, and that there are not enough nurses to get the work done, patients conversely report high levels of satisfaction and give the hospital a high overall grade. It could be argued, using the only patient demographic data collected, that patients in this study were shown to have a low level of educational attainment overall, which impacts on their responses. This would be in-keeping with the findings of Sitkia and Wood (2007) that such patients tend to be more satisfied overall. However patient satisfaction cannot be excluded as a measurable outcome in health care, as it is associated with how effectively the needs of patients are met by the service provided.

A point of note throughout the survey is the issue of staff communication with patients. Although nurses and doctors score very highly on the items measuring listening and

explaining, the minimal difference between the two professions was notable. This may reflect the findings of the nurse questionnaire where nurses indicate that when time is short psychological care remains undone, or conversely it may reflect the increased focus on communication skills in medical education. The questionnaire findings on patient satisfaction with medication safety (as measured by information provided on new medications and side effects) are of primary concern to this study. Medication safety is a high priority component of overall patient safety, and is often highlighted in reports and in the media. Acting on the recommendations of the Report of the Commission of Patient Safety and Quality Assurance (2008), the HSE has established a Medication Safety Programme (HSE 2010) with a number of primary goals to ensure patient safety. The questions in the patient questionnaire which ask about information provided on new medicines and side effects could arguably be described as "nursing communication" questions also, as nurses are responsible in the main for medication administration. Although 60% of patients are "always" told what new medicines are for, over one quarter are told only "sometimes" or "never". In practice, information on the purpose of new medications is frequently given by the prescribing doctor as well as the nurse. Equally concerning is the fact that only a third of patients are "always" told about possible side effects of new medications. Information on side effects is usually provided by the nurse when medications are being administered. Although the findings of the nurse questionnaire suggest that medication errors are rare according to nurse-reported occurrence rates, the findings of the patient survey indicate that practices around medication administration are less than satisfactory in terms of patient safety.

Findings of this research study clearly demonstrate that patient satisfaction with medication safety is linked to staffing ratios within the organisation. A higher ratio

of staff nurses to health care assistants in the direct care workforce in surgical wards, and a lower staff nurse to NCHD ratio in the organisation overall, predict higher patient satisfaction with information provided on side effects of medications. This suggests that when numbers of registered nursing staff are higher, more time can be spent around information giving at the time of administration of medications. Equally a higher number of junior doctors would potentially enable them to provide information around side effects of medication. These findings have implications for hospital management and the Health Service Executive for future workforce planning. They should be considered when skill mix dilution is being considered as a response to budget cuts. In a further regression model a higher nurse to NCHD ratio predicts greater patient satisfaction with information around new medications. This supports the previous model where greater numbers of nurses enable more time to be spent around medication safety. In light of nurse survey findings on work left undone and lack of adequate resources it is possible that the patient survey responses are an acknowledgement of patients' recognition that people are doing their best in less than ideal circumstances, rather than being truly satisfied with their care.

7.2. Key workforce factors associated with patient safety

Since March 2009, a staff recruitment moratorium has been in place in the Irish health service, which prevents replacement of staff members who leave the public health service, or of those who are on leave. This moratorium is a measure introduced by government to reduce staff costs in the health service, in response to a global recession and a severe downturn in the Irish economy since September 2008. Findings of previous international research suggest, that reductions in nursing staff numbers in the health services in Ireland will impact on patient safety. An hypothesis of this research

suggests that staffing levels, as measured by staff ratios, can predict patient satisfaction with medication safety in Irish hospitals. Medication safety is an important aspect of patient safety and as such is used as an indicator of safety in this study. The findings confirm that patient safety can be enhanced through effective workforce planning of the nurse, doctor and healthcare assistant numbers and ratios in acute hospitals.

Predicted changes to patient populations as a result of age, disease profile, length of stay or care needs, will result in further demands on those who work within the service. There will be a requirement of healthcare workers to care for patients in greater need of higher intensity care, in busier environments. Such changes pose challenges for those who plan the workforce, both at local level in hospitals, and at national level. Funding for the Irish health service has been reduced year on year since 2009 (DoHC 2011), with such reductions set to continue until at least 2015. These cuts are in line with other austerity measures introduced by government, to offset the 2010 financial rescue of the Irish banking services by the International Monetary Fund and the European Central Bank. The rapid reduction of funding in the health service overall, has resulted in an equally rapid reduction of funding in the acute hospital services. The impact of this on staff and patients has yet to be evaluated. The single biggest cost to the Health Service Executive is that of staffing the services. In turn, the greatest staffing cost is the nurse workforce. Overall there were 7,000 fewer staff working in the Irish public healthcare system in 2011 than were working in 2007. Of the total reduction, 3,000 were nurses (DoHC 2011). This demonstrates that as a result of overall cost containment measures in the health service, the nursing resource is at a greater risk than others of being reduced.

Ball (2010) demonstrates a trend in the UK where nursing shortages in the 1990s were resolved by increasing numbers of nurses in training and active overseas recruitment. Nurse staffing levels subsequently levelled out in the mid 2000s and since then due to cost containment measures skill mix dilution has increased i.e. the proportion of registered nurses in the workforce has reduced. In Ireland registered nurse numbers are actively being decreased therefore a similar trend may be about to be realised. Although the impact of the UK skill mix reduction on patient outcomes is as yet unclear, the impact of effective nursing on mortality is established (Tourangeau et al 2007, Rafferty et al 2007). Equally the impact on patient safety (McGillis Hall et al 2004) and on cost saving measures such as reduced numbers of adverse events and reduced lengths of stay (Needleman et al 2006), of nursing is acknowledged. This study confirms that nursing skill mix (the ratio of registered nurses to HCAs) impacts on patient satisfaction with medication safety. According to Ball (2010) if nurse staffing is examined only in terms of numbers and the impact of nursing not considered, the impact on patient care will be considerable.

7.2.1. Staffing levels in acute hospitals

The results of this study indicate that there appears to be a lack of centrally held information, on staff numbers and profiles, in Irish hospitals. While respondents to the organisational questionnaire have been followed up in order to maximise the data collected, much of the data requested through the questionnaire is not available centrally at hospital level. This raises questions about the availability of important information for planning the workforce at hospital level. Frequently respondents, who are part of the nurse management team, found it difficult to obtain conclusive figures for numbers of doctors, registered nurses or healthcare assistants. Other potentially useful questions

included in the organisational questionnaire do not yield enough data to be incorporated into the analysis. Nurse management is unable to access data on the numbers of nurses in the organisation educated to degree or masters degree level. This information is not centrally held or recorded in many acute hospitals in Ireland. Additionally the numbers of nurses from non EU countries was frequently unavailable to nurse management. In light of international findings, it would seem that recording of such information would be important for planning the workforce throughout the organisation. An RCN publication entitled *Guidance on Safe nurse staffing in the UK* (Ball 2010) concludes that the cornerstone of effective staff planning is the availability of good quality data, including data on staffing levels and makeup of staff.

Significantly, the time of data collection for this current study, coincided with a time of industrial unrest in the Irish public healthcare system. A work-to-rule by administrative staff was organised by trade unions in Irish hospitals as a protest against public sector pay cuts, between January 2010 and March 2010. All respondents to the hospital questionnaire cited this industrial action as an obstacle to obtaining the information needed for completion of the questionnaire. Clearly however, workforce planning in acute hospitals in Ireland is carried out within professional groups, with little interaction between the professions. This accounts for most difficulties encountered when completing the questionnaire. Nurse management was not familiar with medical staff numbers or organisation. They were often unsure where to source the information, and expressed concern about its relevance to the nurse workforce. Findings from the recent NHS Future Forum (NHS 2011) suggest that workforce planning should not be isolated within the professions. A multi-professional approach is recommended in order to enhance outcomes for patients. This current research study confirms that the ratios

between nursing staff and medical staff are significant in predicting important patient safety indicators, and should be taken into account when planning the workforce in the interests of patient safety. This would require a change of mindset for workforce planners in Irish hospitals, as the organisational survey findings suggested that staff planning is mainly historically based within professional groups.

Table 5.1 provided above p127, containing a summary of the profiles of study hospitals also provides some noteworthy information on activity levels and staffing implications. Higher bed numbers in acute hospitals does not necessarily translate into higher inpatient throughput. One hospital with 605 open beds, had 21,833 inpatient admissions in 2009. Another, with 620 open beds, had almost 6,000 fewer admissions. Both of these hospitals are linked to a university, and are considered to be high technology hospitals. When the nurse numbers are considered, it is important to note that the hospital with the lower patient throughput, has almost 100 more WTE nurses than the other hospital. Similarly a hospital with 131 open beds, has 10,888 admissions while another with 150 beds has almost *12,000 more* admissions (22,750). Both hospitals have similar nurse numbers (206 and 229).

The data reveals that numbers of registered nurses in a hospital is also highly variable in the acute hospital sector in Ireland, revealing several discrepancies. One hospital with 246 beds and an activity level of 15,478 inpatient admissions, had 529 nurses at the time of data collection. Another hospital with a similar number of inpatients (15,957), but with a greater number of beds (317), had 134 fewer nurses. Such results demonstrate the variation in the acute hospital sector in Ireland. Patient throughput can be attributed to differing patient profiles, accounting for differing lengths of stay, although this cannot

be established from the study data. The Economic and Social Research Institute report on Activity in Acute Public Hospitals (ESRI, 2010) confirms that increasing age in itself is a contributing factor to increased length of stay, along with many other factors. The enormous diversity evident across the acute hospital sector such as hospital size, activity and nurse staffing levels poses a challenge for health service management.

Currently in the acute hospital sector in Ireland, changes are taking place such as hospital mergers or changes to levels of activity with shorter hospital stays, and more acutely ill patients. The findings of the organisational profile reflect these changes. In some cases, certain services from smaller hospitals are being centralised in centres of excellence in larger hospitals, resulting in ward closures or mergers; emergency units are being closed in some hospitals without necessarily expanding units in other hospitals. These changes result in different patient profiles and activity levels for hospitals. Significant numbers of recent bed closures were noted within the study hospitals at the time of data collection. The influence of the staff recruitment moratorium imposed by the Health Service Executive (effective from March 2009 and ongoing), has been noted by several respondents, and linked to many of these changes. It would appear however, that often historical nurse staffing allocations remain relatively unchanged, while activities and patient profiles change significantly. There is little evidence that patient outcomes research is taken into account when planning the workforce.

A review conducted by Green et al (2011) confirms that a major disconnect exists between the fields of workforce planning and patient outcomes. They recommend that further research be conducted linking the two fields. This study goes some way to

address this recommendation. The influence of staff ratios at hospital level on patient satisfaction with medication safety is clearly demonstrated. Berkow et al (2007) acknowledge the challenges for those planning the nursing workforce in hospitals where ensuring correct staffing levels for the provision of quality care must be balanced with current constraints. They recommend focussing on the requirements of wards or units. This links in with this current study where ward level factors such as proportion of nurses with degrees at ward level have been found to impact on nurse-reported patient outcomes, and therefore can be integrated into workforce planning for wards.

The changes in the Irish health service, along with other health services worldwide, are a result of changing legislation, advances in technology and increased public expectations (HSE 2006). The implications of these changes for workforce planning have yet to be addressed. Existing nursing staff contracts often impede redeployment between hospitals, combined with personal staff circumstances which prevent movement of staff between hospitals. This can result in nurses who are highly experienced and specialised in an area of nursing, working in vastly different specialities or wards where they have little or no previous experience. In other cases redeployment of staff between hospitals has taken place, but with conditions attached by nurse unions which prevent movement of staff within their new place of work. All of these changes impact on patients and staff. While patients are generally satisfied with their care, the impact on nurses is that they often have more patients to care for, in an uncertain environment. In the current changing environment of healthcare it is essential that redeployment plans for staff are based on evidence and understanding of requirements related to patient safety and quality of care, and best use of nursing skills and resources. An uninformed approach to staff redeployment can result in

understaffing of some areas, and overstaffing of others, with a resultant cost in both cases (Ball 2010). Work is ongoing within the Health Service Executive in Ireland to create groupings within the acute hospital sector, based on activity rates and other similarities, to enable more effective planning of services and workforces. Such groupings should enable comparison of hospitals which are similar in terms of bed numbers and activities, and thereby enable examination of staffing needs.

7.2.2. Skill mix in acute hospitals

The nurse survey results indicate that the mean patient to nurse ratio in acute hospital in Ireland is 6.84 patients per nurse (falling to 5.95 patients per nurse for day shifts only). This is in-keeping with international data on patient to nurse ratios across Europe obtained through the RN4CAST project (Aiken et al 2012). Internationally, nurse workload, as measured by the patient to nurse ratio, has been linked to patient outcomes, where higher workloads are associated with more adverse outcomes (Rafferty et al 2007) and increased mortality and failure to rescue (Aiken at al 2002). A model presented in chapter 6 indicates that the patient to nurse ratio is *not significant* in predicting nurse-reported adverse event occurrence. The variable has been found to be relatively stable across wards in Ireland when outliers were removed, and therefore of limited use in multilevel modelling. In relation to the outcome "nurse-reported adverse event occurrence", as discussed earlier, some items included in the measuring tool yield some improbable results, such as a negligible rate of medication errors and pressure ulcers following admission. In previous international studies it is possible that variability on these items was greater than in Ireland thereby enabling analysis.

Although confirmation of previous research findings using nurse to patient ratio as a measure of workload has not been possible using the data collected in this study, better nurse staffing levels have been associated with better patient outcomes and safer patient care (Aiken et al 2002, Lankshear 2005, Rafferty 2007, Aiken et al 2008, Needleman et al 2011). However more recent work by Aiken et al (2011) suggests that the nurse work environment is an important mediating factor in predicting patient outcomes. Additional staff in a poor work environment has been found to have little impact on patient outcomes, whereas additional staff in a better work environment has been found to impact significantly on outcomes. This study contributes to this idea, as the nurse work environment as described by individual nurses, and aggregated to ward level, has been shown to significantly impact nurse-reported patient outcomes, while nurse to patient ratio failed to reach significance.

In this study the patient to nurse ratio lacked variability across wards, but the issue of skill mix of nursing staff remains to be considered. Considerable variation is evident in the ratio of staff nurses to healthcare assistants, in both medical and surgical wards (see table 5.2, p129 above). The work of Kutney Lee et al (2009a) shows that nurse staffing, as measured by the patient to nurse ratio, is shown to be a significant predictor of patient satisfaction. The idea to examine the relationship of nursing skill mix and patient satisfaction has been derived from this 2009 study. A systematic review by the Agency for Healthcare Research and Quality published in 2007 suggested that skill mix factors do not demonstrate consistent associations with patient outcomes. However, significantly in this study, **surgical ward ratios of registered nurses to healthcare assistants are shown to predict patient satisfaction ratings with information**

provision around medication safety. This points to a need by management to consider this ratio when planning the provision of safe care in acute hospitals in Ireland.

The percentage of qualified nursing staff in the workforce in acute hospitals in Ireland, has been calculated as 85% using the organisational survey data, and 72% using the nurse survey data. This enables comparison with UK figures which were reported by Ball (2010) for acute general wards as 62% (Ball 2010).

The nurse survey derived estimates of registered nurses in the direct care workforce in Ireland is lower than estimates made from data obtained through the organisational profile. The reason for this discrepancy is unknown, but it is likely that as the figure derived from the organisational profile is calculated from overall staff numbers employed in all medical and surgical wards in the hospital, it includes more specialised medical and surgical wards, which were not included in the study (i.e. cardiac surgery, neurosurgery or specialised medical units). Therefore the estimate of 72% is more accurate, reflecting as it does, the situation on general medical and surgical wards in acute hospitals.

This results in a 10% difference between the Irish and UK estimates. The findings of the European wide RN4CAST study (Aiken et al 2012) help clarify this discrepancy between Irish and UK percentages of nurses in the workforce. In that study, the number of patients to total nursing staff (registered nurses and unregistered nurses), has been found to be 5 in Ireland, and slightly lower in England (4.8). This demonstrates the greater levels of non-registered nursing support in England. It again highlights the changing skill mix issue in direct care delivery. Ball (2010) comments that while nurse

numbers have not changed greatly in the last few years in the UK, the skill mix between registered nurses and healthcare assistants has changed significantly. She described a gradual eroding of skill mix which has taken place over time in the UK (Ball 2010). This occurs over time when vacancies are not filled, and subsequently results in lost posts, or are filled, but by lower grades of staff.

As cost containment has become a priority in the Irish health service, and as a result of the recruitment moratorium currently in place, this situation is likely to be replicated in Ireland. It is vital therefore, to ensure that the ratio of nurses to healthcare assistants in the workforce remains at a sufficient level to maintain, or improve, safety and quality of patient care. Pressure to make savings, by staff skill mix adjustment, without assessment of the impact on patient outcomes, could result deteriorating standards.

Although reduced numbers of registered nurses in Ireland remain likely for the foreseeable future, the results of this study suggest an opportunity in Ireland to act in the early stages of skill mix erosion as described by Ball (2010). Nurse factors are identified in this study which enhance patient safety in Irish hospitals (see section 7.3). These factors include improved nurse work environments, greater proportions of degree educated nurses at ward level, and more experienced nurses in wards. A focus on these factors may counterbalance the effects of reduced staffing. In particular, the impact of degree educated nurses is of interest. Increasingly, due to the change in Ireland to a fully graduate level profession, Ireland has a high proportion of degree educated nurses. This is not the case in the UK. According to the results of this survey this provides Ireland with an advantage over the UK in times of reduced nurse numbers, as the proportion of nurses educated to degree level in a ward impacts positively on safety outcomes.

Additionally at the time of data collection registered nurse staffing levels in Irish acute hospitals remain somewhat better than those in the UK (Aiken et al 2012).

The percentage of registered nurses in the direct care workforce in acute hospitals has been established as part of this study. A clear change in skill mix can be seen in the UK, with a drop from 65% in 2005 to 60% in 2009 (62% in general wards). This reduction has occurred despite the benchmarking of 65% as a minimum in 2006 by the RCN (RCN 2006). This current study enables evaluation of the impact of current ratios of registered nurses to healthcare assistants in medical and surgical wards in Irish hospitals, on measurable patient satisfaction outcomes. Eight hospitals in this research have been unable to supply accurate data on ratios, however enormous variation is clearly evident. Although in this study, the mean staff nurse to healthcare assistant ratio is 8:1 in medical wards (median 5:1) and 9:1(median 6:1) in surgical wards, the difference from hospital to hospital is remarkable. In medical wards this varies considerably with 32 staff nurses to one healthcare assistant in one case and in another, 2.5 staff nurses to one healthcare assistant. In surgical wards a similar difference is noted. The reason for variability in registered nurse to healthcare assistant ratios is worthy of consideration.

The budget of the Health Service Executive has seen cuts year on year starting in 2009 (DoHC 2011) as part of the Irish government's response to the current economic crisis, with the trend set to continue until 2015. The budget for 2011 was again reduced by almost a billion euro from 2010 to €13.4 bn. As previously outlined the numbers of nurses employed in the health service has been reduced from 39,006 in 2007 to 35,993

in 2011 (DoHC 2011). The staff reductions are likely to continue over the next year, with vacated posts not being filled due to the moratorium on recruitment.

An incentivised retirement scheme within the HSE, with a deadline of end of February 2012, has added to this depletion. Early media reports outlined Department of Health and Children figures which suggested that 1000 nurses would be lost through this scheme (Wall 2012). However a Department of Health and Children briefing released on 22nd Feb 2012 confirmed that 4326 people overall had indicated their intention to retire at the end of February, 46% of whom were nurses (DoHC 2012). This is set to include frontline staff in acute hospitals, along with managerial posts. Contingency plans, included in the briefing, to deal with the sudden exodus of frontline staff include postponing arranged leave and unpaid overtime with time in lieu to be arranged. It remains to be seen how these measures are accepted.

This reduction of nurse numbers, combined with growing patient numbers, is likely to impact on patient safety and quality of care. In an effort to reduce costs, it is likely that Ireland's health service managers will follow trends already identified in the UK and other countries, by replacing registered nurses with untrained health care assistant staff. In 2000 the World Health Organisation acknowledged the challenges of skill mix in the health services, highlighting the need to find an appropriate mix to deliver high quality care. The practice of replacing nurses with less qualified staff and its effects on patient care is not extensively researched (McKee et al 2006). Of the studies which have taken place methodological limitations are evident (Buchan and Dal Paz 2002).

Some debate has taken place which suggests that such cost containment efforts can be thwarted by the costs of reduced quality in the care provided, and greater rates of absenteeism (Hesterley and Robinson 1990, Powers et al 1990, Orne et al 1998). Absenteeism in unregistered support staff was found to be higher than in registered staff with a resultant impact on patient care. The cost of replacement staff is high in such circumstances and may outweigh the costs saved by adjustments to the skill mix. Although the findings of an early study suggest that replacement of registered nurses with unregistered staff can occur with no effect on patient satisfaction (Bostrom and Zimmerman 1993), this current study of Irish hospitals contradicts this with the ratio of staff nurses to HCAs in direct care in surgical units linked to patient satisfaction with aspects of medication safety.

Concern has been expressed at the recent NHS Future Forums (2011) about the high levels of patient contact by unregistered, unregulated healthcare assistants. Healthcare assistants, by the nature of their work, spend a lot of time with patients. Conversely nurses in this current study indicate that they do not have enough time, or resources, to spend time with patients. Current trends in healthcare internationally suggest that skill mix dilution is likely to continue in Ireland particularly in view of the country's economic situation. Although this trend has not been visible up to now, largely because of the popularity of the nursing profession as an option for Irish school leavers in the past and overseas recruitment of registered nurses in recent years, recent changes may be contributing factors. These changes include reductions in undergraduate places for nurse training, an end to overseas recruitment, and non replacement of nurses who leave. The trend indicates that policy makers, and hospital management, do not have any real understanding of the contribution of nursing to patient outcomes. Nurse leaders

and researchers must ensure that this contribution is highlighted, because although the impact of nursing on patient outcomes has been discussed in the nursing press for the last 15 years, the message has not been delivered effectively to workforce planners in hospitals. To cut numbers of staff known to impact positively on patient safety, and replace them with staff whose impact remains unmeasured, seems ill thought out. While in the short term cost containment is a priority, ultimately reduced patient safety and quality of care through skill mix dilution may have a higher cost (Hesterley and Robinson 1990, Powers et al 1990 and Orne et al 1998). Green et al (2011) recommend linking outcomes research and workforce research in order to ensure a strong message. The findings of this study demonstrate that the ratio of registered nurses to HCAs in the workforce providing direct care in general wards impacts on patient satisfaction.

The findings of the Robert Francis Inquiry into events in the Mid Staffordshire Trust (House of Commons 2010) reinforce the impact of nurse staffing and skill mix on adverse patient outcomes. The findings acknowledge the problem of "too few staff", and that staff cuts and changes to skill mix were made in the Trust, without sufficient information about the impact of those actions on patient care. Ball (2010, p12) argued "short-sighted cuts that leave the service impaired and patient care at risk" should be avoided. In a time of fiscal constraint, it would seem wise to establish the risks to patients of changes to the nurse work force or skill mix, prior to implementing such changes. This study confirms that the ratio of registered nurses to healthcare assistants in surgical wards is significant in predicting patient satisfaction with medication safety as measured by information giving and education provision. This finding demonstrates the impact of adjustments to skill mix in acute hospitals in Ireland. In view of the

enormous variation in reported skill mix in this study (see table 5.2 p129) the attention of those planning adjustments should remain focused on the findings of this study.

In 2009 the OECD reported the ratio of nurses to doctors in Ireland to be 5 nurses to every doctor (OECD, 2009). These data included all nurses in Ireland who were registered to practice in 2007 rather than those actually in practice. It also included those working outside of the acute hospital sector. The data from this current study indicate the mean ratio of total nurses to total doctors in acute hospitals, to be closer to 3 nurses to every one doctor (see Table 5.2, p129). These ratios demonstrated less variability across hospitals, than ratios relating to registered nurses to care assistants (see Table 5.2, p129). In the larger high technology hospitals the ratios of nurses to doctors are slightly lower, than the average across all the hospitals. In contrast to trends in nursing, the number of hospital consultants in the Irish health service has increased since 2007. However the number of Non Consultant Hospital Doctors (NCHDs) has declined overall since 2008. This overall decline includes a reduction in more experienced NCHDs (Registrars and Senior House Officers), but an increase of newly qualified interns (DoHC 2011). This trend suggests that skill mix changes are also occurring in the medical profession in Ireland. As yet the impact of these changes remains unevaluated. It seems unrealistic to suggest, that such changes across the skill mix of two key professions (nursing and medicine) in Irish health care can take place without impact on patient safety and quality of care. While the move by government to appoint more doctors at consultant level is well founded, care should be taken to ensure that in a time of limited resources, this does not result in too few junior doctors, who generally work more closely with patients in hospital.

While a move towards a health service delivered by higher numbers of consultants would be welcome, it is important to be cognisant of the role played by junior doctors in direct care provision. These doctors are frequently involved in medication prescription and information giving around medications in acute hospitals. This study confirms that patient satisfaction with information on side effects of new medication is enhanced by a higher ratio of NCHDs to nurses. This suggests that hospital workforce planners should be aware of skill mix, both within and across, the professions, rather than focussing on changes within professional groups.

7.3. Associated nursing factors impacting on patient safety

International studies confirm that not only are nurse staffing levels critical to improving patient safety in hospitals, but so also are other nursing associated factors such as nurse education levels and the nurse work environment (Van Bogaert 2009b, Clarke 2007, Aiken et al 2003). Much of this well cited work has been conducted using nurse level analysis, i.e. where a nurse level variable such as education level has been seen to impact on a patient outcome. However hospital based nurses do not work in isolation. They work in communities, or groups, based on ward allocation within hospitals, with different managers, different multidisciplinary support, different healthcare assistant support, and different patients. Nurse level analysis fails to take into account the influence of this ward community on nurse behaviours, attitudes, and perceptions. It does not acknowledge that where nurses share a ward environment, they are likely to have more in common with each other, than with nurses outside that environment on other wards.

Much of the data in this current study have been analysed using multilevel modelling (MLM), to examine the effect of the ward grouping of nurses, on patient safety outcomes. It seems that particularly in times of funding shortages, hospital management should look at ward community profiles, and at adjustments which could be made at ward level, in order to enhance patient safety in organisations. An objective of this study has been to examine the impact of nursing factors, both at the level of the individual nurse, and at ward level, on patient safety outcomes. These factors, and the relationships with patient safety outcomes in this study, are discussed below.

7.3.1. Nurse experience levels and patient safety

The age profile of the respondents to the nurse survey confirm a relatively young nurse workforce in general wards in acute hospitals in Ireland (see table 5.6 p135). This may indicate that older nurses chose to work outside of acute settings in Irish hospitals. Respondents provide information on their work experience, and only 25% of respondents have less than five years experience as a nurse, while 34% have less than five years experience in the speciality. This suggests that movement takes place between specialities and that "years spent working as a nurse" do not necessarily equate to "experience in the speciality". The data relates to medical and surgical wards only, but there is no reason to suggest that this is not the case in other areas. In the current study the notable difference between "years working as a nurse" and "years in the speciality", suggest that years spent in the speciality would be a more accurate measure of nurse experience.

This is in-keeping with the early work of Benner (1984) where it is suggested that movement between different areas by nurses impacts, at least temporarily on their level

of expertise. Therefore it is the "years in speciality" variable that is included in the multilevel analysis conducted. This variable has been aggregated to ward level in the first multilevel model developed (above p183). The results confirm that a **lower mean level of nurse experience in the speciality at ward level, is predictive of a higher level of adverse event occurrence.** This suggests that ward managers, and hospital management, should pay attention to the mean level of experience across nurses in the ward, in order to enhance patient safety. This may result in redeployment of nurses within an organisation, in order to maintain mean experience levels in wards. Difficulties must be acknowledged with the idea of mean experience levels in a ward, i.e. recruiting one nurse with 20 years experience in the specialty would automatically raise the mean experience level on the ward, as would three nurses with 10 years experience each. However the results of this research indicate that nurse managers should endeavour to maximise the experience levels of nurses in their wards in order to improve safety outcomes for patients.

This has implications for nurse management, as data from the organisational profile indicate that centrally held information on the composition of the nurse workforce is often lacking in detail. It would therefore seem important to record recent nurse experience with a view to maintaining appropriate experience levels within wards. A focus on retention of experienced nurses within specialities would seem important. The implications of the incentivised retirement scheme, for mean levels of experience in wards, remains to be evaluated.

7.3.2. Nurse education levels and patient safety

Although data from the organisational survey are unclear relating to nurse education levels, the nurse questionnaire provided some useful statistics. Sixty percent of respondents to the nurse questionnaire indicate that they hold a degree in nursing. This can, in part, be explained by the movement of nurse education in Ireland from an apprenticeship model, through a third level diploma, and into a full graduate profession within the last 15 years. Nurse education became fully integrated into third level institutions in Ireland in 2002. Simultaneously over this time period, a Government initiative provided funding for all nurses or midwives qualified to certificate or diploma level, and working in the public health service, to complete a BNS (Bachelor in Nursing Studies) degree in nursing. The scheme was in place for 10 years and ensured that participants would be released from their workplaces to attend lectures, and the payment of all college fees. This enabled nurses, already in the healthcare system, to augment their previous education by obtaining a degree in nursing. The current study data provide us with an estimate of the number of nurses educated to degree level in Ireland at the time of data collection (60%). However it is possible that this is an overestimation, and that nurses with degrees were more inclined to take part in the study. It is not possible to establish which interpretation is more accurate.

This current study differs from another well cited study (Aiken 2003), as the nurse-reported patient outcomes are taken from the nurse data, and therefore are directly associated with the nurses surveyed. Aiken et al (2003) demonstrate the effect of nurse education on patient mortality figures. Higher numbers of nurses educated to degree level, are associated with lower mortality levels. A criticism of Aiken's work was that the mortality figures used could not be directly associated with the nurse data. The

figures related to a different time period, and therefore it was impossible to determine if the nurses surveyed had cared for the patients whose mortality statistics were used. In this current study however, the proportion of nurses on a ward with a degree in nursing, is included as a ward level variable in analysis which examined the impact on nurse-graded patient safety on those wards, and on the numbers of formal adverse incident reports submitted by nurses on that ward. The significance of this ward level variable adds to previous work where the impact of individual nurse's educational level was found to impact on patient outcomes.

In further work by Aiken at al (2011), the effect of 10% more nurses with degrees in wards was found to be a decrease of 4% in both the 30 day mortality and failure to rescue. **In the current study, the proportion of nurses on a ward educated to degree level, significantly impacts on nurse-graded patient safety in the ward. Furthermore this ward level variable is seen to impact positively on the reporting of adverse event practices of nurses.** Although the recent analysis carried out by Aiken et al (2011) has not been replicated in this study the impact of education levels in a ward on patient safety outcomes is clear. This has implications for nurse management in hospitals. Again as previously highlighted it requires greater centralised record keeping regarding nurse education levels, in order to enable effective planning of the workforce at ward level. The table in Appendix D, demonstrates the variation in proportions of nurses with degrees in Irish hospitals. Clear discrepancies are evident within hospitals. This suggests that adjustments may be possible in order to enhance patient safety within those hospitals. Data from the organisational profile suggest however, that recording of educational qualifications of nurses, by nurse management, does not routinely take place in acute hospitals in Ireland.

7.3.3. Nursing work and patient safety

"Non nursing work" as defined in this current study, consists of a composite of three items which refers specifically to work which is not nursing work. Almost 99% of nurses in this study report that they carry out this "non-nursing work" either "sometimes" or "often". There is a consistency to these reports, across hospitals and wards, which suggests that this is an accurate reflection of the work life of nurses in medical and surgical wards in acute hospitals in Ireland. It could be deduced, based on the work of Aiken (2001a and 2001b), that while nurses are engaged in non-nursing activities they cannot fully carry out their nursing duties. To this end, in this current work, data have been collected on work left undone by nurses due to time constraints (see results Figure 5.1, p140). According to the data, physical care is least likely to be left undone, while psychological care (communicating and educating) is most likely. Over 30% of nurses indicate, that due to lack of time, they left adequate patient surveillance undone on the last shift. Twenty four hour patient surveillance and the development of a therapeutic relationship through time spent communicating with patients are core to the nurse's role in patient safety (Institute of Medicine 2004). The surveillance part of the nurse's work has been cited as essential to effective patient safety in hospitals (Institute of Medicine 2004). Kutney Lee et al (2009a), acknowledging the nurses contribution to patient safety, carried out a study to measure the "surveillance capacity" of nurses. Included in the surveillance capacity profile as identified by those researchers are nurse workload, education levels, experience levels and the practice environment in which the nurses worked. All of these factors are examined within the current study and their impacts examined in relation to patient safety outcomes.

The possibility that work left undone by nurses may have been associated with the number of registered nurses in the direct care work force was examined in this study and shown to have little effect i.e. that ratio of registered nurses to care assistants did not impact on amount of necessary nursing work left undone. This suggests that other factors should be considered. Consequently the composite of "total work left undone" by individual nurses is included in analysis in this study, where the impact of this phenomenon on patient safety outcomes is examined. Lucero et al (2010a and 2010b) reveal a clear link between the "necessary work left undone" by nurses due to time constraints, and nurse-reported frequency of adverse event occurrence. Necessary work left undone may in itself compromise patient safety, and certainly is indicative of reduced quality care. **The current study concludes, that higher levels of work left undone by nurses as a result of lack of time, predicts a higher level of nurse-reported adverse event occurrence on the ward.** Thus monitoring of work left undone by nurses, and further analysis of its cause, would seem worthwhile with the aim of advancing ward safety.

7.3.3.1. Nursing communication

Findings from the patient survey also inform this study on the work of nurses in acute hospitals. The slight differences in patients' responses to questions regarding the care they received from medical and nursing staff are of interest. While a 10% difference exists between those who perceive nurses and doctors "always" treat them with courtesy and respect, this difference is reduced to 6% and 7% when asked about listening and explaining skills. Such communication skills have long been claimed by nurses as being integral to nursing, separating the profession from others. However, these results

suggest that this distinction may not be so definitive. The nurse questionnaire findings suggest that activities such as communication and education, are often left undone by nurses if time is short. These patient survey findings also reflect the nurse survey finding that three quarters of nurses feel that the "support services" do not exist which would allow them to spend more time with their patients. Although the exact meaning of "support services" remains undefined, it is likely to mean administration support or the support of other patient services. This confirms that nurses are dissatisfied with the amount of time they have to spend with patients.

Additionally it may be that the role of the nurse has changed to include more activities which were once the domain of doctors, leaving less time for meaningful communication with patients. Doctor training has also changed in recent times to place more emphasis on communicating effectively with patients. This may account for the narrowing gap between the communication skills of the professions. However nurses' proximity to patients, and relationship with patients, is frequently cited as being vital to the key role which they play in patent safety (IoM 2004). The development of a rapport with patients enables them to voice concerns about their care which may otherwise go un-noticed by nurses.

The findings of the patient survey reveal that discharge planning had not been discussed with 54% of patients. In healthcare in Ireland, discharge planning should start on or before admission (HSE 2008). Guidelines suggest that the process must be patient centred, and should be discussed with the patient at the earliest opportunity. It is possible that discharge planning in acute hospitals starts early as recommended but that plans are not discussed with patients until later in the process. Twenty eight percent of

nurses in the nurse survey identify "preparation for discharge" as work which was necessary on their last shift, but which was left undone, due to lack of time. This implies that nurses are aware of their responsibilities in terms of patient discharge, but are unable to carry them out. Communication with patients is recognised as a feature of nursing which sets it apart from other professions. The findings of this research suggest that nurses find it difficult to carry out this function of their role. It seems essential for the advancement of patient safety in Irish hospitals, that the part of nurses' work which involves communication and relationship building with patients, be preserved and supported. This will require effective leadership from professional leaders, nurse educators and nurse leadership within hospitals.

7.3.4. Nurse work environment and patient safety

The findings of this study demonstrate that **the ward level work environment (PES-NWI) predicts nurse-graded patient safety, while the nurse level PES-NWI score predicts number of adverse events reported by nurses in conjunction with the proportion of nurses with degrees in a ward.** The nurse practice environment is defined by Lake (2002, p178) as the "organisational characteristics of a work setting that facilitate or constrain professional nursing practice". The nurse work environment has been measured in this study using the Nursing Work Index- Practice Environment Scale (Lake 2002). The findings from all five subscales are reported individually in chapter 5. The work environment of nurses has been consistently linked to patient safety outcomes (Aiken 2008, Friese 2008). Ultimately in this study, the composite score for all five subscales is used in further analysis as a measurement of the nurse work environment. The inclusion of the "ward aggregate for the nurse work environment", as

measured by the NWI-PES, adds to previous findings where analysis was conducted at the level of the individual nurse and suggested that hospitals which are good places to work for nurses have better patient outcomes (Aiken 1997). It supports the work of Van Bogaert et al (2010) which demonstrates through generalised linear models that ward variation in the practice environment of nurses predicts nurse-reported quality of care outcomes. Without doubt, the study confirms that a more positive work environment for nurses can lead to safer patient care.

In Ireland the nurse data reveals that while most wards have "mixed" work environments as reported by the nurses (see table 5.13, p144), and while 13% have "poor" work environments, only 15% of wards have "better" environments. Recent work by Aiken et al (2011) suggests that the practice environment of nurses is more critical than nurse staffing levels in predicting mortality and failure-to-rescue. They demonstrate that increasing staff numbers in wards with poor environments had little impact on patient outcomes, but increasing staff numbers in wards with better environments improved outcomes by 9-10%. This work is significant in light of the low numbers of nurses in Ireland reporting better work environments. Although Aiken's (2011) work suggests that additional staff in wards with mixed environment can decrease 30 day mortality and failure to rescue by 4%, the impressive impact of "better" environments makes it a far more desirable goal for Irish healthcare and patient safety.

Mean values for the subscales are shown to be around the midpoint of 2.5 (scale scored 1-5). However the staffing and resource adequacy (SRA) measurement yields the lowest mean result (2.04). In the current constrained health service, taking the moratorium on recruitment into account, the results of the SRA subscale are unsurprising. Links

between nurse staffing and patient safety are well established. Almost 78% of nurses, who responded to the nurse questionnaire, disagree that there were enough nurses to get the work done. As described earlier, discrepancies exist in the numbers of nursing staff in acute hospitals in Ireland. These numbers show little or no link to either bed numbers in the hospital, or inpatient numbers. Additionally some wards have very high ratios of registered nursing staff to healthcare assistants. Yet across the hospitals nurses agree that there are not enough nurses. Three quarters of nurse respondents report that there are not enough registered nurses to provide quality care to patients, or enough support services to enable them to spend time with their patients. Such findings demonstrate awareness within nursing that insufficient nurse staffing levels are negatively impacting patient care within their wards. Yet nurses in Ireland overwhelmingly judge the care provided in their wards as being of high quality. This may be based in a reluctance to admit to anything less than high quality care; or it may be that Irish nurses, in a fiscally constrained health service, work very hard to keep quality of care high. If the former is true, it may be a reflection of the "Irish personality" type, or a mistrust of anonymised research studies; however if the latter is the case it is likely that quality of care will begin to deteriorate, as nurses tire of working at a rate beyond that which can normally be expected.

Such intensity of work is unsustainable and is likely to impact on nurse burnout rates and absenteeism. Although the HSE has set a target for absenteeism throughout the organisation of 3.5%, in October 2011 only five of the study hospitals reached this target. These figures relate to overall absenteeism rather than nursing rates in particular. However the overall nursing rate for absenteeism for 2011 overall was 5.56% with some hospitals reporting nurse absenteeism as high as 12.5%. Although no standardised

methods were available prior to 2008 to record nurse absenteeism, since then hospitals have submitted overall records to the HSE's Healthstat. Although trends are difficult to establish with data available for just three years, much higher rates of absenteeism in some regions is notable. Greater scope exists to examine these overall rates as more data becomes available. An examination of nursing rates of absenteeism is required with a view to measuring the impact of health cuts on absenteeism in the profession.

7.3.4.1. Participation by nursing in acute hospitals

In this study the subscale measuring Nurse Participation in Hospital Affairs (NHA) has the second lowest scoring (2.33) in the PES-NWI. This subscale measures the perceptions of nurses about the participation and status of nursing within the organisation. It examines how nurses in direct care view their opportunities for advancement or to become involved in policy decisions. Over 50% disagree that management listens and responds to nursing concerns. Over 55% disagree that nurses are involved in internal governance within the organisation and almost 64% disagree that there are opportunities for nurses to participate in policy decisions.

The findings of this subscale support the findings related to nurse confidence in management to resolve problems in patient care and as such this subscale can be linked to the culture of the organisation. The overall impression is that nurses in direct care perceive management as far removed and unresponsive to its needs. Recent inquiry reports such as that of the Lourdes Inquiry (Government of Ireland, 2006) demonstrate that this perceived powerlessness inhibits nurses' actions around patient safety. It is important that nurses believe that they will be listened to, and responded to, by

management if they raise concerns about safety. A feature of an effective safety culture is a management who responds to staff and is not perceived as remote.

The subscale measuring nurse leadership is positive overall, scoring a mean of 2.7. However this subscale relates mainly to ward management, rather than higher level nurse management which was measured by the NPA subscale. Although overall ward management is evaluated positively, 60% of nurses indicate that nurse leaders do not give praise and recognition for a job well done. The provision of deserved praise by managers is necessary for staff morale and self worth. Omission can result in increased levels of burnout. The results indicate that nurses generally perceive ward managers more positively than they perceive higher level nurse management. Nurses seemed less convinced that nursing has an effective influence at hospital level. Almost 55% of nurses disagree that the director of nursing is visible, and accessible to them, confirming that management is perceived by nurses as remote from the front line. Effective leadership and the provision of support to staff are linked to creating a culture of safety in an organisation. These subscales are useful indicators of how supported nurses feel in their workplace overall and therefore how supported they feel in their role in patient safety.

Although the subscale measuring nursing foundations of quality care (NFQ) has the highest reported score, with items generally being positively evaluated, the scoring of some individual items reveal a contradictory story. Forty seven percent disagree that an active continuing education programme exists for nurses in the hospital. Forty two percent disagree that the hospital has an active quality assurance programme. The organisational survey findings conversely suggest an active education and quality

programme, with safety staff support. These NFQ subscale results indicate that management's apparent commitment to patient safety is not understood by staff. Nurses in direct care do not recognise the efforts of management in relation to patient safety, or at best, are not convinced of it. Communication around safety within Irish acute hospitals, both between senior managers and nursing, and between nurses and their managers, is ineffective. Such limitations in communications pose challenges for the enhancement of patient safety. Supportive leadership and effective communication are central to organisational safety and must be improved if safety in acute hospitals is to be enhanced.

7.3.4.2. Teamwork in acute hospitals

The nurse physician working relationships as measured by the NPR subscale is generally positive in this study, with measures of teamwork and collaboration between the professions highly scored. Effective teamwork in healthcare is seen as a vital component in the provision of safe patient care. However, an additional item included in the nurse questionnaire used in this study from Li et al (2007), which supplemented the original subscale devised by Lake (2002), did not have a uniquely teamwork focus. It simply stated that nurses are held in high esteem by physicians. Study data reveals that almost 60% of nurses disagree with this statement. So while nurses feel that professionally they have a good working relationship with doctors, they doubt that they are held in high esteem by them. This again reflects the findings of the Lourdes Inquiry (Government of Ireland 2006) where nurses do not feel valued by their medical colleagues. Hall (2005), as outlined in the literature review (p47) suggests that teamwork in healthcare is hindered by professional groupings. However recognition of this challenge should be evident when planning patient safety training. The recent NHS

future forum report on Education and Training (NHS 2011) recognises the challenges of effective team functioning in healthcare. It recommends multidisciplinary professional development training to enhance teamwork.

The experience of the aviation industry supports the view that shared in-service safety training is an effective means of enhancing teamwork in an effort to advance safety in an organisation. Although it cannot be established from the data in this current study if in-service training is shared across the professions, it is known that this is commonly not the case in Ireland. In-service training is provided for staff, mainly within their professional groups. Such isolated training fails to enhance one professional groups understanding of the other in relation to patient safety and adverse events. Tamaz and Thomas (2006) as described in the literature review confirm that different professionals in health care view adverse events differently and safety training should address this issue.

7.3.5. Nurses and adverse event reporting

Reporting of adverse events is vital to current patient safety strategy, and organisational learning from such incidents is dependent on transparent analysis. Under reporting of such events is an acknowledged problem (Reason 2000, and Johnstone and Kanitsaki 2006). The nurse questionnaire data reveals that a third of nurses did not submit any formal reports of adverse events in the year preceding data collection. A further 43% submitted fewer than five reports. The possible reasons for under-reporting have been discussed in the literature review chapter of this work, and are frequently thought to be linked to organisational and professional cultures. In a recent US study (Levinson 2012), non-reporting of adverse events is linked to lack of clarity around what

constitutes a reportable event. The Department of Health and Human Sciences report (Levinson 2012) confirms however that although the vast majority of adverse events go unreported, nurses submit the greatest proportion of those reports which are submitted. This re-confirms that nurses report more adverse events than other healthcare professionals, although they are not solely responsible for reporting. It illustrates that by identifying, and supporting, the factors which enhance nurses' reporting practices, non-reporting or under-reporting of adverse events can be reduced.

The adverse event reporting culture described by nurses in the present study suggest that adverse events and near-misses are reported in acute hospitals in Ireland between "sometimes" and "most of the time". This suggests that nurses are aware of incident and near miss occurrences, which had not been reported. This supports the work of Firth-Cozens et al (2003) outlined in the literature review (p38) which shows that nurses and doctors often consider reporting, but do not always follow this through. Nurses in particular are found to associate reporting with negative experiences. The study by Firth Cozens et al (2003) confirms that staff are willing to report, if support is available in the workplace. Positive work environments for nurses are consistently linked to better patient outcomes (Clarke Sloane and Aiken 2002). **The findings of this current study confirm that a more positive work environment, and a higher proportion of nurses in a ward educated to degree level, will result in a higher level of reporting of adverse events by nurses in that ward.** A work environment which encourages and supports patient safety will have a positive impact on reporting rates of nurses. Leadership and support from ward managers, and higher nurse management, can enhance the environment and make reporting of incidents routine practice for nurses in the wards. Greater visibility of participation in hospital affairs by nurses, with effective

communication between the wards and management could help to provide support to nurses when reporting patient safety events. The importance of overall managerial support for patient safety has been discussed and this finding suggests that nurse leaders also have a role to play in patient safety by enhancing the work environment, to promote greater reporting of adverse events.

7.3.6. Burnout levels

Nurse burnout, usually operationalised as high levels of emotional exhaustion, has been consistently linked in the literature to poorer patient outcomes (Rafferty et al 2007, and Van Bogaert 2009b). It is frequently viewed as a nurse outcome which is associated with high workload, and a poor work environment. However as demonstrated through the literature review, the Maslach Burnout Inventory, as the most commonly used measurement tool for burnout, is not without its critics. The applicability of the tool outside of America has been questioned (Shaufeli and Van Dierendonck 1995, Kristensen et al 2005) including the suitability of the Personal Accomplishment scale (PA) and the Depersonalisation (DP) scale to the European personality. In the Depersonalisation subscale some statements may be uncomfortable for nurses to respond to, such as those which refer to the treatment of patients as impersonal objects or to not caring about what happens to their patients. The Personal Accomplishment subscale may be equally unsuitable for the Irish context, with statements referring to feelings of exhilaration when working closely with patients. The language style reflects a level of self confidence and revelation which is more easily associated with American personality traits than Irish ones. The CVI rating conducted on this measurement tool as part of this study also reveals problems with the scale. The PA and DP scales have been shown to be less relevant than the remaining scale measuring Emotional Exhaustion. As

a result, the more robust individual subscale measuring Emotional Exhaustion (EE) has been used to measure burnout, in line with other study practices (Aiken et al 2012). Over 41% of respondents show higher levels of burnout using the EE subscale.

The level of Emotional Exhaustion aggregated to ward level is not found to be significant in a model devised to examine its impact on nurse-graded safety in the ward. Previous research shows it to be significant in analysis conducted at the level of the nurse (Aiken et al 1997), and it was expected that a higher mean score for emotional exhaustion for nurses on a ward would impact on patient outcomes in this Irish study as in other countries. However previous use of the Maslach Burnout Inventory for studies of nurses in Ireland has been limited and without country norms it is difficult to comment on its applicability in Ireland. Consequently, based on international findings which suggest higher levels of nurse burnout lead to poorer patient outcomes, it seems unwise to suggest from the findings of this study that this is not the case in Ireland. The suitability of the measuring tool in an Irish context requires further exploration. This is supported by a lower CVI rating (0.64) obtained for the scale in this study (0.78-1.0 normally accepted), which indicated difficulties with the applicability of at least two of the subscales. Due to the challenges which face those working in the health service it seems likely that nurse burnout levels may worsen in the future. Challenges include non-replacement of staff who leave, changes to skill mix and workload, increased patient dependency and lack of possibility of moving between jobs. All of these issues have been associated with burnout levels in other countries and the links between higher levels of burnout and reduced patient outcomes have been clearly established.

7.4. Chapter summary

This study, in line with previous international studies, confirms that nurses, and nursing, impact on patient safety outcomes. It suggests that any reduction in nursing staff levels could be off-set with improvements to the work environment of nurses, adjustments to the proportions of nurses with degree level education at ward level, and the mean experience levels of nurses working in those wards. The advancement of patient safety in Ireland must be considered within a context of a rapid onset of funding reductions in the Irish health service, brought about by a global financial recession, combined with changing demands on that service. Current government strategies, including the recruitment moratorium and incentivised retirement scheme, are leading to reduced numbers of nurses working in Irish hospitals. Extra funding is unlikely to be available in Ireland for quality and safety initiatives in healthcare for the foreseeable future. However this cannot be seen as a reason to reduce momentum around patient safety. It is imperative that the nursing workforce continues to be seen as an asset to the health service, impacting positively on patient outcomes, and as critical to patient safety, rather than a cost demand which requires containment. This research clearly demonstrates the impact of nurses on patient safety in acute hospitals in Ireland.

This study looks beyond what is known about the nurse factors which enhance patient safety. By aggregating the factors to the ward level, and examining the influence of these ward level variables on patient safety outcomes, it enables a different approach to safety to be considered. This approach takes into account that funding for large numbers of extra nursing staff is unlikely to be available in the near future and suggests

a more effective use of the current workforce. The key findings regarding ward level nursing factors which have been discussed are as follows:

- Results show that it is not simply the individual nurse's level of experience which can enhance patient safety but the aggregated average experience level at ward level.
- The study indicates that the proportion of nurses educated to degree level on wards impacts on nurse-reported patient safety outcomes, with better outcome associated with a higher proportion.
- Improved work environments at ward level for nurses can enhance nurse-reported patient safety and adverse event reporting rates. The NWI-PES scores in this study point to areas which could be improved in Ireland such as "nurse participation in hospital affairs".

Analysis of the study data using a multilevel approach has been useful in developing a more precise view of factors which can be integrated into service planning, in order to enhance safety in Irish hospitals.

Further findings which have been discussed in this chapter are:

- Organisational factors which can enhance safety have been identified, and a disconnect exposed, between management claims around patient safety in their organisations, and staff perceptions of management's commitment to safety.
- Certain staffing ratios have been found to be predictive of better patient safety outcomes. These ratios are staff nurse to HCA ratio in surgical wards and staff nurse to NCHD ratios in the organisation.

Recommendations arising from research studies often require financial investment in order to be realised. In the Irish health service such investment is unavailable at present.

However this should not be a reason to allow the progress made in patient safety falter or decelerate. By using research methods which enable the identification of ward level factors which have the potential to advance patient safety, further important advancements in safety are possible even in fiscally challenging times. This study utilised Multilevel Modelling analysis techniques in order to examine the impact of ward level factors on patient safety outcomes. Such MLM techniques have enabled identification of ward factors which impact safety, and to which, adjustments to the ward means for these factors could be made, thus improving safety for patients with minimal cost implications. Recommendations arising from this research and suggested further research will be outlined in chapter 8.

Chapter 8 CONCLUSIONS AND RECOMMENDATIONS

Patient safety is a priority for health service providers worldwide. Recognition by those working in healthcare, and by the general public, of the unacceptable risks to which patients are exposed has led to an increased focus on safety. Many health services have responded by adopting an approach developed by safety conscious industries. This systems approach to safety has been introduced in healthcare in Ireland and other countries since the 1990s and has faced many cultural challenges. Currently health services are undergoing a period of change with activity levels in hospitals increasing as a result of an aging population, more acutely ill patients, technological advancements and shorter hospital stays. These changes are accompanied in many countries by reduced funding for health services due to a worldwide economic downturn. Higher levels of nurse staffing have been associated with reduced levels of adverse event occurrence in many studies. However the reality in Ireland is that nurse numbers are declining and current government policy suggests that this is likely to continue.

In order to ensure that patient safety in hospitals is not compromised, it is necessary to develop alternate strategies for safety. In this study multilevel modelling analysis techniques have been used which take into account the clustered structure of the data. This methodology enables identification of ward factors which impact safety. Adjustments to the ward means for these factors could ensure that patient safety continues to improve in Irish hospitals. In addition to ward level factors, both nurse level factors and organisational factors which impact on safety in Irish hospitals have been identified in this study. A unique finding of this research is that nurses' adverse event reporting practices are impacted by the environment in which they practice.

Another distinctive finding is that ratios between key staff (as outlined below) impact on patient satisfaction with medication safety.

8.1. Key findings

All of the key findings of the study are outlined below:

- Lower levels of nurse experience (in the speciality in which they work) aggregated to ward level, are predictive of a higher level of nurse-reported frequency of adverse event occurrence. On medical and surgical wards where a greater proportion of nurses have higher experience levels, the numbers of adverse events occurring to patient are reduced, thereby indicating safer patient care.
- Lower nurse-rated patient safety predicts higher nurse-reported adverse event occurrence.
- The proportion of nurses with degrees in a ward impacts on patient safety within that ward. The proportion significantly impacts on nurse-graded patient safety for that ward, with a higher proportion of nurses with degrees associated with higher nurse-graded ward safety. Reporting of adverse events is critical to contemporary patient safety strategies. Under reporting is widely acknowledged. Nurses are known to report more adverse events than any other group of professionals in health care. The proportion of nurses with degrees on a ward is also a significant predictor of nurse adverse event reporting rates, with a higher proportion associated with increased rates of adverse event reporting. Higher rates of adverse event reporting is indicative of a greater focus on patient safety by staff and ultimately, safer care for patients.

- Higher levels of necessary nursing work left undone by nurses predict higher levels of nurse-reported frequency of adverse event occurrence. This suggests a link between higher nurse workloads or lower staffing levels and adverse event occurrence rates.
- Higher nurse-reported culture of safety predicts nurse-graded patient safety in wards.
- Lower nurse confidence in management (aggregated to ward level) to resolve problems reported to them predicts higher nurse-reported rates of adverse event occurrence
- A higher ratio of staff nurses to healthcare assistants in general wards in Ireland predicts patient satisfaction with medication safety. Lower ratios result in lower satisfaction. A higher ratio of NCHDs to staff nurse is also significant in predicting patient satisfaction with information provided around side effects to new medications.

An important key finding of this study, is the influence of the nurse work environment, which encompasses the "organisational characteristics of a work setting that facilitate or constrain professional nursing practice" (Lake 2002, p178), on nurse-reported patient safety outcomes. These organisational features include measurements of staffing and resource adequacy, the relationships between nurses and doctors, leadership shown by nurse management and hospital management, nursing's contribution to quality of care initiatives, and the involvement of nurses in policy decisions at organisational level. Through this study the following findings were established in relation to the nurse work environment:

- Better work environments, as evaluated by individual nurses, predict higher levels of adverse event reporting. Higher levels of reporting reflect a better

safety environment for patients, as under-reporting of adverse events is a major healthcare concern. Adverse event reporting is central to the systems approach to patient safety and

- When the work environment data is aggregated to ward level, along with a higher proportion of nurses with degrees on the ward, better nurse work environments predict higher nurse-graded patient safety.

8.2. Key conclusions

The unique contribution of this research study is the identification, through multilevel analysis, of hospital level, ward level and nurse level factors which enable the delivery of safe care to patients in acute hospitals in Ireland. Crucially also, for the first time, a picture has emerged of how patient safety is currently enacted in Irish hospitals, through information supplied by management within these hospitals, information received from nurses working in direct care provision, and information received from patients regarding their levels of satisfaction with certain important safety indicators.

The research conclusions are as follows:

- All acute hospitals are addressing patient safety through appointments to safety posts, in-service safety training provision and safety audits. How they chose to approach these issues is open to interpretation by hospital management and has given rise to variation between hospitals. Although hospital management has addressed these safety requirements, nurses remain to be convinced of management's support for safety within the hospital.
- The mean nurse experience level in a ward is an important factor in reducing nurse-reported adverse event occurrence rates.

- The proportion of nurses educated to degree level is an important factor to be considered for enhanced patient safety in a ward. Equally this proportion is important for increased adverse event reporting, a requirement of the systems approach to safety. Patient care provided in an environment where the overall education of nurses is higher may provide patients with advantages that previously would have been associated with increased staff numbers.
- Better work environments for nurses are linked to higher levels of safety in Irish hospitals and additionally to nurses' reporting of adverse events.
- The ratio between key staff members is an important factor to be considered in order to improve patient satisfaction levels with medication safety

The idea for this research came about as a result of my background in the area of patient safety in Ireland. Through data provided by hospitals, nurses and patients, three perspectives on safety were examined. This enabled identification of factors, associated with organisations, and with nurses as key players in patient safety, which if developed have the potential to enhance safety in Irish hospitals. Recommendations arising from the research will be outlined below (section 8.4).

8.3. Study limitations

This study has a number of limitations, many of which have been highlighted throughout this piece of work. The original aim was to gather quantifiable data on organisational and nursing factors in acute general hospitals which enable the delivery of safe patient care. As such the methods used have been appropriate, as a survey methodology is suited to the gathering of quantitative data. The limitations and advantages of surveys have been discussed extensively in the methodology chapter (p77

above). Surveys enable the collection of large amounts of quantitative data in a structured and transparent manner which would otherwise be very difficult. The nurse survey is an example of this. The overall response rate is acceptable and the data quantifiable. The most common criticism of the survey method is that its structure does not allow for clarification of responses to questions. In both the patient and organisational surveys this has not been the case. The researcher worked hard to maintain a supportive relationship with the hospital link person and was available for clarification on all matters related to the organisational survey throughout the data collection period. During analysis of the data, this relationship was such that many discussions took place in order to clarify hospital responses. In the case of the patient survey, the researcher was available to all patients when completing the form and was on-hand to offer clarifications if needed. This researcher availability to the patients, in itself, could also be interpreted as a limiting factor and this will be further discussed below in section 8.3.4.

Nonetheless, limitations which were present in this study are outlined below:

8.3.1. Data structure

The hierarchical structure of the data is suitable for multilevel analysis; this is a factor in the unique contribution of this research. Due to this structure it has been possible to link nurses to wards, within hospitals, and patients to the same wards within hospitals. It is a limitation of this study that nurses cannot be directly linked to patients. However nurse and patient data have been collected in the same wards, and although not precisely at the same time (within 3-6 months), it is likely that many of the nurses who provided data for the nurse survey, provided care to the study patients. The study relies on cross

sectional data and therefore causality cannot be established. In relation to the models developed it is possible that variables which are not included may be responsible for the associations discovered.

8.3.2. Sample size

A convenience sample of between two and four medical and surgical wards per hospital was chosen for the study (see methodology chapter p109 above). In some hospitals this resulted in the use of all medical and surgical units and in others only a sample of the wards were used. This may impact on the generalisability of the findings to areas outside general medical and surgical wards.

The multilevel data analysis process was possible at two levels only, nurse level and ward level, because of the limited number of hospitals in the study. All acute hospitals in Ireland were invited to participate, and all but one chose to do so (n=30). Therefore this number represented almost all large general hospitals in Ireland.

The patient survey was limited to 10 hospitals and this had some disadvantages. Data were gathered from 285 patients within these hospitals. When combined with the data from the nurse survey this reduced the nurse data to 467 nurses, and 35 wards, in the 10 hospitals. As a result of this multilevel modelling was not carried out using the patient satisfaction data.

8.3.3. Absence of pilot study

It is recommended that prior to using survey methodology in research studies, a pilot study be carried out to examine the suitability of the tools. No pilot study was carried out in this case. Various versions of the nurse questionnaire had been used over the last

20 years with nurse populations all over the world and it was found to be appropriate and successful. Details of validity and reliability testing are contained in the methodology chapter (see p93 above). More recently the current version of the questionnaire was used extensively in the International Hospitals Outcomes Study and was successfully utilised in the UK and Europe. The Nursing Work Index, an instrument contained in the nurse questionnaire has been used successfully in Ireland (Flynn and McCarthy 2008). However an additional section added to the core questionnaire for this research study would possibly have benefited from a pilot study.

Content Validity Indexing (CVI) was carried on this questionnaire yielding acceptable results for the NWI-PES. However the CVI rating for the Maslach Burnout Inventory was lower than commonly accepted (see methodology chapter p108 above). The limitations of using the MBI scale outside of America have been discussed throughout this work (p108 above). It is of note that nurse burnout, as measured by the Emotional Exhaustion subscale, although found to be a significant predictor of safety in international studies, was not found to be significant in this study. The MBI has had limited use in Irish studies and therefore no national norms have been established.

8.3.4. Data collection procedures in the patient survey

The researcher approached the ward manager in all cases on the day of patient data collection. The ward manager indicated which patients on the ward might be able to complete the questionnaire. It is possible that the researcher was guided to those who would evaluate the care more favourably and as such is a limitation of this study. However this method ensured that the researcher would not approach patients who were unable to help due to physical or psychological frailties.

8.3.5. Patient survey questionnaire

The origins of the patient survey questionnaire have been outlined in the methodology chapter of this work. The demographic details contained in this questionnaire were very limited. Only the education level of the respondent was sought. Patient ages were not recorded. However as the researchers in this case met with all of the patients individually the overall impression regarding the ages of the patients is of interest. The majority of patients were noted to be over 50 years old and a significant number of them appeared to be aged 70 or above. This is in keeping with data reported in the report on the Health Status of the Population of Ireland (HSE 2008 p84) which clearly demonstrates that the Irish inpatients numbers rises significantly from age 50 onwards. The literature review clearly outlines the link between patients' age profile and satisfaction levels. However as "age of respondent" was not recorded, analysis of this issue could not take place.

8.3.6. Nurse questionnaire response rate

The overall response rate for the nurse survey was acceptable at 57% (n=1,406). All nurses employed in the provision of direct care to patients in the study wards were encouraged to participate. The variation in response rates per ward, ranging between 5% (n=1) and 100% (n=24), was significant. Reasons for non-participation cannot be derived from the study data but reports from hospital study link people suggest that research fatigue was a factor. Some nurses cited lack of time due to staff shortages. Again the moratorium on recruitment featured as a reason. Wards where less than five nurses responded to the questionnaire were removed from analysis where aggregation to ward level was required. It was unlikely that fewer than five nurses would be

representative of the total ward staff. This left 1,397 nurses in 108 wards, averaging 13 responses per ward.

8.3.7. Social desirability effects

The impact of social desirability on responses to surveys is well known. Respondents may be reluctant to provide truthful responses if they feel that it will reflect badly on them. To this end in this study, boxes were provided for nurses in which to place their questionnaires when completed, to avoid the forms being available to colleagues or managers. It is possible that answers to safety related questions in the nurse survey may have been influenced by the punitive culture which has been associated with adverse event occurrence in healthcare in the past. This may account for nurses' reluctance to acknowledge the occurrence of common adverse events such as medication given at the wrong time, or pressure ulcers.

The results of the patient survey were very positive in parts. This may also reflect social desirability as associated with questionnaires. In the US this patient satisfaction questionnaire is sent to patients following discharge, but in this case it was completed by patients with an average of 7.4 days left to spend in hospital. It is possible that patients felt their responses could influence their care for the remainder of their inpatient stay, although it was stated that this was not the case.

8.4. Recommendations

The findings of this study have implications both nationally and at hospital level for patient safety in Ireland. Below are recommendations arising from the key findings:

8.4.1. National standards for hospital safety

This study highlights the scope for variation in interpretation by hospitals of the requirements of patient safety at hospital level. All hospitals report that they have appointed safety officers within the hospital and that they provide in-service training and carry out safety audits. **There is a need for national standards in relation to all these aspects of safety**. The Health Information and Quality Authority (HIQA) has a statutory responsibility for setting standards for health and social care services in Ireland. A draft document has been prepared entitled *National Standards for Safer Better Healthcare* (HIQA 2010) and its purpose is to provide a framework for healthcare providers to continuously improve standards of safety. Additionally the aim of these guidelines is to achieve a consistent level of safety across all services. In the draft document the characteristics required of a safe health system are outlined. These include appropriate governance, leadership, management, workforce, use of resources and information. When the document is finally approved by the Minister the guidelines will take effect immediately, and on-going compliance is to be monitored by HIQA. The government has proposed a statutory licensing scheme for hospitals in the future which would be linked to compliance with these standards. Such an initiative would focus the attention of hospital management throughout the country to fully comply with the statutory requirements.

However although these guidelines include all the key principles of quality and safety, they do not include prescriptive guidelines on how hospitals should achieve compliance. HIQA has indicated that more specific service related guidelines will be issued alongside the statutory guidelines. Such guidelines are set to include specific guidelines for acute hospitals drawn up in consultation with key stakeholders and frontline staff as

well as acknowledge experts. Such service specific guidelines will enable effective monitoring of compliance by HIQA inspectors. As interpretations of safety requirements by hospital management are currently so varied, service specific guidelines are urgently required. Based on the findings of this current **study it is clear that guidelines for acute hospitals should include recommendations on the staff grade at which safety officers should be appointed, in-service training provision and safety audits.**

Prior to the publication of these sector specific guidelines, a review of grading of safety personal should be conducted by the *National Patient Safety Advisory Group*. This group was established in 2011 to drive forward the patient safety agenda nationally, provide a forum for consultation and to advise the Minister on patient safety concerns. As trustees of the *Patient Safety First* initiative their role is to identify important patient safety indicators for national use. Membership of this group includes representatives from the Department of Health and Children, An Bord Altranais, the HSE, HIQA and other professional body representation. As such it is ideally placed to assess the needs of hospitals in relation to safety staff. The ongoing work of the HSE which aims to create sub-groupings within the acute hospital network could feed into this work, assessing the requirements for small hospitals differently to larger teaching hospitals.

Guidelines for in-service safety training requirements should also be included in the HIQA service specific guidelines. These guidelines should include curriculum advice based on international guidelines, and advice on duration, audience, training

regularity and attendance record keeping. This would enable comparison between services as part of the ongoing monitoring process.

Lastly the acute hospital specific guidelines should include audit advice and examples. The Clinical Audit Support Programme available through the HSE Quality and Safety Directorate is available for training and consultation. Relevant safety staff from hospitals should be supported to access this training and resources made available for implementation at hospital level. Standardisation of safety auditing would enable comparison across hospitals

8.4.2. Hospital Safety Culture

The findings of this study point to the need for enhancement of certain aspects of the culture of safety in Irish hospitals. These can be subdivided into the following categories:

8.4.2.1. Management support and commitment

The findings of this study point to a difference between the approach to safety reported by hospital management, and the perceptions of nurses regarding the commitment of management to the safety process. The commitment of management is known to influence the safety culture of an organisation. In the case of acute hospitals in Ireland the appointment of safety staff, the provision of training and the practice of safety auditing indicate that management has an understanding of the requirements of good patient safety practice in hospitals. However nurses do not appear to be wholly convinced that managers support the safety process. **It is the role of hospital management to demonstrate their commitment to and support for patient safety. This can be achieved by increasing the visibility of hospital managers at safety**

meetings and in-service training around patient safety. In relation to safety posts, the Draft National Standards for Safer Better Healthcare (HIQA 2010) recommend a visible line of accountability in hospitals. Enabling increased access and communication between those in safety posts and hospital management would demonstrate this line of accountability. This increased visibility and open lines of communication would help staff feel supported in advancing patient safety.

The grading of safety posts may require review by hospital management if guidelines are developed around grading as recommended in the above point (8.4.1.). Management will be required to ensure that post holders have the relevant competencies to carry out the role, and to support any training that may be required. This restructuring will help to demonstrate the commitment of management to patient safety to the organisation at large.

8.4.2.2. Leadership

Leadership is required to advance patient safety at hospital level. The hospital manager or chief executive is ultimately responsible for patient safety. The Report on the Commission on Patient Safety and Quality Assurance (Government of Ireland 2008) recommended the development of clinical directorates where the clinical leader of the directorate would be responsible for safety within that directorate. **The clinical directorate initiative has started in Ireland but needs to be further developed with the safety aspect of the clinical leader role at hospital level clearly defined for all staff.** This leader would host meetings on safety related matters and work to develop risk management strategies within their area of expertise.

Working closely with the leaders of the directorates and co-ordinating patient safety training and adverse event reporting and investigation should be a clearly defined safety officer. Such a post could be filled by an existing risk manager within the hospital, but the post needs to have clear lines of accountability to senior managers. The leadership potential of this post must be acknowledged by managers and clinical leaders alike, as this post is likely to be a first point of contact on all safety issues highlighted by clinical staff. Visible managerial support for this role would help convince staff of an organisation wide commitment to safety.

The Commission on Patient Safety and Quality Assurance report published in 2008, was followed in 2010 with the Irish initiative *Patient Safety First* (Patient Safety First 2010). This initiative brings together leaders in Irish Healthcare, and Department of Health and Children and Health Service Executive officials, with the aim of advancing patient safety in Ireland. *Patient Safety First* recognises the challenges in improving safety for patients, but acknowledges that change is needed to the approach taken by organisations. Its current focus is on implementation of the recommendations of the Commission Report (2008). By signing up to *Patient Safety First*, hospitals and professional bodies, can declare an ongoing commitment to safety. To date only a very low number of acute hospitals (3) have signed up to this initiative (Patient Safety First 2010), and approaches to safety taken by hospitals vary significantly as is evident in this study. Hospital management in the remaining 27 acute hospitals needs to address this issue immediately in order to demonstrate to its staff and to the public its commitment to patient safety.

8.4.2.3. Safety training

Multidisciplinary safety training is recommended to enhance patient safety and enhance team functioning around patient safety issues. Currently in Ireland various in-service safety training sessions take place at hospital level for staff. The sessions are facilitated by safety officers such as risk managers, haemovigilance officers, quality officers, or pharmacovigilance officers. They are frequently aimed at one professional group rather than at a multidisciplinary audience. Curricula are not standardised and sessions run for varying lengths of time. Guidelines are required on safety training which would enable a standardisation across hospitals. Such standardisation would enable staff to move between hospitals without retraining if their training was up to date. The Commission Report highlighted the Patient Safety Education Project (2006) as an example of a standardised safety education curriculum for hospitals. HIQA service-specific guidelines should include advice on length of education sessions, frequency of retraining and multidisciplinary audience. This would enable compliance monitoring across hospitals to ensure all staff received appropriate training. Training at hospital level should take into account the cultural diversity of staff. Irish standards and expectations should be underlined.

Review of undergraduate training for healthcare professionals by Departments of Nursing and Medicine around patient safety should be carried out. The guidelines produced by the WHO (2011) could be incorporated into the training of doctors and nurses. This would help to ensure that patient safety becomes a priority for all staff at the earliest opportunity and would enable follow-up through in-service updates at hospital level after qualification.

In the aviation industry ongoing audit of organisational safety culture is the norm. This enables early detection of reduced safety and comparison between areas. **Safety officers at hospital level are ideally placed to conduct safety culture audits in healthcare. This initiative would enable identification of deficits and strengths along with a targeted response.**

8.4.3. Nurse work environment

This research reconfirms the influence of the nurse work environment on patient safety. **The work environment not only impacts on patient safety but impacts on how nurses fulfil their reporting functioning in relation to adverse events. Investment in the work environment would be beneficial to both patients and nurses and critically in a time of funding shortages, should not imply huge expenditure by hospitals.** The results of this study suggest that although the overall score for the nurse work environment was around the midpoint of the scale, some subscales scored lower than others. By paying attention to these areas, the overall work environment can be improved. For example the subscales of the NWI-PES indicated that "nurse participation in hospital affairs" could be increased. This subscale measured nurse involvement in the overall management of the hospital and policy development, and assessed the perceived interest of management in nursing concerns. The results indicated that there a need to ensure nurse involvement in committees and in policy development in hospitals. Nurses perceived that the voice of nursing was not strong enough at managerial level. Hospital management could address this point by including more front line nurses in policy development. By including only senior nurse management they reinforce the view that management is far removed from the point of

care delivery and their concerns may not always be shared by frontline staff nurses, and vice versa.

The subscale, which measured nurse leadership and support for nurses, contained items which examined nurse perceptions of both nurse leadership in the organisation, and of local ward management. Nurses evaluated ward management more positively than they evaluated nurse leadership in the organisation. **By increasing visibility and accessibility of senior nurse management, including the Director of Nursing, this aspect of the nurse environment could be improved**. The increased presence of senior nurse managers at local ward meetings would convey a message of solidarity among nurses within a hospital. In addition, although team functioning and nurse-doctor relationships were evaluated positively overall, within the work environment, this could be enhanced further through **multidisciplinary safety training which would enable professional groups to increase their understanding of each other roles and contributions to safety.** This would enhance, not only the work environment of staff but also improve patient safety.

The staffing and resource adequacy subscale achieved a low score as part of the nurse work environment. The reality at present is that nurse numbers are reducing rather than increasing. This is due to the recruitment moratorium and the high numbers of retirements in February 2012. Should mandated staff reductions (as described in section 7.2) be achieved they will be indicative of a decrease in the density of nurses per 1,000 of the population working in the Irish health service from an estimated 11.33 in 2010 to 9.85 in 2015 and 9.25 in 2020. This is likely to impact on numbers of nurses in direct care and on patient safety outcomes. The *National Patient Safety Advisory Group* has a

role to play here. It is the remit of this group to advise the Minister on safety related concerns. The impact of lower nurse numbers on patient safety, supported by this study and international research, cannot be ignored. **This is an urgent matter requiring attention by the Minister for Health.** Ultimately the cost of poor safety standards may be more than the cost of recruiting and retaining an adequate nurse work force, as can be seen by the impact on 30 day mortality rates. Hospital and nurse management must examine declining nurse numbers and endeavour to make the most effective use of the nurse resource. **This study points to the importance of staff ratios in maintaining high standards of patient safety**. Effective use of the nursing resource may involve redeployment within hospitals and further reconfiguration of wards.

Aiken et al (2011) demonstrate that the impact of the work environment on patient safety outcomes is greater even than that of nurse staffing. They point out that nurse staffing is contingent on the work environment and there is little to be gained by adding more nurses to a poor work environment. By investing in certain aspects of the nurse environment which according to this study could be improved, this may go some way towards counteracting the inevitable staff shortages which are projected for the future. The Directorate of Quality and Patient Safety in the HSE was set up to ensure that patients receive high quality and safe care in hospitals in Ireland. Reduced funding across the health service means that recruitment of nursing staff to maintain or improve standards is not an option. This study shows that the work environment is critical to improve safety outcomes. **The National Director of Quality and Patient Safety has a responsibility to address the findings of the study through recommendations regarding the importance of the work environment of nurses to patient safety, in combination with the Director of Clinical Strategy and Programmes. Included in**

the role of the Directorate of Clinical Strategy and Programmes is improving cost effectiveness of the care provided in Irish hospitals. Recommendations on nurse visibility and participation in hospital affairs, on effective leadership and management could positively impact on the work environment as perceived by nurses in Irish hospitals. By changing how nurses perceive their environments at ward level, this study suggests that that patient care will benefit, with few cost implications.

8.4.4. Retention of Experienced Nursing Staff

The importance of experienced nurses to the advancement of patient safety is highlighted by this research. The fear in Ireland that the most recent incentivised retirement scheme (Feb 2012) has hastened the exodus of experienced nurses is very real at this time. **Attention should be paid by the Office of the Nursing and Midwifery Services Director (ONMSD) of the HSE to the likely impact of a reduced number of experienced nursing staff in the health service.** The remit of this office is to provide leadership for nursing services in the Irish health service to provide enhanced patient care. Guidelines on retention of experienced staff, provided by this office, would assist hospitals in this task. However overall responsibility does not lie with the ONMSD, the CEO and board of the HSE has further responsibility, heading up the organisation which claims to have patients at it centre. The recent retirement scheme means that experienced nurses have left all areas of service. The CEO of the HSE, along with the board of the HSE is accountable to the Minister and Government. **The value of experienced nurses to the safety of patients is made clear through this research and as such should be seen as a priority for review by the Minister.** The recently released government contingency plans such as cancelling leave, and unpaid overtime will not address the loss of experience.

Nurse management in hospitals must pay close attention to the relevant experience of nurses when planning the workforce at ward level. **Recording experience levels centrally by workforce planners in nursing would enable effective planning to take place which would take into account the mean experience level of the work force within a ward**. The organisational survey findings revealed that in 24 of the hospitals nursing staff did not have an annual staff appraisal with nurse management. Similarly professional development reviews for staff were lacking in 20 of the hospitals. These processes would enable discussion around experience levels to take place. Managers could record experience levels and discuss redeployment possibilities to enhance safety. Redeployment of staff within hospitals may be required in order to maintain the mean experience level on wards. The benefit of this can be seen in the results of this study.

The age profile of nurses in this study implies that the nurses working in the Irish healthcare system currently will potentially be working for a long time into the future. The nurses in this study make up not just current workforce, but also future workforce. As such every effort should be made to enable nurses to build on their experience levels in their chosen area and to retain this experienced resource within that area. This can be enhanced through a supportive work environment, continuous professional development and strong leadership within hospitals. This requires investment at hospital level now, in the future experience levels of nurses.

8.4.5. Education levels of nurses in the workforce

This study demonstrates the importance of maintaining the proportions of nursing staff on wards educated to degree level. The findings support the associations in

previous literature between higher nurse education levels and improved patient outcomes (Aiken et al 2003, Estabrooks et al 2005, Tourangeau et al 2007, Bruyneel et al 2009). The proportion of nurses on a ward with degrees in nursing impacts, both nurse-reported patient safety in the unit, and the number of adverse event reports submitted. Although further work remains to be done on proportions of degree-educated nurses in Irish hospitals, the Institute of Medicine in the US recommends increasing the proportion of nurses with degrees in wards to 80% by 2020 (IoM 2010). The proportions of nurses with degrees in this study range from 10% in some wards to 100% of respondents in other wards. Such variation lends itself to redeployment initiatives which are likely to be cost neutral. Although degree level education for nurses cannot be seen as a panacea for improved patient outcomes many studies have demonstrated its contribution towards improved patient safety. This study supports such findings. **Future hospital recruitment drives should heed the relationship between the proportion of nurses with degrees at ward level and patient safety outcomes**. The cost of employing degree educated nurses is no different to the cost of non-degree educated nurses. However in times of external recruitment it may require a change of recruitment policy to exclusively focus on degree-prepared candidates. In the interests of safety, nurse work force planners at hospital level should record education levels of nurses centrally in order to be able to include this feature into planning the workforce for wards. Again redeployment between wards, within specialities, may be appropriate in some cases in order to ensure a consistent level of safety across hospital services.

8.4.6. Multidisciplinary and integrated workforce planning

The findings of the study suggest that in terms of nursing it is not simply numbers of nurses that are important but the ratio of nurses in direct care of patients to other key

members of staff. There is a need to take a multidisciplinary approach to workforce planning in hospitals, both at local level and at national level. The National Patient Safety Advisory Group, as described in section 8.4.3 p275 above, may have a role here in advising the Minister. Recommendations to hospital management from the Department of Health and Children on integrated workforce planning would be helpful. Currently workforce planning takes place within professional groups with little attention paid to changes within other groups. By establishing a multidisciplinary workforce planning committee in all hospitals the professions can be cognisant of all impending changes in other professional groups. In this way details of all staffing levels can be made available to relevant management and workforce planners throughout the organisation. The importance of examining the ratios of nurses to health care assistants, and staff nurses to NCHDs, is highlighted in this study. Further work remains to be done in establishing minimum ratios to aid workforce planning in acute hospitals.

It is evident in this study that nurse numbers in acute hospitals are linked to neither inpatient numbers nor activity levels. Enormous variation in staffing levels can be seen between wards and hospitals in this study. A joint review of nursing staff numbers in acute hospitals by the HSE Quality and Patient Safety Directorate and the Nursing Services Director may be timely. This would enable planning for the nursing resource into the future, to enhance patient safety in hospitals. This review may not be uncontroversial due to the risk that while some hospitals may gain nurse numbers, others may find the numbers lowered. Within hospitals, caution is to be recommended when adjusting the nursing skill mix of wards. The impact of replacing the qualified nurse work force with a cheaper unqualified workforce is not yet adequately evaluated. It is important that Irish health service management both at government and HSE level,

along with hospital management remain focused on the benefits of a skilled, well educated, and experienced nurse workforce for improved patient safety. It has to be acknowledged in the current economic climate that resources may not be available to maintain the current skill-mix. However this study highlights the benefits of maintaining ratios of key staff, focussing on experience levels at ward level and the proportion of nurses with degrees at ward level. It is hoped these measures might help to counterbalance possible patient safety deficits caused by reduced staff numbers.

8.5. Issues raised which require further research

This study raised many interesting questions which were not fully addressed in this work. Some of these are outlined below:

- **The impact of nurse migration on patient safety**

Although the organisational questionnaire data were not very useful in relation to overseas-qualified nurses (only 12 hospitals provided details), the nurse data provided some clarity. Thirty eight percent of the respondents received their basic nurse education overseas. Unsurprisingly 52% of these trained in the UK. This reflects the established pattern of Irish people travelling to the UK for nurse training. Nonetheless as respondents were not asked to indicate their nationality, it cannot be established from the data if those who indicated that they trained in the UK are Irish nationals who trained there and returned to practice in Ireland, or if they are UK, or other, citizens who travelled to Ireland to work. However it can be assumed that the former is more accurate on the basis of previous patterns of movement. Over 38% of the nurses who trained abroad, trained in India and the Philippines reflecting the overseas recruitment trend of the past decade. Ninety percent of work visas issued to nurses wishing to work in Ireland between 2000 and 2006 went to nurses from India and the Philippines. A total of

almost 9,500 nurse work visas were issued during this time (Humphries et al 2008, Barrett et al 2009). In this study the impact of the country of training of the nurse was not explored in relation to its impact on patient safety outcomes and as such needs further attention. Such a significant demographic difference in almost 38% of nurses in Ireland should not be ignored in any study of nurses. While overseas recruitment has been in decline since 2007, and indeed many nurse immigrants to Ireland have now left to either return home or work in other countries, significant numbers of nurses from other countries continue to work in Irish hospitals. Further analysis of current data or a new study might help in understanding if this has any implications for patient safety.

- **Safety Culture in Irish Hospitals**

The issue of the culture of safety was examined within the nurse survey. However a more complete examination of safety culture would seem appropriate. The limited number of items included in the nurse questionnaire from a larger questionnaire used in the US (Agency for Healthcare Research and Quality 2007) to examine safety culture provided interesting insights into the culture of safety in Irish hospitals. While this study provides a baseline for safety culture measurement in acute hospitals, a more extensive examination of safety culture would provide more information. Ongoing monitoring of safety culture takes place in the aviation industry and its benefits are widely acknowledged. This enables continuous auditing of the safety culture through which there can be identification of areas which need to be improved. Such continuous monitoring of safety culture in hospitals would be of benefit to patient safety.

- **Impact of safety officer grading on patient safety**

Data were gathered on the grade of safety officers in acute hospitals which could be included in the safety scores applied to hospitals. The safety score developed in this research did not include grading of posts, but simply recorded the presence of safety

personnel. The impact of an alternative safety score, which included grading of posts, could provide interesting results regarding the impact of lower or higher grades in these posts. To develop such a score the professions and their similarities would require further examination. Some of the posts are appointed at nursing grades, some at administrative grades and some at scientific grades. The nursing grades involved are CNM2, CNS and ADoN. The administrative grades are grades 6, 7 or 8, and the scientific grades are basic grade or chief medical scientist. Across the professions decisions would be required as to which nursing grade equates to which administrative grade and which scientific grade.

- **Critical staff ratios to enhance patient safety**

This study demonstrated that the ratios of staff nurse to HCA and staff nurse to NCHD impact on patient safety outcomes. It did not make suggestions for critical ratios. The acute hospital sector is very varied and ratios may vary depending on the hospital type, size and activity. Thus further work in this area would enable critical minimum ratios to be developed which would ensure that patients in these hospitals continue to receive the safest care possible.

8.6 Conclusion

This research study was conducted at a time of change in the Irish health service. Patient safety, as a concept, in Ireland continues to gather momentum, at a time when resources for health services are reduced, and nursing staff numbers are declining. This presents challenges for those aiming to increase levels of safety in acute hospitals. The study identifies factors at hospital level, and nurse factors at ward level which have the potential to enhance safety.

The study can contribute to the development of enhanced safety policies and practices throughout the acute hospital sector if these factors are considered at national and local level. The implications for hospitals of some of the study's findings are that a move must take place from intra-professional workforce planning to a multidisciplinary approach where ratios of staff can be examined. For nurse leaders and managers the implications of the study are such that the importance of an adequately resourced, well educated and experienced nurse work force, working in a positive practice environment, is readily associated with improved patient safety. To fail to respond to the study findings, is at best a lost opportunity for all concerned in health service provision in Ireland to improve safety for patients; at worst, in a time where funding is low and nurse numbers are in decline, it is to place patients in hospital at risk of delayed discharge, injury, or in extreme circumstances, death. At a time when cost containment is becoming the main priority of healthcare managers, this study retains a focus on safe patient care. To compromise standards in this area is likely to result in a much larger cost in the long term.

Reference List

Adamson, B.J, Kenny, D.T, Wilson-Barnett, J. 1995. The Impact of Perceived medical dominance on the workplace satisfaction of Australian and British Nurses. *Journal of Advanced Nursing.* 21(1). P172-183

Agency for Healthcare Research and Quality. 2007a.*Hospital Survey on Patient Safety Culture* [online] Available from: www.ahrq.gov/qual/patientsafetyculture/ [accessed 18 January 2012]

Agency for Healthcare Research and Quality 2007b. *Nurse Staffing and Quality of Patient care.* [online] Available from: http://www.ahrq.gov/research/nursestaffing/nursestaff.htm [accessed 19th March 2012]

Ahern, K and McDonald, S. 2002. The beliefs of nurses who were involved in a whistleblowing event. *Journal of Advanced Nursing.* 38(3) pp303-309.

Aiken LH, Smith, HL and Lake, ET. 1994. Lower Medicare Mortality Among a Set of Hospitals Known for Good Nursing Care. *Medical Care.* 32(8) p771-787.

Aiken, LH and Sloane, DM 1997a. Effects of Specialization and Client Differentiation on the Status of Nurses: The Case of AIDS. *Journal of Health and Social Behaviour.* 38, p203-222

Aiken, LH and Sloane DM 1997b. Effects of Organizational innovations in AIDS care on burnout among urban hospital nurses. *Work and Occupations.* 24(4) p453

Aiken, LH, Sloane, DM and Lake, ET. 1997. Satisfaction with Inpatient Acquired Immunodeficiency Syndrome Care: A National Comparison of Dedicated and Scattered-bed Units. *Medical Care.* 35(9) pp948-962

Aiken, LH, Sloane DM, Lake ET, Sochalski, JA and Weber AL (1997a) Design of an outcomes study of the organisation of hospital AIDS care. *Res Social Health Care.* 14 p13-26.

Aiken, LH, Sloane, DM and Klocinski JL. 1997. Hospital Nurses' Occupational Exposure to Blood: Prospective, Retrospective, and Institutional Reports. *American Journal of Public Health.* 87(1) pp103-107.

Aiken LH, Sochalski, J and Lake, ET. 1997b. Studying Outcomes of Organisational Change in Health Services. *Medical Care.* 35(11) ppNS6-NS18 Supplement

Aiken, LH, Sloane, DM and Sochalski 1998. Hospital organisation and outcomes. *Quality in Health Care.* 7 pp222-226.

Aiken, LH, Sloane, DM, Lake, ET, Sochalski, J and Weber, AL. 1999. Organisation and Outcomes of Inpatient AIDS Care. *Medical Care.* 37(8) p760-772

Aiken, LH, Clarke, SP and Sloane, DM (2000) Hospital Restructuring: Does it Adversely Affect Care and Outcomes? *Journal of Nursing Administration.* 30(10) p457-465.

Aiken, LH, Havens, DS and Sloane DM. 2000. The Magnet Nursing Services Recognition Program: A Comparison of Two Groups of Magnet Hospitals. *American Journal of Nursing.* 100(3) pp26-36.

Aiken, LH and Patrician, PA. 2000. Measuring Organizational Traits of Hospitals: the Revised Nursing Work Index. *Nursing Research.* 49(3) pp146-153.

Aiken, LH, Clarke, SP, Sloane, DM, Sochalski, JA, Busse, R, Clarke, H, Giovanetti, P, Hunt, J, Rafferty, AM and Shamian, J. 2001a. Nurses' Reports On Hospital Care in Five Countries. *Health Affairs.* 20(3) pp43-53.

Aiken, LH, Clarke SP, Sloane DM and Sochalski JA. 2001b. An international perspective on Hospital Nurses' Work Environments: the case for reform. *Policy, Politics and Nursing Practice.* 2(4) pp255-263.

Aiken, LH, Clarke, SP and Sloane, DM (2002) Hospital staffing, organisation and quality of care: cross –national findings. *International Journal for Quality in Health Care.* 14(1) pp5-13.

Aiken LH, Clarke, SP, Sloane, DM, Sochalski, J and Silber JH. 2002. Hospital Nurse Staffing and Patient Mortality, Nurse Burnout, and Job Dissatisfaction. *Journal of the American Medical Association.* 288(16) pp1987-1993

Aiken, LH, Clarke, SP, Cheung, RB, Sloane DM and Silber JH 2003. Education levels of Hospital Nurses and Surgical Patient Mortality. *Journal of the American Medical Association.* 290(12) p1617-1623.

Aiken LH. 2008. Economics of Nursing. *Policy, Politics and Nursing Practice.* 9(2) pp73-79

Aiken LH, Buchan J, Ball J and Rafferty AM. 2008. Transformative impact of Magnet designation: England case study. *Journal of Clinical Nursing.* 17 pp3330-3337.

Aiken LH, Cimiotti JP, Sloane DM, Smith HL, Flynn L and Neff DF. 2011. Effects of Nurse Staffing and Nurse Education on Patient Deaths in Hospitals with Different Nurse Work Environments. *Medical Care.* 49(12) pp1047-1053

Aiken, L.H., Sermeus, W., Van den Heede, K., Sloane, D.M., Busse, R., McKee, M. et al., 2012. Patient Safety, Satisfaction, and Quality of Hospital Care: Cross-Sectional Surveys of Nurses and Patients in 12 Countries in Europe and the United States. *British Medical Journal*, article in press.

Aiken M and Hage J. 1968. Organizational Interdependence and Intra-organizational Structure. *American Sociological Review.* 33(6) pp912-930.

An Bord Altranais 2000. *The Code of Professional Conduct for each Nurse and Midwife.* Dublin: An Bord Altranais.

An Bord Altranais 2007. *Guidance to Nurses and Midwives on Medication Management.* Dublin: An Bord Altranais.

An Bord Altranais 2010. *Practice Standards and Guidelines for Nurses and Midwives with Prescriptive Authority.* Dublin: An Bord Altranais.

Armitage G. 2009 Human error theory: relevance to nurse management. *Journal of Nursing Management.* 17(2) pp193-202.

Asghari F, Fotouhi A and Jafarian A. 2009. Doctors' views of attitudes toward peer medical error. *Quality and Safety in Health Care*. 18. pp209-212.

Attree M.2007. Factors influencing nurses' decisions to raise concerns about care quality. *Journal of Nursing Management.* 15 p392-402.

Atwal, A. and Caldwell, K. 2006. Nurses's Perceptions of Multidsiciplinary team work in acute healthcare. *International Journal of Nursing Practice.* Vol.12. p359-365.

Auffrey L 2005. Nurses leading on patient Safety. *Journal of Advanced Nursing.* 49(6) p563.

Avis M, Bond M and Arthur A. 1995. Satisfying solutions? A review of some unresolved issues in the measurement of patient satisfaction. *Journal of Advanced Nursing.* 22 pp316-322.

Avis M, Bond M and Arthur A. 1997. Questioning Patient Satisfaction: an empirical investigation in two outpatients clinics. *Social Science Medicine.* 44(1) pp85-92

Baker GR, Norton PG, Flintoft V, Blais R, Brown A, Cox J, et al. 2004. The Canadian Adverse Events Study: the incidence of adverse events among hospital patients in Canada. *CMAJ* 170(11):1678-86

Ball, J. 2010. *Guidance on safe nurse staffing levels in the UK.* London: RCN

Banja, J.D. 2004. Persisting Problems in Disclosing Medical Error. *Harvard Health Policy Review.* 5(1) pp14-20.

Barach P and Small SD 2000. Reporting and preventing medical mishaps: lessons from non-medical near-miss reporting systems. *British Medical Journal.* 320. p759-763.

Barrett, A., and Rust, A. 2009. *Working Paper No. 275. Projecting the Future Numbers of Migrant Workers in the Health and Social Care Sectors in Ireland*. Dublin: Economic and Social Research Institute.

Behan J, Condon N, Milicevic I and Shally C. 2009. A Quantitative Tool for Wokforce Planning in Health Care. FAS, Expert Group on Future Skills Needs. [online] Available

at:http://www.fas.ie/NR/rdonlyres/9ABC5EE1-CF20-4AA5-ACA4-C5B81DD9FE5E/792/SLMRU_FAS_EGFSN_Final_Version_Report_AQuantitative.pdf [accessed 15th April 2012]

Benner P.E 1984. *From Novice to Expert: Excellence and Power in Clinical Nursing Practice.* California: Addison-Wesley Publishing.

Berkow S, Jaggi T, Fogelson R, Katz S and Hirschoff A. 2007. Fourteen unit attributes to guide staffing. *Journal of Nursing Administration.* 37(3) pp150-155.

Bleich SN, Ozaltin E and Murray CJL. 2009. How does satisfaction with the health-care system relate to patient experience? *Bulletin of the World Health Organisation.* 87 pp271-278.

Blendon, R.J., DesRoches, C.M., Brodie, M., Benson, J.M., Rosen A.B., Schneider, E., Altman, D.E., Zapert, K., Herrmann, M.J. and Steffenson, A.E. 2002. Views of practising physicians and the public on medical errors. *New England Journal of Medicine.* 347(24) pp1933-1940.

Boyle SM. 2004. Nursing Unit Characteristics and Patient Outcomes. *Nursing Economics.* 22(3) pp111-120.

Brady, AM, Redmond, R, Curtis, E, Fleming, S, Keenan, P, Malone, AM and Sheerin, F. 2009. Adverse events in health care: a literature review. *Journal of Nursing Management.* 17. pp155-164.

Brennan TA, Leape, LL, Laird, NM, Hebert, L, Localio AR, Lawthers AG, Newhouse JP, Weiler PC and Hiatt HH.1991. The incidence of adverse events and negligence in hospitalised patients: results of the Harvard Medical Practice Study. *New England Journal of Medicine.* 324 pp370-376.

Bruyneel L, Van den Heede K, Diya L, Aiken Land Sermeus W. 2009. Predictive Validity of the International Hospital Outcomes Study Questionnaire: An RN4CAST Pilot Study. *Journal of Nursing Scholarship.* 41(2) pp202-210

Bryman A. 1988. Introduction. *IN* Bryman A. *Doing Research in Organisations.* London: Routledge.

Bryman A. 1989. *Research Methods and Organization Studies.* London: Routledge.

Bryman A. 2004. *Social Research Methods*. 2nd Edition. Oxford: University Press.

Bolsin, S. 2003. Whistleblowing. *Medical Education.* 37. *pp294*-296

Bostrom J and Zimmerman J. 1993. Restructuring nursing for a competitive healthcare environment. *Health Care Economics.* 11(1) pp35-41

Brady AM, Redmond R, Curtis E, Fleming S, Keenan P, Malone M and Sheerin F. 2009. Adverse events in heath care: a literature review. *Journal of Nursing Management.* 17 pp 155-164

Broaden R. 2006. The contribution of quality management to patient safety. *IN* Walshe K and Broaden R (eds) *Patient Safety: research into practice.* Berkshire: Open University Press.

Brous, E. (2008) The Criminalisation of Unintentional Error: Implications for TAANA. *Journal of Nursing Law.* 12 (1).

Buchan J. 1999. Still attractive after all these years? Magnet hospitals in a changing healthcare environment. *Journal of Advanced Nursing.* 30(1) pp100-108.

Buchan J and Dal Paz MR. 2002. Skill mix in the Health Care Workforce: Reviewing the Evidence. *Bulletin of the World Health Organisation.* 80(7) [online] Available at: http://www.who.int/bulletin/archives/80(7)575.pdf [accessed 23rd January 2012]

Buchan J, Parkin T, Sochalski J. 2003. *International Nurse Mobility: Trends and Policy Implications.* Geneva: World Health Organisation. [on line] available at http://whqlibdoc.who.int/hq/2003/WHO_EIP_OSD_2003.3.pdf [accessed 16th April 2012]

Burkoski V 2007 Identifying risk: the limitations of incident reporting. *Canadian Nurse* 103 (3) pp 12-4

Byrne B. 1994. Burnout: testing for the validity, replication and invariance of causal structure across elementary, intermediate, secondary teachers. *American Educational Research Journal.* 31 pp645-673.

Campbell H. 2008. *Report on the Independent Review of Symptomatic Breast Care Services at Barringtons Hospital, Limerick: September 2003-August 2007*. Department of Health and Children [on line] Available at: http://www.dohc.ie/publications/pdf/breast_care_services_barringtons.pdf?direct=1 [accessed 18th November 2011]

Carroll, JS, Rudolph, JW and Hatakenaka, S. 2002. Lessons learned from non- medical industries: root cause analysis as culture change at a chemical plant. *Quality and Safety in Health Care.* 11 p266-269.

Carter DE. 2000a. Quantitative Research. Chapter 14 *IN* Cormack D (Ed) *The Research Process in Nursing.* 4th Ed. Oxford: Blackwell Science.

Carter DE. 2000b. Descriptive Research. Chapter 18 *IN* Cormack D (Ed) *The Research Process in Nursing.* 4th Ed. Oxford: Blackwell Science.

Carter DE and Porter S. 2000. Validity and reliability. Chapter 3 *IN* Cormack D (Ed) *The Research Process in Nursing.* 4th Ed. Oxford: Blackwell Science

Cho SH, Ketefian S, Barkauskas VH, Smith DG. 2003. The Effects of Nurse Staffing on Adverse Events, Morbidity, Mortality and Medical Costs. *Nursing Research*. 52(2) pp71-79

Clark AM. 1998. The qualitative-quantitative debate: moving from positivism and confrontation to post-positivism and reconciliation. *Journal of Advanced Nursing.* 27 pp1242-1249

Clarke SP. 2006. Organisational Climate and Culture Factors. Annual Review of Nursing Research. 24. pp255-277

Clarke SP. 2007. Hospital work environments, nurse characteristics and sharps injuries. *American Journal of Infection Control.* 35 pp302-309.

Clarke S and Aiken LH. 2008. An international hospital outcomes research agenda focused on nursing: lessons from a decade of collaboration. *Journal of Clinical Nursing.* 17 p3317-3323.

Clarke SP, Sloane DM and Aiken LH 2002 Effects of Hospital Staffing and Organisational Climate on Needlestick Injuries to Nurses. *American Journal of Public Health.* 92(7) pp1115-1119

Cleary PD. 1999. The increasing importance of patient surveys. Editorial. *British Medical Journal.* 319 pp720-721.

Cleary M, Horsfall J and Hunt GE. 2003. Consumer feedback on nursing care and discharge planning. *Journal of Advanced Nursing.* 42(3) pp269-277.

Clinton, H.R. and Obama, B. 2006. Making Patient Saftey the Centrepiece of Medical Liability Reform. *The New England Journal of Medicine.* 354 (21) pp2205-2208.

Corley, M.C., Minick, P., Elswick, R.K. and Jacobs, M. 2005. Nurse Moral Distress and Ethical Work Environment. *Nursing Ethics.* 12(4) pp381-390.

Cooke H 2006. Examining the disciplinary process in nursing: a case study approach. *Work Employment and Society.* 20(4) p687-707

Cooke H. 2009.Theories of risk and safety: what is their relevance to nursing? *Journal of Nursing Management.* 17 pp256-264.

Cook, A.F., Hoas, H., Guttmannova, K. and Joyner, J.C. 2004. An Error by any other Name. *American Journal Of Nursing.* 104 (6) p32-44.

Cook, G., Gerrish, K. And Clarke, C (2001) Decision-making in teams:issues arising from two UK evaluations. *Journal of Interprofessional Care, 8(1) 95-99*

Coyle J and Williams B. 1999. Seeing the wood for the trees: definitely the forgotten concept of patient dissatisfaction in the light of patient satisfaction research. *International Journal of Health Care Quality Assurance Inc Leadership in Health Service.* 12(4) i-ix

Cox, K. 2008. The Application of Crime Science to the prevention of medical errors. *British Journal of Nursing.* 17(14) p24-26.

Crigger, N. 2005. Two models of mistake-making in professional practice: moving out of the closet. *Nursing Philosophy.* 6. pp11-18.

Crossan F. 2003. Research philosophy: towards an understanding. *Nurse Researcher.* 11 (1) pp46-55.

Crowch, T. 2008. Making the healthcare system truly 'error tolerant'. *Clinical Risk.* 14 pp127-129.

Cummings GD, Hayduk L and Estabrooks CA. 2006. Is the Nursing Work Index Measuring Up? Moving beyond estimating reliability to test validity. *Nursing Research.* 55(2) pp82-93

Dekker, S 2007. Just culture, balancing safety and accountability. Burlington, VT: Ashgate Publishing Company.

Densten IL. 2001. Re-thinking burnout. *Journal of Organisational Behaviour.* 22 pp833-847

Department of Health and Children 2006. *The Lourdes Hospital Inquiry: An Inquiry into peripartum hysterectomy at Our Lady of Lourdes Hospital, Drogheda*. Dublin: the Stationery Office.

Department of Health and Children. 2008. *Building a Culture of Patient Safety. Report of the Commision on Patient Safety and Quality Assurance.* Dublin: The Stationery Office.

Department of Health and Children. 2011. *Health in Ireland: key trends.* [online] Available at: http://www.dohc.ie/publications/pdf/key_trends_2011.pdf?direct=1 [accessed on 3rd January 2012]

Department of Health (UK) 2000. *An Organisation with a Memory: report of an expert group on learning from adverse events in the NHS.* London: HMSO

Department of Health (UK) 2001. *Learning from Bristol: The Report of the public inquiry into children's heart surgery at Bristol Royal Infirmary 1984-1995.* London: The Stationery Office.

Doran N. 1987. The relationship between burnout and job satisfaction in nurses. *Journal of Advanced Nursing.* 12 pp3-12

Douchette, JN. 2006. View from the cockpit. *Nursing 2006.* 36(11) pp50-53.

Economic and Social Research Institute. 2010. *Activity in Acute Public Hospitals in Ireland, 2010 Annual Report.* [online] Available at:

http://www.esri.ie/health_information/latest_hipe_nprs_reports/2010_hipe_report/Final_Report.pdf [accessed 3rd Jan 2012]

Edelmann RJ 2000. Attitude measurement. *IN* Cormack D (Ed) *The Research Process in Nursing.* 4th Edition. Oxford: Blackwell Science.

Edwards P, Roberts I, Clarke M, DiGuiseppi C, Pratap S, Wentz R and Kwan I. 2002. Increasing response rates to postal questionnaires: systematic review. *British Medical Journal.* 324 pp1183-1185.

Emerton, A. 1992. Professionalism and the role of the UKCC. *British Journal of Nursing.* 1(1) pp25-29.

Erlin, J.A. 2007. Patient Safety, Error Reduction, and Ethical Practice. *Orthopaedic Nursing.* 26(2) pp130-133.

Esmail, A. 2006 Clinical Perspectives on Patient Safety. Chapter 1. *IN:* Walshe, K and Broaden, R. (Eds) *Patient Safety: research into practice.* Maidenhead: Open University Press.

Estabrooks CA, Midodzi WK, Cummings GG, Ricker KL and Giovanetti P. 2005. The impact of hospital nursing characteristics on 30 day mortality. *Nursing Research.* 54. Pp74-84.

Fawcett J, Watson J, Neuman B, Walker P and Fitzpatrick JJ. 2001. On nursing theories and evidence. *Journal of Nursing Scholarship.* 33(2) pp115-119.

Feng, X, Bobay, K. and Weiss, M. 2008. Patient safety culture in nursing: a dimensional concept analysis. *Journal of Advanced Nursing.* 63(3) pp310-319.

Field A. 2009. *Discovering Statistics Using SPSS.* 3rd Edition. London: Sage Publications.

Firth-Cozens J, Firth RA and Booth S. 2003. Attitudes to and experiences of reporting poor care. *Clinical Governance: An international Journal.* 8(4) pp331-336.

Flynn M and McCarthy 2007. Magnet hospital characteristics in acute general hospitals in Ireland. *Journal of Nursing Management.* pp1- 10.

Flint C. 1989. A Matter of Judgement. *Nursing Times.* 85 (12)

Fowler FJ 2002. *Survey Research methods.* 3rd Ed. Thousand Oaks, CA: Sage Publications.

Friese CR, Lake ET, Aiken LH, Silber JH and Sochalski J. 2008. Hospital nurse practice environments and outcomes for surgical oncology patients. *Health Service Research.* 43(4) pp1145-1163.

Fullbrook, S. 2008a. The duty of care and political expectations. Part 1: a literature review. *British Journal of Nursing.* 17(6) pp386-387.

Fullbrook, S. 2008b. The duty of care and political expectations. Part 1:law and the new code.*British Journal of Nursing.* 17(8) pp 538-539.

Gaba, DM, Singer, SJ, Sinaiko, AD, Bowen, JD, and Ciavarelli, AP. 2003. Difference in safety climate between hospital personnel and naval aviators. *Human factors.* 45 (summer) pp173-185.

Gardner JP, Baker GR, Norton P and Brown AD. 2002. Governments and Patient Safety in Australia, the United Kingdom, and the United States: a review of policies, institutional and funding frameworks and current initiatives: a final report. Prepared for the advisory committee on Health Services Working Group on Quality of Health care services. [on line] Available at http://www.hc-sc.gc.ca/hcs-sss/pubs/qual/2002-gov-patient-securit/index-eng.php [accessed on 15th November 2011]

Garman, AN, Leach, DC and Spector, N. 2006. Worldviews in collision: Conflict and collaboration across professional lines. *Journal of Organisational Behaviour.* 27 pp829-849.

Gerrish K and Lacey A. 2006. Research and Development in Nursing. *IN* Gerrish K and Lacey A. (Eds) *The Research Process in Nursing.* 5th Edition. Oxford: Blackwell.

Green A, Kishi A and Esperat MCR. 2011. State policy and research initiative focused on improving nursing workforce: an integrative literature review. *Annual Review of Nursing Research.* 28. Pp63-112.

Golemboski K. 2011. Improving patient safety: lessons from other disciplines. *Clinical Laboratory Science.* 24(2) pp 114-119.

Government of Ireland. 1997. *Report of the Tribunal of Inquiry into the Blood Transfusion Service Board.* Dublin: The Stationery Office.

Government of Ireland. 2002. *Report of the Tribunal of Inquiry into the Infection with HIV and Hep C of Persons with Haemophilia and Related Matters.* Dublin: The Stationery Office.

Government of Ireland. 2006. *The Lourdes Hospital Inquiry: An Inquiry into peripartum hysterectomy at Our Lady of Lourdes Hospital, Drogheda.* (Author: Judge Harding Clark). Dublin: Stationary Office.

Government of Ireland. 2008. *Building a Culture of Patient Safety: Report on the Commission on Patient Safety and Quality Assurance.* Dublin: The Stationery Office.

Haber J. 2010. Sampling. *IN* LoBiondo-Wood, G and Haber J. *Nursing Research: methods and critical appraisal for evidence-based practice.* 7th Edition. Missouri: Mosby Elsevier

Hair JF, Black WC, Babin BJ, Anderson RE and Tatham RL. 2006. *Multivariate Data Analysis.* 6th Edition. New Jersey: Pearson Education International

Hall, P. 2005 Interprofessional teamwork: Professional cultures as a barrier. *Journal of Interprofessional Care.* May p188-196.

Han CH, Connolly PM and Canham D. 2003. Measuring patient satisfaction as an outcome of nursing care at a teaching hospital of southern Taiwan. *Journal of Nursing Care Quality* 18(2) pp143-150.

Harding KE and Taylor NF 2010. Highly satisfied or eager to please? Assessing satisfaction among allied health outpatients. International Journal of Therapy and Rehabilitation. 17(7) pp353-359

Hardingham, L.B. 2004. Integrity and moral residue: nurses as participants in a moral community. *Nursing Philosophy.* 5. pp127-134.

Hart, E. and Hazelgrove, J. 2001. Understanding the organisational context for adverse events in the health services: the role of cultural censorship. *Quality in Health Care.* 10 p257-262.

Hartz AJ, Krakauer H, Kuhn EM, Young M, Jacobsen SJ, Gay G, Muenz L, Katzoff M, Bailey RC and Rimm AA (1989) Hospital characteristics and mortality rates. *New England Journal of Medicine.* 321(25) pp1720-1725.

Havens,D.S. and Aiken, LH 1999. Shaping Systems to Promote Desired Outcomes: the Magnet Hospital Model. *JONA* 29(2)

Health Information and Quality Authority (HIQA). 2008. *Report of the Investigation into the circumstances surrounding the provision of care to Rebecca O'Malley, in relation to her symptomatic breast disease, the Pathology Services at Cork University Hospital and Symptomatic Breast Disease Services at the Mid Western Regional Hospital, Limerick.* [on line] Available at : http://www.hiqa.ie/media/pdfs/HIQA_Rebecca_OMalley_Report.pdf [Accessed 18th November 2010]

Health Information and Quality Authority. (HIQA) 2010. *Draft National Standards for Safer Better Healthcare.Consultation Document Sept 2010.* [online] Available at: http://www.hiqa.ie/standards/health/safer-better-healthcare [Accessed 2nd December 2011]

Health Service Executive. 2006. *Guiding Change in the Irish Health System.* [on line] Available at: https://www.hseland.ie/lcdnn/Portals/0/pdf/Guiding%20change%20in%20the%20Irish%20health%20system.pdf [accessed 22nd January 2012]

Health Service Executive. 2007. Insight 07. Health and Social Services in Ireland- a survey of consumer satisfaction. [online] http://www.hse.ie/eng/services/Publications/Your_Service,_Your_Say_Consumer_Affairs/Reports/Insight_07.pdf [accessed 8th February 2012]

Health Service Executive. 2008. Health Status of the Population of Ireland. [online] Available from: http://www.hse.ie/eng/services/Publications/HealthProtection/Public_Health_/Health_Status_of_the_Population_of_Ireland_2008.html [accessed 11th November 2011]

Health Service Executive. 2008. *Towards an integrated Health Service or More of the Same?* [online] Available at: http://www.hse.ie/eng/services/Publications/services/Hospitals/An_Integrated_Health_Service_-_Briefing_Document.pdf [accessed 3rd January 2012]

Health Service Executive. 2008. *Code of Practice for Integrated Discharge Planning*. [on line] Available at: http://www.hse.ie/eng/services/Publications/services/Hospitals/Code_of_practice_for_integrated_discharge_planning.pdf [accessed 21st January 2012]

Health Service Executive. 2010. November 2010 Performance Report. [online] Available from: http://www.hse.ie/eng/services/Publications/corporate/November_2010_Performance_Report.pdf [accessed 8th February 2012]

Health Service Executive. 2010. *Medication Safety Programme.* [online] Available at: http://www.hse.ie/eng/about/Who/Quality_and_Clinical_Care/medicationsafetyprogramme/ [accessed 4th December 2011]

Health Service Executive. 2010. *Annual and Financial Statements 2010*. [online] Available at: http://www.hse.ie/eng/services/Publications/corporate/HSE%20Annual%20Report%202010.pdf [accessed 2nd December 2011]

Health Service Executive. 2011. HSE Service Plan West 2011. [online] Available at: http://www.hse.ie/eng/services/Publications/corporate/regionalserviceplanwest2011.pdf [accessed 6th March 2012]

Heck RH, Thomas SL and Tabata LN. 2010. *Multilevel and Longitudinal Modeling with IBM SPSS.* London: Routledge.

Helmreich, RL. 2000. On error management: lessons from aviation. *British Medical Journal.* 320 pp781-785.

Hesterley SC and Robinson M 1990. Alternative Caregivers: cost effective utilization of RNs. *Nursing Administration Quarterly.* 14 pp18-23.

Hinkin TR and Holtom BC. 2009. Response rates and sample representativeness: identifying contextual response drivers. *IN* Buchanan DA and Bryman A. *The Sage Handbook of Organizational Research Methods.* London: Sage Publications.

Hinton Walker P, Carlton G, Holden L and Stone PW. 2006. The Intersection of Patient Safety and Nursing Research. *Annual Review of Nursing Research.* 24 pp3-15.

Hospital Consumer Assessment of Healthcare Providers and Systems. 2005. CHAHPS Hospital Survey. [online] Available from : http://www.hcahpsonline.org/surveyinstrument.aspx [accessed 22 October 2011]

Hotouras A. 2009. Human Safety in Medicine: Lessons still to learn from the aviation model. *Internet Journal of Law, Healthcare and Ethics.* 6(1) ISSN: 1528-8250. [online] Available at: http://web.ebscohost.com.remote.library.dcu.ie/ehost/detail?vid=3&hid=18&sid=2f65b2e7-defe-4848-9797-fc638e92c691%40sessionmgr10&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=rzh&AN=2010546127 [accessed 1st April 2012]

House of Commons. 2010. *The Mod Staffordshire NHS Foundation Trust Inquiry. Independent Inquiry into care provided by Mid Staffordshire NHS Foundation Trust, January 2005-March 2009. Volumes I and II.* Chairman Robert Francis QC. London: The Stationery Office

Houser J 2008. *Nursing Research. Reading, Using and Creating Evidence.* London: Jones and Bartlett Publishers.

Humphries, N., Brugha, R., McGee,. H. (2008)**.** *Nurse Migration to Ireland: An Overview. Nurse Migration Project Policy Brief 1.* Dublin: Royal College of Surgeons in Ireland,

International Council of Nurses (ICN) 2003. *Ethical Guidelines for Nursing Research.* Geneva: ICN

International Council of Nurses (ICN) 2002. *Position statement on patient safety*. [online] Available at: http://www.patienttalk.info/pspatientsafe.htm [accessed 16th April 2012]

Ilan, R. 2005. Brief history of patient safety culture and science. *Journal of Critical Care.* 20 pp2-5.

Infante, C. 2006. Bridging the "system's gap between interprofessional care and patient safety: Sociological insights. *Journal of Interprofessional Care.* 20(5) pp517-525.

Institute of Medicine. 2004. *Keeping Patients Safe: Transforming the Work Environment of Nurses.* Washington, D.C.: The National Academies Press.

Institute of Medicine. 2010. *The Future of Nursing: Leading Change, Advancing Health.* Washington DC: The National Academies Press.

Johnstone, M.J. 2007. Patient safety ethics and human error management in ED contexts. Part II: Accountability and the challenge to change. *Australasian Emergency Nursing Journal.* 10 p80-85.

Johnstone, M.J. and Kanitsaki, O. 2006. The ethics and practical importance of defining, distinguishing and disclosing nursing errors: A discussion paper. *International Journal of Nursing Studies.* 43. 367-376.

Kahn JH. 2011. Multilevel Modelling: Overview and Apllications to Research in Counselling Psychology. *Journal of Counseling Psychology.* 58(2) p257-271.

Kalisch J. and Aebersold, M. 2006. Overcoming barriers to patient safety. *Nursing Economics.* 24(3) pp143-149

Kaplan, H.S. 2003. Benifiting from the "Gift of Failure", Essentials for an Event Reporting System. *The Journal of Legal Medicine.* 24.pp29-35.

Kalliath TJ, O'Driscoll MP, Gillespie, DF and Bluedorn AC. 2000. A test of the Maslach Burnout Inventory in three samples of healthcare professionals. *Work and Stress.* 14(1) pp35-50

Kellet, J. 1996. Taking the Blame. *Nursing Standard.* 11(12).pp 21-22.

Kingston, M., Evans,S., Smith, B. and Berry, J. 2004. Attitudes of doctors and nurses towards incident reporting: a qualitative analysis. *Medical Journal of Australia.* 181(1). Pp36-39.

Kirwan, M. 2003. *Supporting Nurses' Transfusion PracticesThrough Action Research.* Submitted as part requirement for the MSc. in Education and Training Management, School of Education Studies, Dublin City University.

Knapp TR 1998. *Quantitative Nursing Research.* London: Sage Publications.

Kohn, L.T., Corrigan, J.M. and Donaldson, M.S. (Eds.) 2000. *To Err is Human: building a safer health system.* Committee on Quality of Health Care in America, Institute of Medicine. Wasington DC: National Academy Press.

Krakauer H, Bailey RC, Skellan KJ, Stewart JD, Hartz AJ, Kuhn EM and Rimm AA. 1992. Evaluation of the HCFA model for the analysis of mortality following hospitalisation. *Health Service Research.* 27 pp317-335

Kramer M and Schmalenberg C. 1988a. Magnet Hospitals: Institutions of Excellence, parts I. *JONA.* 18(1) pp13-24

Kramer M and Schmalenberg C. 1988b. Magnet Hospitals: Institutions of Excellence, parts II. *JONA.* 18(2) pp11-19

Kramer, M and Hafner LP 1989. Shared Values: Impact On Staff Nurse Job Staisfaction And Peceived Productivity. *Nursing Reseach.* (38) p172-177.

Kramer M. 1990. The Magnet Hospitals: Excellence revisited. *JONA.* 20 pp 35-44.

Kramer, M and Hafner LP 1989. Shared Values: Impact On Staff Nurse Job Staisfaction And Peceived Productivity. *Nursing Reseach.* (38) p172-177.

Kravitz RL. 2001. Measuring patients' expectations and requests. *Annals of Internal Medicine.* 134 pp881-888

Kristenson TS, Boritz M, Villadsen E and Christensen KB. 2005. The Copenhagen Burnout Inventory: a new tool for the assessment of Burnout. *Work and Stress: An International Journal of Work, Health and Organisations.* 19(3) p192-207.

Kutney-Lee A, McHugh MD, Sloane DM, Cimiotti JP, Flynn L, Neff DF and Aiken LH. 2009a. Nursing: a key to Patient Satisfaction. *Health Affairs.* 28(4) w669-w677

Kutney-Lee, A, Lake ET, Aiken LH. 2009b. Development of the Hospital Nurse Surveillance Capacity Profile. *Research in Nursing and Health.* 32 pp217-228.

Lacey A. 2006. The Research Process. Chapter 2 *IN* Gerrish K and Lacey A (Eds) *The Research Process in Nursing.* 5th Edition. Oxford:Blackwell Publishing.

Lachman, V.D. 2007. Patient Safety: The Ethical Imperative. *Medsurg Nursing.* 16(6) p401-403.

Lachman, V.D. 2008. Whistleblowing: Role of Organisational Culture in Prevention and Management. *Dermatology Nursing.* 20(5) pp394-396.

Lake ET. 2002. Development of the Practice Environment Scale of the Nursing Work Index. *Research in Nursing and Health.* P176-188.

Lake ET. 2007. The Nursing Practice Environment: measurement and evidence. *Medical Care Research and Review.* Suppl. 64(2) pp104S-122S.

Lankshear AJ, Sheldon TA and Maynard A. 2005. Nurse Staffing and Healthcare Outcomes: a systematic review of the international research evidence. *Advances in Nursing Science.* 28(2) pp163-174

Larsson BW, Larsson G and Starrin B. 1999. Patients' views on quality of care: a comparison of men and women. *Journal of Nursing Management.* 7 pp133-139.

Laschinger, HKS 1996a A theoretical approach to studying work empowerment: a review of studies testing Kanter's theory of structural power in organisations. Nursing Administration Quarrterly 20(2): 25-41.

Laschinger HKS 1996b. *UWO Workplace Empowerment Research Program, Descriptive statistics results: CWEQ.* [online] Available from: http://publish.uwo.ca/~hkl/CWEQ.html [accessed 6th April 2012]

Laschinger HS, Hall LM Pedersen A and Almost J. 2005. A psychometric analysis of the patient satisfaction with nursing care quality questionnaire: an actionable approach to measuring patient satisfaction. *Journal of Nursing Care Quality.* 20(3) pp220-230

Laschinger HK and Leiter MP. 2006. The Impact of Nursing Work Environment on Patient Safety Outcomes. *The Journal of Nursing Administration.* 36(5) pp259-267.

Lawton, R and Parker, D. 2002. Barriers to incident reporting in a healthcare system. *Quality and Safety in Health Care.* 11 p15-18

Leape, L.L. 1994. Error in Medicine. *The Journal of American Medical Association.* 272. p1851-1857.

Leape, LL and Berwick, DM 2000. Safe health care: are we up to it? *British Medical Journal.* 320 p725-726

Leape, L.L. and Berwick, D.M. 2005. Five years after *To Err is Human*: What have we learned? *Journal of the American Medical Association.* 293. pp2384-2390.

Leiter MP and Laschinger HK. 2006. Relationships of Work and Practice Environment to Professional Burnout: testing a causal model. *Nursing Research.* 55(2) pp137-146.

Levinson, DR. 2012. *Hospital Incident Reporting Systems Do Not Capture Most Patient Harm.* Department of Health and Human Services, Office of Inspector General. [online] Available at: http://oig.hhs.gov/oei/reports/oei-06-09-00091.pdf [accessed 19th January 2012]

Lewis GH, Vaithianathan R, Hochey PM, Hirst G and Bagian JP. 2011. Counterheroism, common knowledge, and ergonomics: concepts from aviation that could improve patient satisfaction. *The Milbank Quarterly.* 89(1) pp4-38.

Li YF, Lake ET, Sales AE, Sharp ND, Greiner GT, Lowy E, Liu CF and Sochalski JA. 2007. Measuring nurses' practice environments with the revised nursing work index: Evidence from registered nurses in the Veterans Health Administration. *Research in Nursing and Health.* 30(1) pp31-44

Liang BAA. 2002. System of medical error disclosure. *Quality and Safety in Health Care.* 11(1) pp64-68.

Liang, B.A. 2004. A Policy of System Safety: Shifting the Medical and Legal Paradigms to Effectively Address Error in Medicine. *Harvard Health Policy Review.* 5(1) pp6-13.

Lincoln YS and Guba EG. 1985. Naturalistic Inquiry. Beverley hills: Sage Publications.

Linder-Pelz (1982) Toward a theory of patient satisfaction. *Social Science and Medicine.* 16 pp577

LoBiondo-Wood G and Haber J 2010. Reliability and Validity. Chapter 13. *IN* LoBiondo-Wood, G and Haber J. *Nursing Research: methods and critical appraisal for evidence-based practice.* 7th Edition. Missouri: Mosby Elsevier

Looseley, A., Hotouras, A. and Keogh, M. 2009. Patient Safety and the aviation model: Medicine is still learning. *International Journal of Risk and Safety in Medicine.* 21 pp131-137.

Lucero RJ, Lake ET and Aiken LH. 2010a. Variation in nursing care quality across hospitals. *Journal of Advanced Nursing.* 65(11) 2299-2310.

Lucero RJ, Lake ET and Aiken LH. 2010b. Nursing care quality and adverse events in US hospitals. *Journal of Clinical Nursing.* 19 pp2185-2195.

Lyndon, A. 2006. Communication and Teamwork in Patient Care: How Much Can We Learn From Aviation? *JOGNN.* 35(4) pp538-546.

Macdonald C. 2002. Nurse autonomy as relational. *Nursing Ethics.* 9(2) p194-201.

Macrae, C. 2008. Learning from patient safety incidents: creating participative risk regulation in healthcare. *Health, Risk and Society.* 10(1) pp53-67

Mann, C. 2004. Safety culture? What safety culture? *Nursing Management.* 11(7) p10-13

Martin, P., Higton, P. and Scholfield, H. 2005. Close encounters. *Nursing Management.* 12(4) pp15-18.

Maslach C and Jackson SE. 1981. The Measurement of experienced burnout. *Journal of Occupational Behaviour.* 2 pp99-113.

Maslach C, Jackson SE and Leiter MP. 1996. *Maslach Burnout Inventory Manual.* 3rd Ed. Palo Alto, California: Consult. Pschol. Press.

Maslach C, Schaufeli, WB and Leiter MP. 2001. Job Burnout. *Annual Review of Psychology.* 52 pp397-422

Matthews A and Scott A. 2008. Perspectives on midwifery power: an exploration of the findings of the Inquiry into peripartum hysterectomy at Our Lady of Lourdes Hospital, Drogheda, Ireland. *Nursing Inquiry.* 15(2) p127-134.

May T. 1997. *Social Research: issues, methods and process.* Buckingham: Open University Press.

Mayer, C.M. and Cronin, D. 2008. Organisational Accountability in a Just Culture. *Urologic Nursing.* 28(6) pp427-430

McCarthy G, Tyrell MP and Cronin C. 2002. *National Study of Turnover in Nursing and Midwifery.* Dublin: Department of Health and Children [online] Available at: http://www.ncnm.ie/files/publications/turnover%20study.pdf [accessed 16th April 2012]

McClure ML, Poulin MA, Sovie MD and Wandelt MA. 1983. *Magnet Hospitals: Attraction and retention of professional nurses.* Kansas City: American Academy of Nursing.

McKenna, H, Hasson, F and Keeney, S. 2006. Chapter 17 Surveys *IN* Gerrish K and Lacey A (Eds) *The Research Process in Nursing.* 5th Edition. Oxford:Blackwell Publishing.

McGillis Hall, L., Doran, D., and Pink, G. 2004. Nurse staffing models, nursing hours and patient safety outcomes. Journal of Nursing Administration, 34 (1), 41-45.

McKee M, DuBois CA and Sibbald B. 2006. Changing Professional Boundaries. Chapter 4 *IN* McKee M, Nolte E and Dubois CA (Eds) *Human Resources for Health in Europe.*European Observatory on Health Systems and Policy Series. Maidenhead: Open University Press. Available at: http://www.euro.who.int/__data/assets/pdf_file/0006/98403/E87923.pdf [accessed 22nd January 2012]

Meaney, M.E. 2004. Error Reduction, Patient Safety and Instituional Ethics Committees. *Journal of Law, Medicine and Ethics.* 32. pp358-364.

Merry, A. and McCall Smith, A. 2001. *Errors, Medicine and the Law.* Cambridge: Cambridge University Press.

Mewshaw MR, White KM and Walrath J. 2006. Medical errors: where are we now? *Nursing Management.* pp50-54

Milligan F and Dennis S. 2004. Improving patient safety and incident reporting. *Nursing Standard.* 19(7) pp33-36

Millenson, ML. 2002. Pushing the profession: how the news media turned patient safety into a priority. *Quality and Safety in Health Care.* 11 p57-63

Mitchell G.L 2001. Policy, Procedure, and Routine: Matters of Moral Influence. *Nursing Science Quarterly.* 14(2) pp109-114.

Mitchell P. 2002. Nursing is essential to improving patient safety. *Journal of Advanced Nursing.* 38(2) pp109-110

Mitchell T and Fletcher I. 1998. Stating the case for nursing research ethics committees: a discussion paper. *Nurse Education Today.* 18 pp133-137

Moss F and Barach P. 2002. A time of Transition. *Quality and Safety in Health Care.* 11 p1.

Mouillin M. 2002. *Delivering Excellence in Health and Social Care.* Berkshire: Open University Press.

Murphy- Black T 2006. Chapter 24 Using Questionnaires. *IN* Gerrish K and Lacey A (Eds) *The Research Process in Nursing.* 5th Edition. Oxford:Blackwell Publishing.

National Haemogilance Office. 2010. *NHO Report 2008/2009*. Available on line at: http://www.giveblood.ie/Clinical_Services/Haemovigilance/Publications/NHO_Report_2008_2009.pdf [accessed 16th January 2012]

Needleman, J., P. I. Buerhaus, M. Stewart et al. 2006. Nurse Staffing in Hospitals: Is There a Business Case for Quality? *Health Affairs (Millwood)* 25 (1): 204-211.

Needleman, J, Buerhaus P, Pankratz S, Leibson CL, Slevens SR and Harris M. (2011) Nurse staffing and inpatient hospital mortality. 364 pp1037-1045

NHS (2011) *Education And Training: A report from the NHS Future Forum.* [online] Available at: http://www.dh.gov.uk/en/Publicationsandstatistics/Publications/PublicationsPolicyAndGuidance/DH_127443 [accessed 24th January 2012]

Norris B. 2009. Human factors and safe patient care. *Journal of Nursing Management.* 17 pp203-211

Organisation for Economic Co-Operation and Development . 2009 *Health at a Glance 2009. OECD indicators.* OECD Publishing.

Orne RM, Garland D, O'Hara M, Perfetto L and Stielau J. 1998. Caught in the crossfire of change: nurses experience with unlicensed assistive personnel. *Applied Nursing Research.* 11(3) pp101 -110.

O'Toole M. 2002. The relationship between employees' perceptions of safety and organisational culture. *Journal of Safety Research.* 33 pp231-243.

Ottewal, M. 2003. The current approach to human error and blame in the NHS. *British Journal of Nursing.* 12 (15) pp919-924.

Palant J. 2007. *SPSS Survival Manual.* 3rd Edition. Miadenhead: Open University Press.

Parker, D and Lawton R. 2003. Psychological contribution to the understanding of adverse events in healthcare. *Quality and Safety in Health Care.* 12 pp453-457.

Parahoo K. 2006. *Nursing Research. Principles, Process and Issues.* 2nd edition. Basingstoke: Palgrave Macmillan.

Patient Safety Education Project. 2008. *PSEP: Participants Handbook.* [online] Available at: http://patientsafetyeducationproject.org/media/docs/PSEP_Participant_Handbook.pdf [accessed 19th January 2012]

Patient Safety First. 2010. [on line] Available at: http://www.patientsafetyfirst.ie/ [accessed 2nd December 2011]

Pearson A. 2005. Minimising errors in health care: focusing on the root cause rather than the individual. *International Journal of Nursing Practice.* 11 pp141.

Peugh JL 2010. A practical guide to multilevel modelling. *Journal of School Psychology.* 48. pp85-112.

Pink, G. 1992. *Truth from the bedside.* Charter 88, London.

Poghosyan L, Aiken LH and Sloane DM. 2009. Factor Structure of the Maslach burnout inventory: An analysis of data from large scale cross-sectional surveys of nurses from eight countries. *International Journal of Nursing Studies.* 46 pp894-902

Poghosyan, L, Clarke S, Finlayson M and Aiken LH. 2010. Nurse Burnout and Quality of Care: Cross- National Investigation in Six Countries. *Research in Nursing and Health.* 33 pp288-298.

Powers PH, Dickey LA and Ford A. 1990. Evaluating an RN/Co-worker Model. *Journal of Nursing Administration.*20 pp11-15.

Proctor S. 1998. Linking philosophy and method in the nursing research process: the case for realism. *Nurse Researcher.* 5 (4) pp73-90.

Procter S and Allan T. 2006. Sampling. *IN* Gerrish K and Lacey A (Eds) *The Research Process in Nursing.* 5th Edition. Oxford: Blackwell Publishing.

Punch L. 2005.Introduction to social research: quantitative and qualitative approaches. 2nd ed. London: Sage.

Pyne, R. 1994. Empowerment through use of the Code of Professional Conduct. *British Journal of Nursing* 3 (12) pp631-634.

Rafferty, AM, Ball, J and Aiken 2001 Are teamwork and professional autonomy compatible, and do they result in improved hospital care? *Quality in Healthcare.* 10

Rafferty AM, Clarke SP, Coles J, Ball J, James P, McKee M and Aiken LH. 2007. Outcomes of variation in hospital nurse staffing in English hospitals: Cross-sectional analysis of survey data and discharge records. *International Journal of Nursing Studies.* 44 pp175-182.

Ramanujam R, Abrahamson K and Anderson JG. 2008. Influence of workplace demands on nurses perceptions of patient safety. *Nursing and Health Sciences.* 10 pp144-150.

Ramsey, G. 2005. Nurses, Medical Errors, and the Culture of Blame. *Hastings Centre Report.* 35(2) pp20-21.

RCN. 2006. *Setting appropriate ward staffing levels in NHS acute trusts.*RCN Policy Unit . Policy Guidance 15/2006. [online] Available at: http://www.rcn.org.uk/__data/assets/pdf_file/0007/287710/setting_appropriate_ward_nurse_staffing_levels_in_nhs_acut.pdf [accessed 22nd January 2012]

Reason, J. (1990). *Human error.* New York, NY: Cambridge University Press.

Reason J. 1997 *Managing the risks of organizational accidents.* Aldershot: Ashgate

Reason, J. 2000. Human error: models and management. *British Medical Journal*. 320 (7237) pp768-770.

Reason, J. 2004. Beyond the organisational accident: the need for "error wisdom" on the frontline. *Quality and Safety in Health Care.* 13(suppl.II) p28-33.

Ricci M, Goldman AP, de Leval MR, Cohen GA, Devaney F and Carthy J. 2004. Pitfalls of adverse event reporting in paediatric cardiac intensive care. *Archive of Disease in Childhood.* 89 pp856-859.

Riley, W. 2009. High reliability and implications for nursing leaders. *Journal of Nursing Management.* 17 pp238-246.

Risjord M. 2010. *Nursing Knowledge: science, practice, and philosophy.* Chichester: John Wiley and Sons Ltd.

Rivers, M, Swain, D. and Nixon, W. 2003. Using Aviation safety measures to enhance patient outcomes. *AORN journal.* 77(1) pp158-162.

Robins Mewshaw, M., White, K.M. and Walrath, J. 2006. Medical Errors: where are we now? *Nursing Management.* Oct. p50-54

Rogers AE, Hwang WT, Scott LD, Aiken LH and Dinges DF 2004. The working hours of hospital staff nurses and patient safety. *Health Affairs.* 23(4) pp202-212

Rowin EJ, Lucier D, Pauker SG, Kumar S, Chen J and Salem DN. 2008. Does error and adverse event reporting by physicians and nurses differ? *Joint Commission Journal on Quality and Patient Safety.* 34(9) pp537-545

Sarantakos S. 1993. *Social Research.* Basingstoke: The Macmillan Press.

Schaufeli, WB and Van Dierendock, D. 1993. The Construct validity of two burnout measures. *Journal of Organisational Behaviour.* 14 pp631-647

Schaufeli WB and Van Dierendock D.1995. A cautionary note about the cross national and clinical validity of cut-off points for the Maslach Burnout Inventory. *Psychological Reports.* 76 pp1083-1090

Schaufeli WB, Bakker AB, Hoogduin K, Schaap C and Kladler A. 2001. On the clinical validity of the Maslcah Burnout Inventory and the Burnout Measure. *Psychology and Health.* 16 pp565-582.

Slater P and McCormack B (2007) An Exploration of the Factor Structure of the Nursing Work Index. *Worldviews on Evidence-based Nursing.* 4(1) p30- 39

Scott, P A., Matthews, A. & Corbally, M. (2003) *Nurses' and Midwives' Understanding and experiences of empowerment. Final Report.* Dublin: Department of Health and Children

Sexton, JB, Thomas, EJ and Helmreich, RL. 2000. Error, stress, and teamwork in medicine and aviation: cross sectional surveys. *British Medical Journal.* 320 pp745-749

Silber JH, Williams SV, Krakauer H and Schartz JS. 1992. Hospital and Patient characteristics associated with death after surgery: a study of adverse occurence and failure to rescue. *Medical Care.* 30 pp615-629.

Silber JH, Rosenbaum PR, Even-Shoshan O, Shabbout M, Zhang X, Bradlow ET and Marsh RR. 2003. Length of stay, conditional length of stay, and prolonged saty in pediatric asthma. *Health Services Research.* 38(3) 867-886.

Sitzia J and Wood N. 1997. Patient Satisfaction: a review of issues and concepts. *Social Science Medicine*. 45(12) pp1829-1843.

Smith, M.L. and Forster, H.P. 2000. Morally Managing Medical Mistakes. *Cambrdge Quarterly of Healthcare Ethics.* 9. pp38-53.

Sorlie V, Torjuul K, Ross A and Kihlgren M. 2006. Satisfied patients are also vulnerable patients – narratives from an acute care ward. *Journal of Clinical Nursing.* 15 pp1240-1246.

Sochalski J and Aiken LH (1999) Accounting For Variation in Hospital Outcomes: a cross-national study. *Health Affairs.* 18(3)

Sochalski, J, Aiken, LH and Fagin CM 1997. Hospital Restructuring in the United States, Canada, and Western Europe: An Outcomes Research Agenda. *Medical Care.*35 (10) Supplement OS13-OS25.

Spooner SH. 2003. Survey Response Rates and Overall Patient Satisfaction Scores: what do they mean? *Journal of Nursing Care Quality.* 18(3) pp162-174

Sullivan-Bolyai, S and Bova C. 2010. Data Collection Methods. Chapter 12 *IN* LoBiondo-Wood, G and Haber J. *Nursing Research: methods and critical appraisal for evidence-based practice.* 7th Edition. Missouri: Mosby Elsevier

Swan JE, Sawyer JC, Van Matre JG, McGee GW. 1985. Deepening the understanding of hospital patient satisfaction: fulfilment and equity effects. *Journal of Health Care Marketing.* 5(3) pp7-18

Tabachnik BG and Fidell LS. 2007. *Using Multivariate Statistics*. 5th Edition. Boston: Pearson Education.

Tamuz, M and Thomas, EJ. 2006. Classifying and interpreting threats to patient safety in hospitals: insights from aviation. *Journal of Organisational Behaviour*. 27 pp919-940.

Tierney, AJ. 2008. Matching up to the airline industry. *Journal of Advanced Nursing.* P539

Thi PLN, Briancon S, Empereur F and Guillemin F. 2002. Factors determining inpatient satisfaction with care. *Social Science and Medicine.* 54 pp493-504

Thomas, EJ., Sherwood, GD, Helmreich, RL. 2003. Lessons from Aviation: Teamwork to Improve Patient Safety. *Nursing Economics.* 21(5) pp241-243.

Thomas, EJ, Sherwood, GD, Mulhollem, JL, Sexton, JB and Helmreich RL. 2004. Working together in the Neonatal Intensive Care Unit: Provider Perspectives. *Journal of Perinatology.* 24 pp552-559.

Topping A. 2006. Chapter 11 The Quantitative- Qualitative Continuum. *IN* Gerrish K and Lacey A (Eds) *The Research Process in Nursing.* 5th Edition. Oxford:Blackwell Publishing.

Tourangeau AE, Doran DM, McGillis-Hall L, O'Brien-Pallas L, Pringle D, Tu JV and Cranley LA. 2007. Impact of hospital nursing care on 30 day mortality for acute medical patients. *Journal of Advanced Nursing.* 57. Pp32- 44

Tucker, AL and Edmondson, AC. 2003. Why Hospitals Don't Learn from Failures: Organisational and Psychological Dynamics that Inhibit System Change. *California Management Review.* Vol 45 (2) pp55-72.

Vahey DC, Aiken, LH, Sloane, DM, Clarke SP and Vargus D. 2004. Nurse Burnout and Patient Satisfaction. Medical Care. 42(2 suppl) II-57-II66

Van Bogaert P, Clarke S, Vermeyen K, Meulemans H and Van de Heyning P. 2009a. Practice environments and their associations with nurse-reported outcomes in Belgian hospitals: Development and preliminary validation of a Dutch adaptation of the Revised Nursing Work Index. *International Journal of Nursing Studies.* 46 pp55-65

Van Bogaert P, Meulemans H, Clarke S, Vermeyen K and Van de Heyning P. 2009b. Hospital nurse practice environment, burnout, job outcomes and quality of care: test of a structural equation model. *Journal of Advanced Nursing.* 65(10) pp2175-2185

Van Bogaert P, Clarke S, Roelant E, Meulemans H and Van de Heyning P. 2010. Impacts of unit-level nurse practice environment and burnout on nurse reported outcomes: a multilevel modelling approach. *Journal of Clinical Nursing.* 19 pp1664-1674

Van der Schaaf, TW. 2002. Medical applications of industrial safety science. *Quality and Safety in Health Care.* 11 pp205-206.

Vickers, R. 2008. Training in human factor skills: lessons from aviation. *Clinical Risk*. 15 pp8-10.

Vincent C, Stanhope N and Crowley-Murphy M. 1999. Reasons for not reporting adverse incidents: an empirical study. *Journal of Evaluation of Clinical Practice.* 5(1) pp13-21.

Vincent, C. 2001. Introduction. *IN:* Vincent, C. (Ed) *Clinical Risk Management.* British Medical Journal Books: London.

Volker, D.L. and Clark, A.P. 2004. Taking the High Road. What should you do when an Adverse Event Occurs? Part II. *Clinical Nurse Specialist.* 18(4).pp180-182.

Wagner D and Bear M. 2009. Patient satisfaction with nursing care: a concept analysis within a nursing framework. *Journal of Advanced Nursing.* 65(3) pp692-701.

Wall M. 2012. 1000 nurses and 50 consultants among 2,100 HSE staff leaving. *Irish Times.* 21st January 2012. [online] Available at: http://www.irishtimes.com/newspaper/frontpage/2012/0121/1224310578688.html [Accessed 22nd January 2012]

Warburton RN 2009. Improving patient safety: an economic perspective on the role of nurses. *Journal of Nursing Management.* 17(2) pp223-229

Weaver K and Olson JK. 2006. Understanding paradigms used for nursing research. *Journal of Advanced Nursing.* 53(4) pp459-469.

Weick KE and Sutcliffe KM 2003. Hospitals as Cultures of Entrapment: A Re-analysis of the Bristol Royal Infirmary. *California Management Review.* 45(2) pp73-84.

West E 2006 Sociological contributions to patient safety. Chapter 2. *IN:* Walshe, K and Broaden, R. (Eds) *Patient Safety: research into practice.* Maidenhead: Open University Press.

Williams B 1994. Patient satisfaction: a valid concept? *Social Science and Medicine.* 38 pp509-516.

Williams B, Coyle J and Healy D 1998. The meaning of patient satisfaction: an explanation of high reported levels. *Social Science and Medicine.* 47(9) pp1351-1359.

Wilson, R.M., Runciman, W.B., Gibberd, R.W., Harrison, B.T, Newby, L. and Hamilton, J.D. 1995. The Quality in Australian Healthcare Study. *Medical Journal of Australia.* 163(9). Nov 6. p458-471.

World Health Organisation 2000. *The World Report 2000. Health Systems: improving performance.* Geneva: WHO. Available at: http://www.who.int/whr/2000/en/ Accessed 22nd January 2012.

World Health Organisation 2006. *World Alliance for Patient Safety Forward Programme.* Geneva: WHO

World Health Organisation 2011. *Patient Safety Curriculum Guide: Multi-professional edition.* [online] Available at: http://whqlibdoc.who.int/publications/2011/9789241501958_eng.pdf [accessed 19th January 2012]

Wu, A. 2000. Medical error: the second victim. *British Medical Journal.* 320 (7237) pp726-727.

Young GJ, Meterko M and Desai KR. 2000. Patient Satisfaction With Hospital Care: Effects of demographic and institutional characteristics. *Medical Care.* 38(3) pp325-334.

Appendix A

Nurse questionnaire and covering letter

(pages i-x)

Please complete this questionnaire ONLY if you are a staff nurse providing direct patient care.

Dear Staff Nurse,

This questionnaire relates to a study which is aiming to develop more innovative methods of planning the nurse workforce into the future. As it is a European-wide study, it is important that the voice of Irish nursing is heard. In order to do this we need to learn more about nurses in Ireland today; their views on patient care and patient safety, and the environment in which they work. We would be very grateful if you choose to help us in this by completing the attached questionnaire.

This study has been approved by your hospital. The survey is voluntary and confidential. Do not write your name on the questionnaire. Your name is not required and not known to us and therefore can never be associated with your responses. The information you provide will go directly to the researchers. Your participation will not affect your employment status in any way. By completing and submitting the questionnaire, you are giving your consent to participate.

Please place the completed questionnaire in the designated RN4CAST study box provided on your ward.

If you have any questions or concerns regarding this study, please call me at 01 7006179 or e-mail me at marcia.kirwan@dcu.ie. If further help is required I will be in a position to provide advice and guidance. Thank you for participating in this research study.

Investigators:

Marcia Kirwan (Researcher for this hospital)

School of Nursing, Dublin City University, Dublin 9.

Questionnaire number	

PLEASE MARK AN "X" IN THE BOX CORRESPONDING TO YOUR ANSWER IN EACH QUESTION, OR SUPPLY THE REQUESTED INFORMATION.

A. ABOUT YOUR JOB

1. Please indicate the extent to which you agree that each of the following features is present in your current job.

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
1. Adequate support services allow me to spend time with my patients.	1☐	2☐	3☐	4☐
2. Physicians and nurses have good working relationships.	1☐	2☐	3☐	4☐
3. A supervisory staff that is supportive of nurses.	1☐	2☐	3☐	4☐
4. Active staff development or continuing education programs for nurses.	1☐	2☐	3☐	4☐
5. Career development/clinical ladder opportunity.	1☐	2☐	3☐	4☐
6. Opportunity for registered nurses to participate in policy decisions.	1☐	2☐	3☐	4☐
7. Physicians value nurses' observations and judgments.	1☐	2☐	3☐	4☐
8. Enough time and opportunity to discuss patient care problems with other nurses.	1☐	2☐	3☐	4☐
9. Enough registered nurses on staff to provide quality patient care.	1☐	2☐	3☐	4☐
10. A nurse manager who is a good manager and leader.	1☐	2☐	3☐	4☐
11. A chief nursing officer who is highly visible and accessible to staff.	1☐	2☐	3☐	4☐
12. Enough staff to get the work done.	1☐	2☐	3☐	4☐
13. Physicians recognize nurses' contributions to patient care.	1☐	2☐	3☐	4☐
14. Praise and recognition for a job well done.	1☐	2☐	3☐	4☐
15. High standards of nursing care are expected by the management.	1☐	2☐	3☐	4☐
16. A chief nursing officer is equal in power and authority to other top level hospital executives.	1☐	2☐	3☐	4☐
17. A lot of team work between nurses and physicians.	1☐	2☐	3☐	4☐
18. Opportunities for advancement.	1☐	2☐	3☐	4☐
19. A clear philosophy of nursing that pervades the patient care environment.	1☐	2☐	3☐	4☐
20. Working with nurses who are clinically competent.	1☐	2☐	3☐	4☐

	Strongly Disagree	Somewhat Disagree	Somewhat Agree	Strongly Agree
21. Physicians respect nurses as professionals	1☐	2☐	3☐	4☐
22. A nurse manager who backs up the nursing staff in decision making, even if the conflict is with a physician.	1☐	2☐	3☐	4☐
23. Management that listens and responds to employee concerns.	1☐	2☐	3☐	4☐
24. An active quality assurance program.	1☐	2☐	3☐	4☐
25. Registered nurses are involved in the internal governance of the hospital (e.g., practice and policy committees).	1☐	2☐	3☐	4☐
26. Collaboration between nurses and physicians.	1☐	2☐	3☐	4☐
27. A preceptor program for newly hired nurses.	1☐	2☐	3☐	4☐
28. Nursing care is based on a nursing rather than a medical model.	1☐	2☐	3☐	4☐
29. Registered nurses have the opportunity to serve on hospital and nursing committees.	1☐	2☐	3☐	4☐
30. Physicians hold nurses in high esteem.	1☐	2☐	3☐	4☐
31. Written, up-to-date care plans for all patients.	1☐	2☐	3☐	4☐
32. Patient care assignments that foster continuity of care (i.e., the same nurse cares for the patient from one day to the next).	1☐	2☐	3☐	4☐

2. How satisfied are you with your current job in this hospital?

1☐ Very dissatisfied 2☐ A little dissatisfied 3☐ Moderately satisfied 4☐ Very satisfied

3. How would you rate the work environment at your job in this hospital (such as adequacy of resources, relations with co-workers, support from supervisors)?

1☐ Poor 2☐ Fair 3☐ Good 4☐ Excellent

4. How satisfied are you with the following aspects of your job?

	Very Dissatisfied	A Little dissatisfied	Moderately Satisfied	Very Satisfied
1. Work schedule flexibility	1☐	2☐	3☐	4☐
2. Opportunities for advancement	1☐	2☐	3☐	4☐
3. Independence at work	1☐	2☐	3☐	4☐
4. Professional status	1☐	2☐	3☐	4☐
5. Wages	1☐	2☐	3☐	4☐
6. Educational opportunities	1☐	2☐	3☐	4☐
7. Annual leave	1☐	2☐	3☐	4☐
8. Sick leave	1☐	2☐	3☐	4☐
9. Study leave	1☐	2☐	3☐	4☐

5 a). If possible, would you leave your current hospital within the next year as a result of job dissatisfaction?

[1]☐ Yes [2]☐ No

b). If yes, what type of work would you seek?

[1]☐ Nursing in another hospital [2]☐ Nursing, but not in a hospital [3]☐ Non-nursing

6. If you were looking for another job, how easy do you think it would be for you to find an acceptable job in nursing?

[1]☐ Very difficult [2]☐ Fairly difficult [3]☐ Fairly easy [4]☐ Very easy

7. Would you recommend your hospital to a nurse colleague as a good place to work?

[1]☐ Definitely no [2]☐ Probably no [3]☐ Probably yes [4]☐ Definitely yes

8. Would you recommend your hospital to your friends and family if they needed hospital care?

[1]☐ Definitely no [2]☐ Probably no [3]☐ Probably yes [4]☐ Definitely yes

9. Please mark the response that best describes <u>how frequently</u> you have each feeling in relation to your current job in this hospital.

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
1. I feel emotionally drained from my work.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
2. I feel used up at the end of the workday.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
3. I feel fatigued when I get up in the morning and have to face another day on the job	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
4. I can easily understand how my patients feel about things.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
5. I feel I treat some patients as if they were impersonal objects.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
6. Working with people all day is really a strain for me.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
7. I deal very effectively with the problems of my patients.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
8. I feel burned-out from my work.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
9. I feel I'm positively influencing other people's lives.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
10. I've become more callous toward people since I took this job.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
11. I worry that this job is hardening me emotionally.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
12. I feel very energetic.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
13. I feel frustrated by my job.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
14. I feel I'm working too hard on my job.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
15. I don't really care what happens to some patients.	[0]☐	[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
16. Working directly with people puts too much stress on me.	0☐	1☐	2☐	3☐	4☐	5☐	6☐
17. I can easily create a relaxed atmosphere with my patients.	0☐	1☐	2☐	3☐	4☐	5☐	6☐
18. I accomplish many worthwhile things in this job.	0☐	1☐	2☐	3☐	4☐	5☐	6☐
19. I feel exhilarated after working closely with my patients.	0☐	1☐	2☐	3☐	4☐	5☐	6☐
20. I feel like I'm at the end of my rope.	0☐	1☐	2☐	3☐	4☐	5☐	6☐
21. In my work, I deal with emotional problems very calmly.	0☐	1☐	2☐	3☐	4☐	5☐	6☐
22. I feel patients blame me for some of their problems.	0☐	1☐	2☐	3☐	4☐	5☐	6☐

B. QUALITY AND SAFETY

1. In general, how would you describe the quality of nursing care delivered to patients on your unit/ward?
1☐ Poor 2☐ Fair 3☐ Good 4☐ Excellent

2. How confident are you that your patients are able to manage their care when discharged?
1☐ Not at all confident 2☐ Somewhat confident 3☐ Confident 4☐ Very confident

3. How confident are you that hospital management will act to resolve problems in patient care that you report?
1☐ Not at all confident 2☐ Somewhat confident 3☐ Confident 4☐ Very confident

4. Please give your unit/ward an overall grade on patient safety.
1☐ Failing 2☐ Poor 3☐ Aceptable 4☐ Very good 5☐ Excellent

5. In the past year would you say the quality of patient care in your hospital has …
1☐ Deteriorated 2☐ Remained the same 3☐ Improved

6. The following questions ask for your opinion about patient safety issues in your employment setting.

	Strongly Disagree	Disagree	Neither	Agree	Strongly Agree
1. Staff feel like their mistakes are held against them.	1☐	2☐	3☐	4☐	5☐
2. Important patient care information is often lost during shift changes.	1☐	2☐	3☐	4☐	5☐
3. Things "fall between the cracks" when transferring patients from one unit to another.	1☐	2☐	3☐	4☐	5☐
4. Staff feel free to question the decisions or actions of those in authority.	1☐	2☐	3☐	4☐	5☐
5. In this unit, we discuss ways to prevent errors from happening again.	1☐	2☐	3☐	4☐	5☐
6. We are given feedback about changes put into place based on event reports.	1☐	2☐	3☐	4☐	5☐
7. The actions of hospital management show that patient safety is a top priority.	1☐	2☐	3☐	4☐	5☐

7. **How often would you say each of the following incidents occurs involving you or your patients?**

	Never	A few times a year or less	Once a month or less	A few times a month	Once a week	A few times a week	Every day
1. Patient received wrong medication, time, or dose	0☐	1☐	2☐	3☐	4☐	5☐	6☐
2. Pressure ulcers after admission	0☐	1☐	2☐	3☐	4☐	5☐	6☐
3. Patient falls with injury	0☐	1☐	2☐	3☐	4☐	5☐	6☐
4. Healthcare-associated infection:							
1. Urinary tract infections	0☐	1☐	2☐	3☐	4☐	5☐	6☐
2. Bloodstream infections	0☐	1☐	2☐	3☐	4☐	5☐	6☐
3. Pneumonia	0☐	1☐	2☐	3☐	4☐	5☐	6☐
5. Complaints from patients or their families	0☐	1☐	2☐	3☐	4☐	5☐	6☐
6. Verbal abuse toward nurses							
1. By patients and/or families	0☐	1☐	2☐	3☐	4☐	5☐	6☐
2. By staff	0☐	1☐	2☐	3☐	4☐	5☐	6☐
7. Physical abuse toward nurses							
1. By patients and/or families	0☐	1☐	2☐	3☐	4☐	5☐	6☐
2. By staff	0☐	1☐	2☐	3☐	4☐	5☐	6☐
8. Work related physical injuries to nurses	0☐	1☐	2☐	3☐	4☐	5☐	6☐

C. ABOUT YOUR MOST RECENT SHIFT AT WORK IN THIS HOSPITAL

1. Which best describes the most recent shift you worked in this hospital?
1☐ Day 2☐ Afternoon/evening 3☐ Night

2. Write in the box the number of hours you worked on your most recent shift in this hospital? Hours: ☐☐

3. On your most recent shift at this hospital did you work beyond your contracted hours?
1☐ Yes 2☐ No

4. How many patients were you directly responsible for on the most recent shift you worked? ☐☐

5. Is the number of patients in preceding question (C4) typical of your workload?
1☐ Less 2☐ Same 3☐ More

6. Of all the patients were you directly responsible for on your most recent shift,
a. how many required assistance with all activities of daily living? ☐☐

b. how many required hourly or more frequent monitoring or treatments? ☐☐

7. How would you describe your role in caring for most of the patients on your most recent shift?
Mark the one option that fits best.
1☐ I provided most care myself
2☐ I supervised the care by others and provided some myself.
3☐ I provided only limited care such as dressing changes or drug administration and most of direct care was done by others

8. On your most recent shift how many patients in total were on your unit/ward? ☐☐

9. Counting yourself, how many registered nurses in total provided direct patient care on your unit/ward during the most recent shift you worked?
Number of registered nurses: ☐☐

10. How many other nursing care staff in total provided direct patient care on your unit/ward during the most recent shift you worked?
Other nursing care staff: ☐☐

11. On your most recent shift, how often did you perform the following tasks?

	Never	Sometimes	Often
1. Delivering and retrieving food trays	0☐	1☐	2☐
2. Performing non-nursing care	0☐	1☐	2☐
3. Arranging discharge referrals and transportation (including to long term care)	0☐	1☐	2☐
4. Routine phlebotomy/blood draw for tests	0☐	1☐	2☐
5. Transporting of patients within hospital	0☐	1☐	2☐
6. Cleaning patient rooms and equipment	0☐	1☐	2☐
7. Filling in for non-nursing services not available on off-hours	0☐	1☐	2☐
8. Obtaining supplies or equipment	0☐	1☐	2☐
9. Answering phones, clerical duties	0☐	1☐	2☐

12. On your most recent shift, which of the following activities were necessary but left undone because you lacked the time to complete them? Mark all that apply.

1. Adequate patient surveillance	☐
2. Skin care	☐
3. Oral hygiene	☐
4. Pain management	☐
5. Comfort/talk with patients	☐
6. Educating patients and family	☐
7. Treatments and procedures	☐
8. Administer medications on time	☐
9. Prepare patients and families for discharge	☐
10. Adequately document nursing care	☐
11. Develop or update nursing care plans/care pathways	☐
12. Planning care	☐
13. Frequent changing of patient position	☐

D. ABOUT YOU

1. What is your gender?
1☐ Female 2☐ Male

2. What is your age? Years: ☐☐

3a. Did you receive your basic nursing education in the country where you currently work as a professional nurse?
1☐ Yes 2☐ No

b. If no, in what country did you receive your basic nursing education? Country: ☐

4. Not including the country where you currently work, list the last three countries, if any, (and years) where you have worked as a professional nurse.

Country|Years: ☐ **Country|Years:** ☐ **Country|Years:** ☐

5. What was your age when you first became a professional nurse? Years: ☐☐

6. Do you have a baccalaureate degree in nursing?

[1]☐ Yes [2]☐ No

7. How satisfied are you with your choice of nursing as a career?

[1]☐ Very dissatisfied [2]☐ A little dissatisfied [3]☐ Moderately satisfied [4]☐ Very satisfied

8. Are you working in this hospital full time?

[1]☐ Yes [2]☐ No

9. How many years have you worked as a registered nurse …

a. in your career **Years:** ☐☐ b. in this hospital **Years:** ☐☐

E: ADDITIONAL QUESTIONS FOR THE IRISH STUDY

1. For how many years have you worked as a registered nurse….

a) in this field (medical/surgical) **Years:** ☐☐ b) in this ward/unit? **Years:** ☐☐

2. Please tick the box which best describes your response to the following:

	Strongly Agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
a. Overall, my current work environment empowers me to accomplish my work in an effective manner					
b. Overall, I consider my workplace to be an empowering environment					

3. Have you received in-service updates in the last year on any of the following?
MARK ALL THAT APPLY

	YES	NO
a. Clinical risk management/patient safety	0 ☐	1 ☐
b. Infection control	0 ☐	1 ☐
c. Blood transfusion practice	0 ☐	1 ☐
d. CPR	0 ☐	1 ☐
e. Manual handling	0 ☐	1 ☐
f. Adverse event reporting	0 ☐	1 ☐
g. Informed Consent	0 ☐	1 ☐
h. Open disclosure for adverse clinical events	0 ☐	1 ☐

4. Frequency of adverse events reported:

	Never	Rarely	Sometimes	Most of the time	Always
a. When a mistake is made but is caught and corrected before affecting the patient, how often is this FORMALLY reported?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
b. When a mistake is made but it has no potential to harm the patient how often is this FORMALLY reported?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐
c. When a mistake is made that could harm the patient but does not, how often is this FORMALLY reported?	1 ☐	2 ☐	3 ☐	4 ☐	5 ☐

5. In the past 12 months, how many FORMAL adverse events reports have you filled out and submitted in the following categories?

a. Risk Management report forms	**Number:**	☐☐
b. Blood transfusion report forms	**Number:**	☐☐
c. Irish Medicines Board forms OR online reports	**Number:**	☐☐

Thank you for taking the time to complete and return this questionnaire.

Appendix B

Organisational Profile Questionnaire

(pages i-x)

Organisational profile

Section 1: ORGANISATION PROFILE [required for all hospitals]

1. **Does this return cover a hospital group? Yes / No**

2. **Name of the organization (hospital or hospital group)**

   _____

3. **Address**

   _____

   _____

   _____ **Postcode** _____

4. **If this return is for a single *hospital* that is part of a hospital group please name the hospital group**

   _____

5. **Is it a university hospital?** **Yes / No**
6. **Is ownership public?** **Yes / No**
7. **Is the hospital run for profit?** **Yes / No**
8. **Is it a *regional* referral centre?** **Yes / No**
9. **Is it a *national* referral centre?** **Yes / No**

10. **Which of the following services are provided?**

    a. Emergency **Yes / No**
    b. ITU/ICU **Yes / No**
    c. Open Heart Surgery **Yes / No**
    d. Organ Transplant surgery **Yes / No**

11. Annual Activity [last year for which complete data is available]

Total Inpatient Admissions (n)	
*i) Inpatient Elective Admissions (n)**	
*ii) Inpatient Emergency Admissions (n)**	
Day Case Admissions (n)*	
Total ambulatory/outpatient attendances (n)*	
i) Emergency department visits (n)	
*ii) Planned ambulatory/outpatient attendances (n)**	
Total Annual Expenditure	
(year end date dd/mm/yy)	

12. Bed Numbers (mean for year)

	Total number of open beds (N)	**Mean Occupancy (%)**
Total		
Total Acute Beds		
Of which		
ICU*		
Are figures above an annual average?	Yes / No	Yes / No
Please give year end date (dd/mm/yyyy) or census date if different from 11e above		

13. Adult (or mixed adult / children) Medical and Surgical ICU wards*

	Medical ICU	**Surgical ICU**	**Mixed (med / surg) ICU**
a) Number of wards			
b) Total number of beds			

Please indicate below any inpatient specialty wards that you have excluded from this definition

Number of *General* (or mixed adult / children) Medical and Surgical wards and beds

	Medical Wards	**Surgical Wards**
a) Number of wards		
b) Total number of beds		

Please indicate below any inpatient specialty wards that are excluded from this definition

---

---

14. Are there any other factors which you feel might be relevant, in terms of understanding the results of the nurse survey or patient outcomes data? Please give details under the following headings.

a) Mergers with other hospitals Yes / No
b) Moving wards within the hospital Yes / No
c) New buildings Yes / No
d) Substantial increase in beds numbers Yes / No
e) Substantial decrease in bed numbers Yes / No
f) Other major new facilities opened Yes / No
g) Other major facilities closed Yes / No
h) Other

Details:

15. Is there a chief nurse with overall professional responsibility for inpatient nursing services in the organization? Yes / No

Section 2: STAFFING

1. **What is the usual contracted full time working week for the following grades of staff (in hours)**

Medical staff	
Registered/ licensed nursing staff	
Un-registered nursing staff	

2. **Staff numbers**
   Please write a number in each box, to show the whole time equivalent of the establishments and of staff in post, and provide the total headcount of staff in each category.

	Staff in Post (WTE)	**Staff in Post (Head count)***	**Vacancies (WTE)***
All Employees			
Medical staff (total)			
Consultants / attending / chef de clinique			
Other qualified medical staff			
Registered/licensed nursing staff (total)			
Other registered nurse * (e.g. senior nurse managers or senior specialist nurses not counted below)			
Ward manager or equivalent*			
Staff nurse (RN)*			
Staff nurse (Licensed nurse)*			
Non-registered nursing staff			

3. **Number and grades of the permanent staff on general adult (or mixed adult / children) wards***

	Medical		Surgical	
	Staff in Post (WTE)	Vacancies*	Staff in Post (WTE)	Vacancies*
Ward manager or equivalent				
Staff nurse				
Non-registered nursing staff				

4. **Nursing staff numbers: outpatient and day case staff***

	Staff in Post (WTE)	Staff in Post (Head count)	Vacancies (WTE)*
Registered / licensed nursing staff			
Non-registered nursing staff			

5. **Nursing staff other detail*:**

	Staff in Post (headcount)	Not recorded
Nurses with a masters degree or higher		
Nurses with a bachelors degree		
Nurses with initial nursing qualification from any other country		
Nurses with initial nursing qualification from non EU country		
Nurses who are not EU citizens		

6. **Are figures above an annual average? YES/NO**

7. **Please give the year end date OR the relevant census date (dd/mm/yy)**

8. Staff turnover*

Please show the annual number of staff joining, leaving and staying (headcount not WTE).

	Number appointed (JOINERS)	**Number left (LEAVERS)**	**Number in post For full year (STAYERS)**	**% turnover***
All Employees				
Medical staff (total)				
Registered/ licensed nursing staff				
Non-registered nursing staff				

9. Use of bank or agency registered nurses*

Please give details of bank (float – employed by the hospital) and agency (employed via outside agency) usage.

	Whole time equivalents	**% of total nursing pay bill**
Bank registered/ licensed nurses		
Agency registered/ licensed nurses		

10. Sickness/absence*

Please enter the percentage of nursing time lost through sickness absence annually, using the space below to describe how the figure is calculated.

	Percentage (% of all working hours/shifts missed due to sickness absence)
Registered/ licensed **nursing staff**	
Non-registered nursing staff	

Method of calculation:

11. Please give the year end date for the data given in 8-10 (dd/mm/yy)

Section 3: Organising and Managing Nursing Work in the Hospital

1. Planning of staffing on general medical / surgical wards.

Which of the following best describes how staffing levels for the general medical / surgical wards in your hospital are determined (select all that apply)

a) The current staffing levels are largely historical, based on what has been used in the past? Yes / No

b) The hospital as a whole uses a formal system to determine staffing adequacy on its inpatient units Yes / No

c) Different wards use different approaches to determine staffing adequacy Yes / No

d) Staffing levels for most wards in the hospital are reviewed regularly (yearly or more often) Yes / No

e) Staffing levels for most wards are determined by reference to established (local or national) benchmarks or norms for the type of ward Yes / No

*f) Staffing levels are set to **match** established benchmarks or norms for the type of ward Yes / No*

*g) Staffing levels are set to **exceed** established benchmarks or norms for the type of ward Yes / No*

h) Ward staffing levels are based on the result of matching staffing to patient acuity/dependency using a formal system Yes / No

i) Ward staffing levels are based on informal review of patient acuity/dependency Yes / No

j) *Staffing is planned to match patient acuity/dependency on a shift by shift basis using a formal system* Yes / No

k) Please give additional details (including name and references for any systems used) Yes / No

2. Performance review and professional development

Which of the following best describes how the hospital reviews and supports nursing staff performance, educational needs and professional development (select any that apply)

a) The hospital has an appraisal system where all nursing staff undergo an annual review with their manager *Yes / No*

b) The performance of all nursing staff is formally reviewed at least once a year *Yes / No*

c) The training needs of all nursing staff are formally reviewed at least once a year *Yes / No*

d) The career goals and professional development of all nursing staff are formally reviewed at least once a year *Yes / No*

e) The hospital supports nurses in their professional development and training by giving financial support for courses *Yes / No*

f) The hospital supports nurses in their professional development and training by giving study leave *Yes / No*

3. Budget for in service training and professional development*

What is the budget for in service training and professional development for nurses on the medical and surgical wards. Please give figures in local currency

a) Total budget for providing courses and releasing staff _____

b) Budget for providing courses and training _____

c) Budget for releasing staff to attend courses and training _____

Please give further details. If you are unable to provide the figures requested above please explain why.

_____

_____

_____

Section 4: Quality and safety personnel, training and reporting

1. Does your organisation have a named person in the following posts?

	Yes	No	If yes, what grade?
Quality Manager			
Clinical Risk Manager			
Haemovigilance Officer			
Pharmacovigilance or medication safety officer			

2. Does your organisation provide regular in-service education for clinical staff on any of the following?

	Yes	No	If yes is the training mandatory?
Clinical risk management /Patient safety			
Infection control			
Blood transfusion practice			
CPR			
Manual handling			
Adverse clinical event reporting			
Informed Consent			
Open disclosure for adverse clinical events			
Medication safety			

3. Does your organisation audit the following?

	Yes	No
Blood transfusion practice		
Compliance with local patient safety standards		
Hospital acquired infection		

4. Please indicate the organisation's approach to the following areas?

	Quantify incidences	Analyse trends
Patient safety incidents		
Adverse event reporting		
Medication errors		
Pressure sores following admission		
Blood transfusion adverse events		

5. In your organisation are the following areas evaluated on an on-going basis?

	Yes	No
Impact of adverse events on patients and their families		
Impact of adverse events on staff		

Appendix C

Patient satisfaction questionnaire

(pages i-vi)

PATIENT SURVEY INSTRUCTIONS

This survey is part of a European Union study to improve the quality of care in hospitals. Your participation is voluntary. Your care will not be affected in any way by your decision to participate or not. Your answers are anonymous.

Do not write your name or any personal details on the form.

Place your completed questionnaire in the envelope provided. The sealed envelopes will be collected directly by RN4CAST researchers. By filling out the questionnaire you are giving your permission to participate.

- Please tell us about your experience in this hospital. You may ask for help in filling out the questionnaire but the answers should be your own. Do not fill out this questionnaire if you are not the patient unless you are assisting the patient, and then record the patient's responses not your own.

- After completing the questionnaire, please insert it in the attached envelope, seal the envelope, and the sealed envelope will be collected by the researchers.

- Answer all the questions by checking the box to the left of your answer.

- You are sometimes told to skip over some questions in this questionnaire. When this happens you will see an arrow with a note that tells you what question to answer next, like this:

  Yes

  No ⟶ If No, Go to Question 1

If you have any questions, the DCU researcher is available on your ward on the day of the study.

Please answer the questions in this survey about your stay at this hospital. Do not include any other hospital stay in your answers.

YOUR CARE FROM NURSES

1. During this hospital stay, how often did nurses treat you with courtesy and respect?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

2. During this hospital stay, how often did nurses listen carefully to you?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

3. During this hospital stay, how often did nurses explain things in a way you could understand?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

4. During this hospital stay, after you called for assistance, how often did you get help as soon as you wanted it?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always** [4]☐ **Never**

YOUR CARE FROM DOCTORS

5. During this hospital stay, how often did doctors treat you with courtesy and respect?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

6. During this hospital stay, how often did doctors listen carefully to you?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

7. During this hospital stay, how often did doctors explain things in a way you could understand?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

THE HOSPITAL ENVIRONMENT

8. During this hospital stay, how often were your room and bathroom kept clean?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

9. During this hospital stay, how often was the area around your room quiet at night?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

YOUR EXPERIENCES IN THIS HOSPITAL

10. During this hospital stay, did you need help from nurses or other hospital staff in getting to the bathroom or in using a bedpan?

[1]☐ **Yes** [2]☐ **No** → **If No, Go to Question 12**

11. How often did you get help in getting to the bathroom or in using a bedpan as soon as you wanted?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

12. During this hospital stay, did you need medicine for pain?

[1]☐ **Yes** [2]☐ **No** → **If No, Go to Question 15**

13. During this hospital stay, how often was your pain well controlled?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

15. During this hospital stay, were you given any medicine that you had not taken before?

[1]☐ **Yes** [2]☐ **No** → **If No, Go to Question 18**

16. Before giving you any new medicine, how often did hospital staff tell you what the medicine was for?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

17. Before giving you any new medicine, how often did hospital staff describe possible side effects in a way you could understand?

[1]☐ **Never** [2]☐ **Sometimes** [3]☐ **Usually** [4]☐ **Always**

WHEN YOU LEAVE THE HOSPITAL

18. **How many more days do you expect to be in this hospital? Your best guess is fine. Write your answer in the blank. _____ days**

19. During this hospital stay, have doctors, nurses or other hospital staff talked with you about your care after you leave the hospital?

[1]☐ **Yes** [2]☐ **No**

20. During this hospital stay, have you gotten information in writing about what symptoms or health problems to look out for after you leave the hospital?

[1]☐ **Yes** [2]☐ **No**

OVERALL RATING OF HOSPITAL

Please answer the following questions about your stay at this hospital. Do not include any other hospital stays in your answer.

21. Using any number from 0 to 10, where 0 is the worst hospital possible and 10 is the best hospital possible, what number would you use to rate this hospital during your stay?

Worst hospital possible										**Best hospital possible**
[00]☐	[01]☐	[02]☐	[03]☐	[04]☐	[05]☐	[06]☐	[07]☐	[08]☐	[09]☐	[10]☐
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**

22. Would you recommend this hospital to your friends and family?

[1]☐ **Definitely no** [2]☐ **Probably no** [3]☐ **Probably yes** [4]☐ **Definitely yes**

ABOUT YOU

23. In general, how would you rate your <u>overall health</u>?

[1]☐ **Excellent** [2]☐ **Very good** [3]☐ **Good** [4]☐ **Fair** [5]☐ **Poor**

24. What is the highest grade or level of school that you have <u>completed</u>?

[1]☐	[2]☐	[3]☐	[4]☐	[5]☐	[6]☐
Primary school	**Some secondary school, but did not complete Leaving certificate**	**Completed Leaving certificate**	**Some college**	**College graduate (degree level)**	**More than primary college degree**

THANK YOU

Please return the completed questionnaire to the researcher in the envelope provided.

Appendix D

Breakdown of Proportion of nurses in a unit who have a degree

hospital	Ward 1	Ward 2	Ward 3	Ward 4	Ward 3	Ward 4
A	20%	40%	40%	80%		
B	60%	60%	90%	90%		
C	70%	50%	60%	60%		
D	80%	60%	50%	50%		
E	60%	60%	90%	80%		
F	60%	60%	40%	30%		
G	60%	60%	20%	50%		
H	40%	60%				
I	50%	60%	70%			
J	40%	50%	10%	50%		
K	20%	40%				
L	30%	80%	80%			
M	60%	40%	30%	30%		
N	70%	90%	50%	90%		
O	90%	70%	70%	80%		
P	100%	60%	50%	70%		
Q	50%	70%	60%	50%		
R	70%	70%	70%	60%	60%	20%
S	80%	90%	50%	80%		
T	70%	80%	30%			
U	50%	40%				
V	50%	40%	50%			
W	70%	90%	100%	100%		
X	90%	80%				
Y	80%	80%	60%			
Z	80%	90%	60%	90%		
AA	90%	80%	50%	60%		
BB	60%	70%	60%	60%		
CC	90%	60%	50%	50%		
DD	50%	50%	80%			

* Wards with less than five nurse respondents are not included