

The role of nurse education in improving patient
outcomes and patient satisfaction with nursing care:
A multiple case study of nursing teams in three
hospitals across Ireland and Germany.

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January 2016

Submitted for the Degree of Doctor of Philosophy

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Self Declaration

I hereby certify that this material, which I now submit for assessment on the programme of study leading to the award of Doctor of Philosophy 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.

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Acknowledgements

The submission of this thesis marks an opportunity to thank several people, who have contributed in many ways and to whom I am sincerely grateful.

Firstly, I would like to express my sincere gratitude to my supervisors Professor Anne Matthews and Professor P. Anne Scott for their encouragement and professional guidance throughout my time of study. Supervision sessions were both fun and hard work. I thank you for your constant and constructive feedback on the many drafts relating to this study. Thank you also for your patience and understanding during times when other life demands made for untimely distractions.

Secondly, I would like to say ‘Herzlichen Dank!’ to Professor Dr. med. Reinhard Busse, Ms. Britta Zander and Ms. Lydia Dobler for granting me access to the German RN4CAST data. Your assistance meant the world to me! Without access to the German data, my idea to conduct a multiple-case study would have been crushed. A special thanks to Britta for answering all my questions, for the friendship, and for responding to my numerous emails.

I would also like to express my gratitude to my colleagues in the School of Nursing and Human Sciences, who have supported and encouraged me. A special thanks to Sabina Stan for the endless cups of teas and chats. The encouragement that you offered helped me to believe that I could actually complete this journey.

I would also like to express my sincere gratitude to all the staff, managers, nurses and patients who contributed to this study. This study would not have happened without your participation. The views that you provided, in regards to your work and care, challenged my conceptions and opened my mind. Thank you!

I am especially grateful to my family and friends, who encouraged me and who were incredibly patient. Thank you for your unceasing support in person, on social media and on the phone. A special thanks to Tara and Mary for willingly taking on the task of proof reading. Most of all I want to thank my son George who, through his unconditional love, gave me inspiration and happiness. Thank you for all the little things that you have done to make this journey special!

Lastly, I would like to thank everybody who supported me throughout the completion of this thesis.

Daniela Lehwaldt

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Glossary of relevant German and Irish Institutions

(by country, in alphabetical order)

GERMANY

Deutscher Berufsverband für Pflegeberufe

The Deutscher Berufsverband für Pflegeberufe (DBfK) (German Nurses Association) is one of the largest professional nurses' associations in Germany. It represents the interests of its members in relation to employers, authorities, and other organisations. It also advises regional, national and international legislative bodies on nursing matters, and promotes professional standards by improving basic and post-basic education for nurses.

Deutscher Bildungsrat für Pflegeberufe

The Deutscher Bildungsrat für Pflegeberufe (DBR) (German Nurse Education Council) was founded in 1993 by the Arbeitsgemeinschaft Deutscher Schwesternverbände und Pflegeorganisationen e.V. (Working Group of Religious Sisters Orders and Nursing Organisations) and members of the DBfK. The DBR brings together the experts from vocational and academic nursing schools, and is concerned with all aspects of nurse education.

Deutscher Pflegerat

The Deutscher Pflegerat (DPR) is the umbrella organisation of nurses associations in Germany. Their primary function is to represent the professions of nursing and midwifery through its member associations, and to influence health care policy and structures.

Federal Ministry of Health

The Federal Ministry of Health in Germany is responsible for a variety of policy areas, whereby its activities focus predominantly on the drafting of bills, ordinances and administrative regulations in the areas of health, prevention and long-term care. Functions include the development of hospital policies and structures, and the implementation of quality of care initiatives. It is also responsible for the safeguarding and further development of the statutory health insurance system which, through its funds, provides hospital and community care to the public.

Wissenschaftsrat

The Wissenschaftsrat (Scientific Council) is one of the most important policy advisory bodies in Germany. It advises the Federal Government and the Federal Ministry of Education and Research in all matters relating to the content and structural development of the higher education system, including the planning of individual areas and subject matters.

IRELAND

Department of Health

The role of the Department of Health (DoH) in Ireland is to provide strategic leadership for the health service and to ensure that Government policies are translated into actions and implemented effectively. They support the Minister and Ministers of State in their implementation of Government policy, including the delivery of high quality care. From 1997-2011 the Department was known as the Department of Health and Children, as it covered both health and children functions.

Health Service Executive

The Health Service Executive (HSE) provides all of Ireland's public health services in hospitals and communities across the country. The HSE was established by the Health Act in 2004 and came into official operation on 1st January 2005.

Nursing and Midwifery Board of Ireland

The Nursing and Midwifery Board of Ireland (NMBI), formerly known as An Board Altranais (Nursing Board) is the independent, statutory organisation which regulates the nursing and midwifery professions in Ireland. It sets the standards for the education, registration and professional conduct of nurses and midwives. Their title was changed following the signing of the Commencement Order S.I. No. 385 of 2012 to reflect the recognition of midwifery as a separate and distinct profession to that of nursing.

List of Abbreviations and Acronyms

Abbreviations and Acronyms	Explanation
ABA	An Bord Altranais (former Title for the Nursing and Midwifery Board of Ireland)
AHA	American Hospital Association
BNS	Bachelor of Nursing Studies
BSc	Bachelor in Science in Nursing
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CSO	Central Statistics Office
CVI	Content Validity Indexing
DBfK	Deutscher Berufsverband für Pflegeberufe (German Nurses Association)
DBR	Deutscher Bildungsrat für Pflegeberufe
DoH	Department of Health
DoN	Director of Nursing
DPR	Deutscher Pflegerat
DRGs	Diagnostic Related Groups
EE	Emotional Exhaustion
ERSI	Economic and Social Research Institute of Ireland
FSO	Federal Statistics Office
FTR	Failure-To-Rescue
FTR-N	Failure-To-Rescue in Nursing
German DRGs	German Diagnostic Related Groups
HCA	Health Care Assistant
HCAHPS	Hospital Consumer Assessment of Healthcare Providers and Systems
HSRA	US Health Resources and Services Administration Bureau of Health Professions
HSE	Health Service Executive
ICN	International Council of Nurses
ID	Identification
IOM	Institution of Medicine
KPH	Krankenpflegehelfer/in
KrPflAPrV	Ausbildungs- und Prüfungsverordnung für die Berufe in der Krankenpflege (German Nurse Training Regulations)
MBI	Maslach Burnout Inventory
MoU	Memorandum of Understanding
N/A	Not applicable
NCLEX-RN	National Council Licensure Examination for Registered Nurses
NICE	National Institute for Health and Care Excellence
NMBI	Nursing and Midwifery Board of Ireland
NMC	Nursing and Midwifery Council
NPR	Nurse-To-Patient Ratio
OECD	Organisation for Economic Co-operation and Development
PES-NWI	Practice Environment Scale – Nurse Working Index
REC	Research Ethics Committee
RN4CAST	Registered Nurse Forecasting: Human Resources Planning in Nursing study
SD	Standard Deviation
SPO	Structure-Process-Outcome
UK	United Kingdom
U-REC	University Research Ethics Committee
USA	United States of America
WHO	World Health Organisation
WTE	Whole Time Equivalent

Abstract

Background: International large-scale research has found that nurse education at degree level contributes to reduced mortality and failure-to-rescue rates. The influences of hospital and national contexts and of different types of nurse education levels towards improved patient care seem often overlooked.

Aim and objectives: The aim of this study was to explore the role of nurse education in improving patient outcomes and patient satisfaction with nursing care, taking into account different types of nurse education levels within different hospital-based and country-specific contexts. The objectives were: (1) to explore and compare nurse education levels, hospital and nurse structures, care processes and patient-related outcomes for selected nursing teams from the Irish and German arms of the RN4CAST project (2) to explore factors other than nurse education affecting patient outcomes, including country-specific factors.

Methodology: A multiple case study design was utilised to conduct an in-depth exploration of the findings generated from the Irish and German arms of the RN4CAST (Nurse Forecasting: Human Resources Planning in Nursing) project. Three nursing teams, with different proportions of degree (pre-registration, post-registration and international degree) and apprenticeship trained nurses working in hospitals in Ireland and Germany were selected. Data were explored and compared based on Donabedian's (2005) Structure-Process-Outcome model for health care practice. Patient outcomes included falls with injury, medication errors and pressure ulcers developed after admission. Patients rated nurse communication, pain control and discharge information provided.

Findings: Findings suggest that degree level education, and type of degree, play a role in improving patient-related outcomes. The team with both degree and apprenticeship trained nurses reported the best patient outcomes, which were also attributed to better working conditions and lower levels of hospital bed occupancy. Country-specific factors such as nurse-to-patient ratios and skill mix further affected the care provided by the nursing teams.

Conclusion: This study provides new insights into the role of nurse education in improving patient-related outcomes. It also provides new information about hospital-based and country-specific contexts, within which nurses with different educational backgrounds provide care.

CHAPTER 1: INTRODUCTION

1.1 Introduction

Nurse education can be provided at various levels from apprenticeship training to degree (World Health Organisation 2009a). In Ireland, nurses are prepared to degree level (pre-registration degree) since the student intake of 2002. Prior to the transition to degree nurses in Ireland were trained through diploma and apprenticeship programmes (An Bord Altranais 1994). Post-registration programmes offer existing diploma and apprenticeship trained nurses a non-obligatory route to degree. In addition, nurses holding degrees obtained from various places overseas joined the Irish workforce from 2000 onwards (Humphries, Brugha and McGee 2008). Therefore, nurses with a variety of educational backgrounds, from apprenticeship training to different types of degrees, provide care to hospitalised patients in Ireland.

In Germany, nurses are by and large trained through apprenticeship programmes. While there is work ongoing in regards to the reformation of nurse education and practice (Deutscher Bildungsrat für Pflegeberufe 2006, Blum 2006, Deutscher Berufsverband für Pflegeberufe 2011, Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012), a lack of consensus with regards to the appropriate deployment of degree nurses in Germany is evident in some of the literature (Isfort 2008, Bartels, Simon, Plohmann 2012). Post-registration degree programmes in German generally prepare nurses for research, management and teaching positions, and less for clinical practice (Steffen and Löffert 2010, Stöver 2010). Nurses recruited from European and non-European countries to practice in Germany can be either, degree educated or apprenticeship trained (Bundesagentur für Arbeit 2014a).

1.2 The aims of nurse education

The elements of the two programmes that prepare nurses in Ireland and Germany for practice, namely apprenticeship training and degrees, are discussed in detail in the second chapter of this thesis (please refer to page 10 for details). On the whole, the following differences are described in the literature:

The **aim of apprenticeship training** is to develop a specific nursing knowledge-base and the technical skills required to provide direct patient care (An Bord Altranais 1994, Landenberger et al. 2004, Fealy 2006). It also functions as a tool to socialise future nurses into their roles as hospital employees (Fealy 2006). As the theory and practice training largely occurs in one hospital, the knowledge and skills gained can be confined to local contexts and hospital routines (Cowman 2002).

Degree nurse education purports to go beyond apprenticeship training in that it provides a more universal preparation within higher education structures (Ryan 2008). Theoretical and practice elements of degrees are shared between higher education institutes and clinical partner services. Apart from the traditional content, there is a focus on developing broader, transferable skills including research, technology and decision making (An Bord Altranais 2005). As such the skill set that degree nurses obtain is more extensive compared to apprenticeship training, which is said to assist them in finding solutions for intricate patient situations (World Health Organisation 2009b, 2010).

1.3 Problem statement

The research literature, which will be discussed in more detail in Chapter 3 (Literature Review, see page 38), indicates that the level of nurse education plays a major role in the provision of safe and effective care. Nurse education at degree level is linked in previous research with improved patient outcomes such as reduced rates of mortality and failure-to-rescue (Aiken et al. 2003, Tourangeau et al. 2007, Friese et al. 2008, Kanai-Pak et al. 2008, Van den Heede 2009a, 2009b, You et al. 2013, Aiken et al. 2014, Cho et al. 2015). The research has been conducted in various countries including the USA, Asia and Europe on a cross-country level.

The focus of previous research is, generally, on identifying the link between degree education and patient outcomes. Data is examined at an aggregated level and, by and large, excludes directly comparing the contribution of apprenticeship trained nurses, though this is implied. The various types of nursing degrees such as pre-registration, post-registration and international degree, and their influence on patient outcomes, are also less often examined in existing research (Aiken et al. 2003, Tourangeau et al. 2007, Kutney-Lee and Aiken 2008, Friese et al. 2008, Kanai-Pak et al. 2008, Van den Heede et al. 2009b, You et al. 2013, Aiken et al. 2014, Cho et al. 2015). Through the methodological approaches taken in previous studies (most are large-scale quantitative studies), the role of nurse education is studied out of the real-life context. The rich structural hospital-based and country-specific contexts are largely lost. This prompted me to conduct a case study to address some of the shortfalls identified in the existing research.

1.4 Impetus for the study

The impetus to conduct this study came through my involvement with the Nurse Forecasting: Human Resources Planning in Nursing (RN4CAST) study. I joined the project as a researcher at the beginning of the study in January 2009. I became a Ph.D. student on the project and was involved in all steps of the research process in Ireland, from ethics applications and gaining access to hospitals to collecting the data from hospitals, nurses and patients (please refer to more detailed information on page 111). Through this involvement as a researcher and student on the project, and during discussions at consortium meetings, it became apparent that further investigation into nurse education levels would be valuable given the range of educational arrangements in the consortium countries. I decided to explore the findings of two of the RN4CAST countries, namely Ireland and Germany, in more depth to gain a deeper understanding of the role of nurse education within their hospital-based and country-specific contexts.

I began to develop a multiple case study with its own approaches to data analysis. The design and approaches are outlined in the Design and Methodology Chapter of this thesis (please refer to page 87 for details). Within the study, I utilised the tools and data from the RN4CAST project, which examined how features of the nursing work environment and nurse qualifications impact on nurse and patient outcomes. The following paragraphs summarise the RN4CAST project.

1.5 The RN4CAST project

The RN4CAST (Registered Nurse Forecasting: Human Resources Planning in Nursing study) was a 3-year project which began on 1st January 2009 and which concluded on 31st December 2011 (please see Appendix H for RN4CAST study protocol). Dublin City University was a member of a 12-country consortium funded under the 7th Framework Programme of the European Commission. Data for the RN4CAST project was collected between October 2009 and May 2010. Other consortium members included Belgium, England, Finland, Germany, Greece, Norway, Poland, Spain, Sweden, Switzerland, and the Netherlands.

RN4CAST is to date the largest nurse workforce planning study that has been conducted in Europe with samples of 486 hospitals, 33,541 survey responses from hospital nurses and 11,318 patient satisfaction surveys obtained from across European hospitals (Aiken et al. 2012). With the extensive and detailed data gathered from RN4CAST a prime opportunity, to explore the contribution of nurses with different educational backgrounds by taking into consideration their hospital and country-specific contexts, presented itself to me. After a period of reading and consulting with my supervisors, I decided to study a small selection of nursing teams working within two Irish and one German hospital.

1.6 Personal background

The selection of a sample from Ireland and Germany was also influenced by my personal background. Having practiced as a registered nurse, nurse practitioner and lecturer in Ireland since 1999, I am originally from Germany where I trained and gained clinical experience as a staff nurse in a number of hospitals. I can relate particularly well to the data from Ireland and Germany, as I hold the necessary background knowledge to understand the contexts and the

findings. That a contextual knowledge is useful in understanding research data, and thus in interpreting findings, has also been articulated by case study researchers such as Yin (2003) and Stake (2006).

For the study it was also useful to be in command of the two languages (English and German), as relevant literature needed to be sourced and read. I was also able to communicate with relevant German stakeholders in their native language, which was helpful in gaining their trust and support. Fluency in the two languages assisted me throughout the study from identification of the research topic to discussing and presenting the findings to audiences from both countries.

1.7 The overall aim of the study

The overall aim of this study is to explore the role of nurse education in improving patient-related outcomes within different hospital-based and country-specific contexts. Findings generated from the Irish and German arms of the RN4CAST (Registered Nurse Forecasting: Human Resources Planning in Nursing) project were explored in depth to develop new insights with regards to the interactions between the compositions of education in nursing teams, the types of degrees, nurse characteristics, working conditions and care outcomes.

The World Health Organisation (WHO) has urged researchers to demonstrate the impact that nurses have on patient outcomes in order to strengthen their role as a resource for better health (World Health Organisation 2010). By examining the contribution of nurses with different educational backgrounds to patient-related outcomes, this study aims to add to the WHO nursing research agenda (World Health Organisation 2010).

1.8 Summary of chapters

Following this introduction provided in **Chapter 1**, **Chapter 2** outlines in detail the approaches to nursing education in Ireland and in Germany. The specific programme elements within apprenticeship training and degrees are discussed with regards to their potential impact on clinical practice. The differences and similarities within nurse education are highlighted. This is followed by a contextual piece, which outlines the surrounding factors influencing nursing and nurse education in Ireland and in Germany. Factors related to the economy, the delivery of health care and the population in both countries are discussed and related to nursing and nurse education. Tables summarising data on nurse education programmes and contextual information are provided within the text.

Chapter 3 reviews the existing research literature on the topics of nurse education levels, skills developed through nursing education programmes and factors other than nurse education, which have been shown to contribute towards improved patient outcomes and patient satisfaction with nursing care. The review is divided into a number of sections, including a critical debate on the initial, subsequent and RN4CAST studies examining the link between nurse education and patient outcomes. The skills developed through nurse education programmes are also identified in this section of the literature review. Throughout the review, patient outcome measures including patient mortality, failure-to-rescue and nurse-reported patient outcomes are evaluated. Factors other than nurse education, which have shown to improve patient outcomes are reviewed in the final section of the chapter.

Chapter 4 presents a detailed account of the design and methodology employed in this study. The chapter begins with a critical debate on case studies and the rationales for using an exploratory multiple case study design for this study. This is followed by a section which

explains how design obstacles were overcome. The theoretical propositions and the analytical framework are presented in this chapter also.

‘What’ and ‘how’ questions are used in this study, as they have been suggested as particularly useful in exploratory case designs (Yin 2003, Thomas 2011), like the one used in this study. As this case study draws on the methods of the RN4CAST project, the final section of this chapter outlines the approaches utilised in this study. Furthermore, the ethical issues and procedures, access to hospitals, data collection and analysis are discussed.

Chapter 5 begins with a detailed overview of the research tools utilised in RN4CAST, with an emphasis on the parts that are particularly relevant to this case study. The contents and questions in the hospital (organisational), nurse and patient survey are explained. The case selection process is then outlined in detail including multi-stage purposeful sampling. Multi-stage purposeful sampling allowed for the careful selection of hospitals (cases) and nursing teams with different nurse education compositions (embedded cases) for this study.

Chapter 6 presents the findings of the study, which are based on the hospitals (cases) and nursing teams (embedded cases) selected during multi-stage purposeful sampling. The chapter is divided into two main sections:

- Section A provides a comparison of relevant RN4CAST data from the Irish and German arms of the study.
- Section B begins with the background data for the three selected hospitals (cases). Data from each hospital are outlined and compared. This is followed by a comparison of the findings relating to the three selected nursing teams (embedded cases).

Chapter 7 is a discussion on the findings of this study, which is presented under the following sub-headings:

- The role of nurse education in improving patient-related outcomes
- The mediating effects of factors other than nurse education
- Country-specific and hospital-based factors interacting with nurse education.

Chapter 8 outlines the main conclusions and the recommendations for practice, policy and research, based on the findings and key conclusions of this case study. Recommendations for nurse education, practice and policy are made within the text. A separate section for further research provides recommendations in regards to research themes, topics and designs emerging from this case study. The limitations of the study are outlined in this chapter. The chapter ends with the final conclusions for the study.

The following chapter outlines the nurse education context in Ireland and in Germany, followed by the economic and health care delivery context in the two countries.

CHAPTER 2: NURSE EDUCATION IN CONTEXT

This chapter outlines the approaches to nurse education in Ireland and Germany. Internationally, there is a trend towards degree level nurse education evident since the commencement of the Bologna Declaration process in 1999. In Ireland degree level nurse education was introduced in 2002. In Germany nurse education is mainly at apprenticeship training level, although degree level nurse education has been introduced. The main differences between nurse education in Ireland and Germany are discussed in this chapter.

2.1 Introduction

The WHO published the '*European Strategy for Nursing and Midwifery Education*', in which they recommended a transformation from apprenticeship training to degree level nurse education (World Health Organisation 2001). This signified that degree education is more appropriate in developing a nursing workforce capable of responding to increasingly complex patient needs. This recommendation was continued in other publications by the International Council of Nurses (ICN) (International Council of Nurses 2010a) and the WHO (World Health Organisation 2009b), where it was suggested that degree nurse education ensures patient safety and quality of care.

There are currently 47 countries participating in the Bologna process, which aims at bringing nurse education to degree level within Europe (European Higher Education Area 1999, 2010). The WHO established during a review that nurse preparation was at degree level in 22 out of 37 monitored EU-countries (World Health Organisation 2009a), including:

- Belarus, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Greece, Iceland, Ireland, Italy, Lithuania, Norway, Portugal, Romania, Slovenia, Sweden, Switzerland, Ukraine and the United Kingdom.

The process of converting existing apprenticeship programmes into degree programmes varied between countries (Davies 2008). The transition from apprenticeship training to degree in Ireland is depicted below.

2.2 Educational preparation of nurses in Ireland

The transition of nurse preparation in Ireland began in the 1990s, when the apprenticeship training moved towards an academic nurse education system (An Bord Altranais 1994). It began as a pilot project, with the establishment of a diploma programme in Galway. The Bachelor in Science in Nursing (BSc) was subsequently introduced in 2002 (An Bord Altranais 2005), and had its first graduates in 2006. As such Ireland followed the international trend stipulated by the Bologna Declaration (European Higher Education Area 1999) and the World Health Organisation (2001), as described above. The transition of nursing education in Ireland was characterised by the features described below.

2.2.1 Features that characterised the transition of nursing education in Ireland

The transition of nurse education in Ireland could be described as radical in Ireland in that all pre-registration programmes changed to a Bachelor of Science degree (BSc) in 2002. The option to train to become a nurse, in more traditional non-degree level programmes, was therefore completely eradicated. Post-registration Bachelor of Nursing Studies degrees (BNS) were introduced to advance traditionally trained nurses' knowledge and skills for practice (An Bord Altranais 2010). The BNS was presumably also a useful instrument to speed up the

process of converting the Irish nursing workforce into an all-degree profession. The Government supported the post-registration degree initiative. They provided funding for all nurses qualified at apprenticeship or diploma level to complete a post-registration degree. The scheme was in place for 10 years and ensured that all nurses, who opted for the degree, were released from their workplaces to attend university; it also ensured payment of all college fees (Health Service Executive 2008a).

In addition, overseas recruitment in the years 2000-2006 focused on countries with degree educated nurses largely from India and the Philippines (Humphries, Brugha and McGee 2008). An Irish nation-wide recruitment analysis of 238 overseas nurses recruited within that timeframe showed that 70% had a degree, and 15% had a diploma or master's degree (Humphries, Brugha and McGee 2008, 2009). Degree level preparation also became a requirement for registration with the Nursing and Midwifery Board of Ireland (NMBI). This implies that the bar, for any nurse wanting to practice in Ireland, has been raised from apprenticeship training to degree.

In other countries, the transition from apprenticeship training to degree took longer or is ongoing, as is depicted in the following paragraphs. Nurse education and routes towards registration for practice in the United States of America (USA), which has the longest established degree education system (Scheckel 2009), are briefly outlined next. This is followed by an overview on the transition of nursing education in England, one of Ireland's closest neighbours.

2.2.2 Nurse education and routes to registration in the USA

Degree level nurse education was introduced during the early 1900s and became widespread during the 1960s in the USA (Scheckel 2009). The transition from apprenticeship training to degree is ongoing and follows different requirements compared to Ireland. In Ireland, the requirements to commence nursing education include meeting the criteria set out by NMBI in regards to the pre-registration nursing programme and its branches. In the USA, in contrast, requirements depend by and large on the nursing programme. Two to three-year programmes include the diploma and the associate degree in nursing, and these often have individual admission requirements (US Advisory Council on Nurse Education 2000, Robinson and Griffith 2007). Diploma programmes are the most traditional type of nursing education in the USA. Diploma programmes provide nursing education primarily in the hospital setting (Scheckel 2009), and as such they are comparable to apprenticeship training.

The four-year Bachelor of Science in Nursing degree in the USA can include two years of coursework followed by special admission to the university's nursing programme and another two years of nursing specific coursework, or four years of a generic nursing programme at university (US Advisory Council on Nurse Education 2000, Robinson and Griffith 2007, Scheckel 2009). At the end of the three programmes (diploma, associate degree and degree) students are entitled to sit the same National Council Licensure Examination for Registered Nurses (NCLEX-RN); successful completion of this examination leads to registration (US Advisory Council on Nurse Education 2000). While this implies that the knowledge-base of nurses educated through diploma, associate degree and degree programmes is compatible in the USA, research from Pennsylvania conducted by Kendall-Gallagher et al. (2011) found differences in patient outcomes for these educational groups. Care provided by nurses holding a degree was associated with lower rates of surgical patient mortality, compared to

diploma and associate degree educated nurses. The findings of this study will be discussed in more detail in the literature review chapter.

Approximately 55 percent of the nursing workforce currently holds a degree in the USA, according to the latest figures of the US Health Resources and Services Administration Bureau of Health Professions (HRSA). The percentage of nurses holding a degree increased from 50 to 55 over the past decade (US Health Resources and Services Administration Bureau of Health Professions 2013). While this implies a trend towards increased levels of degree prepared nurses, it also demonstrates that there is a proportion of approximately 45 percent of nurses practicing without a degree.

2.2.3 The transition to degree nurse education in England

In England, offering a choice of pre-registration nurse education programmes, such as a hospital-based diploma and a university degree programme, had been a longstanding policy objective. The aim of offering two different programmes simultaneously was to increase the numbers applying to nursing (Robinson et al. 2003). School leavers with different academic strengths were therefore able to apply to suitable nursing programmes (Nursing and Midwifery Council 2008).

Both the National Nursing Research Unit of King's College London and the Nursing and Midwifery Council (NMC) explored the potential impact of an all-degree nurse education structure in England. Findings from the investigations, however, yielded no clear predictions on the impact on practice or patient outcomes (Robinson and Griffiths 2008). More than half

(57%) of the nurses participating in the NMC (2008) survey relating to nurse education supported the continuation of a parallel system.

Nurse preparation in England moved to all-degree in September 2013 (Royal College of Nursing 2012). The move has been described as one of the key actions in modernising nursing (Robinson and Griffiths 2008). The extent to which degrees can prepare nurses to provide high levels of quality patient care may also depend on the elements taught in the programme. The following section discusses the main elements, which changed during the transition from apprenticeship training to degree level nurse education in Ireland.

2.3 Elements of degree nurse education programmes in Ireland

Degree nurse education in Ireland is described by the Nursing and Midwifery Board of Ireland, previously known as An Bord Altranais, as a programme containing the essential elements that facilitate student nurses to develop their professional knowledge, skills and attitudes necessary to meet the needs of patients who are acutely or chronically ill (An Bord Altranais 2012). In their *Requirements and Standards for Nurse Registration Education Programmes* (An Bord Altranais 2005), the Board states that ‘theoretical instruction’ is one such essential element. One third of the hours of a degree programme are made up of theoretical instruction, such as 1533 hours of 4600 hours in total (An Bord Altranais 2005).

According to An Bord Altranais (2005) ‘theoretical instruction’ is provided by third level institutions (either university or institute of technology) and includes: definitions and conceptualisations of nursing care, knowledge on various health care systems, research processes and applications, communication and interpersonal skills, technology, clinical

judgment and decision making, health promotion, and the individual in health and illness. It seems that the intention of the introduction of a degree programme in Ireland was to allow for the preparation of nurses who can effectively act upon the modern-day medical, technological, interpersonal and demographical challenges (An Bord Altranais 1994). It may be argued though that the term ‘instruction’ does not adequately reflect the Board’s intentions, as it appears rather teacher-centred, and somewhat undermines the notion that students need to be prepared for reflective learning (Somerville and Kealing 2004, Jarvis 2004).

While using the term ‘instruction’ may not have prevented any student nurse from acquiring the knowledge and skills required for modern-day practice, a term such as ‘academic elements’ would possibly be more easily associated with developing reflective practitioners. The term ‘academic elements’ could also be more useful in pointing towards a preparation for post-degree level study, in that it recognised the need for life-long self-driven learning. It also appears to be more in line with the notions depicted by the WHO (2009b) and the European Higher Education Area in that ‘academic elements’ provide student nurses with a set of skills that foster professional and geographical mobility, as the elements taught appear applicable to various health care systems (European Higher Education Area 1999).

‘Theoretical instruction’ within Irish degree programmes also includes learning clinical skills in laboratories and simulated work environments (Hourican et al. 2008, Lyng et al. 2009, Poikela 2012, Houghton et al. 2013). Hence the term used by An Bord Altranais (2005) does not seem to fully describe the content covered, which is in fact a combination of theoretical and clinical content taught at higher education institutes. The clinical skills learned in simulated work environments may be particularly important in the consolidation of

theoretical knowledge, and in developing students' confidence in their practice abilities, as has been shown in previous research (Hourican et al. 2008, Kaddoura 2010). Hence the term theoretical instruction seems to insufficiently address the clinical skills content covered during the part of degree programmes taught at higher education institutes.

Another key element that changed with the transition to degree nursing in Ireland is that of 'clinical instruction'. Clinical instruction adds up to approximately 2300 hours, one half of the programme in total (An Bord Altranais 2005). It includes a variety of clinical placements including general medicine, surgery and specialist placements. The next section outlines the main changes introduced to 'clinical instruction' of degree programmes in Ireland namely supernumerary status, preceptorship and internship.

2.3.1 Supernumerary status

During apprenticeship training students became part of the workforce from day one (Robins 2000). Nurses undergoing degree education in contrast are in a supernumerary capacity for the first 3 years of the 4-year programme, no less than 40 weeks of clinical placements (An Bord Altranais 2005). The supernumerary status means that students practice outside of the staffing compliment during their clinical placements (An Bord Altranais 2003). This was a necessary change in the nursing education approach, as it shifted the onus from functioning within a hospital to learning in practice (Government of Ireland 1998). On the contrary, the supernumerary status could be viewed as impacting on the students' ability to develop their clinical skills. There is a chance that supernumerary students take less ownership of care and may be less motivated than traditional students, if they are more focused on their own rather than the hospital's needs (Castledine 2001). The supernumerary status of students can also challenge existing social structures within nursing teams. The nurses' focus on getting

through the work day without emphasising much the supervision needs of supernumerary students may become disturbed (Hyde and Brady 2002). To ensure that students benefit from their supernumerary status requires nurses within clinical placements, who assist in creating an environment for learning. The following outlines the role of preceptorship within pre-registration degree education.

2.3.2 Preceptorship

Preceptorship is a clinical teaching role specifically designed to enhance pre-registration degree students' learning experience during clinical placements (An Bord Altranais 2003). There is some consensus within the literature that preceptorship is an effective tool in teaching and assessing degree students the intricacies of clinical nursing (O'Callaghan and Slevin 2003, Myrick, Yonge and Billay 2010). As maintained by Myrick and Yonge (2004), in their textbook, preceptors are ideally placed to teach students the relevant nursing skills due to their proximity to the coalface of practice. Preceptors also collaborate with the university through committees and meetings, which contributes to a positive clinical learning environment for students (Papp, Markkanen and Von Bonsdorff 2003). In Ireland the role of the clinical placement co-ordinator (CPC) has been developed to provide additional support to students and to preceptors (Government of Ireland 1998, An Bord Altranais 2003).

Preceptors are usually nurses in practice who take on an additional teaching and assessment load. Due to the dual nature of the role, preceptorship may be affected by factors including volume of patients and unpredictable workloads (clinical practice and teaching) (McCarthy and Murphy 2010). The claim is that preceptors need recognition and support from their managers to successfully undertake their role (McCarthy and Murphy 2010).

The quality of the clinical teaching and learning presumably also depends on the preparation for the role and the teaching abilities of preceptors; both of which have been examined in previous literature (Dolan 2003, Carlson, Wann-Hansson and Philhammar 2009, O'Brien et al. 2014). The use of a competency-based assessment approach in pre-registration degree programmes assists in ensuring that all types of care situations, basic to complex, are assessed by the preceptors prior to students' graduation (An Bord Altranais 2005). The competency-based assessment used in pre-registration degree programmes is incremental in that there is documentation for each level of learning. The competency-based assessment in Ireland only allows students to progress who have successfully completed all five domains of nursing practice, including:

1. Professional / Ethical Practice
2. Holistic Approaches to Care and the Integration of Knowledge
3. Interpersonal Relationships
4. Organisation and Management of Care
5. Personal and Professional Development.

The learning requirements are also likely to change towards the end of the programme in the internship, where pre-registration degree students do become part of the workforce. In the following section the internship is explained.

2.3.3 Internship

The internship, which is a 36-week placement (An Bord Altranais 2005), is intended to assist students in consolidating the knowledge gained from theory and from previous supernumerary clinical placements (Government of Ireland 1998). As such it offers pre-registration degree students an opportunity to practice as a fully responsible member of the

nursing team prior to graduation. During the internship two students replace one staff nurse (An Bord Altranais 2003).

It might be difficult for degree students, however, to confirm all of the knowledge and skills gained from supernumerary placements. The limited number of weeks available during internship may leave students with insufficient time in gaining the necessary competence to provide some of the more complex patient care interventions independently. Concerns with regards to the preparedness for clinical practice of degree educated nurses have been articulated in the Irish literature (O'Dwyer 2007, Health Service Executive 2009a, 2010a). Perhaps this is one of the reasons why the Department of Health in Ireland (DoH) recommended an increase in the internship period from 36 to 52 weeks (2012). On the whole, the internship has been described as a pathway to clinical competence and confidence (Blanzola, Lindeman and King 2004, Deasy, Doody and Tuohy 2011). This concludes the section on the main features and elements of degree nursing education in Ireland. The next section outlines the main features and elements of nursing preparation in Germany, which are considerably different.

2.4 Educational preparation of nurses in Germany

Germany is at the beginning of the transition to degree nursing education. As asserted by Davies (2008) in a historical review, Germany has a tradition of viewing nursing as a practical profession. Subsequently nurse education is by and large based on apprenticeship training (Blum et al. 2006, Robinson and Griffiths 2007). While first degree programmes in nursing commenced in Germany, after a period of pilot programmes (Steffen and Löffert 2010, Bundesministerium für Bildung und Forschung 2014), they did not fully replace apprenticeship training. The current intention in Germany seems to be to continue nurse

preparation at apprenticeship level, while supplementing the health system with small proportions of degree educated nurses (Deutscher Bildungsrat für Pflegeberufe 2006, Wissenschaftsrat 2012). Similar to England in the past (see pages 32-33 for details) the intention is to offer school leavers with different academic strengths an opportunity to gain access into nursing education (Deutscher Bildungsrat für Pflegeberufe 2006, Wissenschaftsrat 2012).

A lack of consensus with regards to the appropriate deployment of degree educated nurses exists in Germany. To this end, the Deutscher Pflegerat (Head of Nurses Associations) and the Deutsche Gesellschaft für Pflegewissenschaft (German Nursing Research Association) published examples of activities for degree and apprenticeship trained nurses in specific patient care scenarios (Deutscher Pflegerat und Deutsche Gesellschaft für Pflegewissenschaft 2014). While these examples might assist in clarifying some of the areas of responsibilities for various staff nurses (at degree and apprenticeship training level), the boundaries between staff and advanced nursing roles appear blurred. For example, degree nurses in the report were allocated the development of clinical policies and guidelines. This could be described as an activity, which falls into the remit of a nursing practice development co-ordinator (Department of Health and Children 2010). The danger of role confusion is, however, mentioned in the report (Deutscher Pflegerat und Deutsche Gesellschaft für Pflegewissenschaft 2014).

According to Einhäupl, who engaged at a round table discussion of the German Scientific Council (2013), the integration of degree educated nurses into the hospital system will be slow due to cost pressures involved with the German Diagnostic Related Groups (German DRGs). Since the introduction of German DRGs the emphasis has been on re-designing the

nursing skill mix to include less expensive, and therefore less qualified, staff (Isfort et al. 2010). The introduction of degree level nurse education may be seen as an unnecessary added cost (Collins and Hewer 2014).

A skill mix case study of the Association of University Teaching Hospitals' Directors of Nursing in North Rhine-Westphalia examined the integration of degree nurses into practice. (Grünewald et al. 2014). Two cases using different skill mix approaches in the care of patients following myocardial infarction showed how degree nurses can be integrated into existing teams in a cost-effective way. Such studies may assist in changing the belief, as described in Fleischman (2013) in her textbook chapter on job opportunities for nurse graduates, that degree nurses are over-skilled and too costly for their roles in direct patient care. Similar to degrees in Ireland, the effectiveness of nurse education possibly depends on the elements and structures of programmes. The following sections discuss the main features of nurse education programmes in Germany.

2.4.1 Features of nurse education programmes in Germany

Similar to Ireland, new degree nurse education programmes in Germany include academic components taught at third level institutions (Deutscher Bildungsrat für Pflegeberufe 2006). The components of nurse education programmes in Germany are currently guided by the training regulations in the Nursing Act, the ‚Ausbildungs- und Prüfungsverordnung für die Berufe in der Krankenpflege‘ (KrPflAPrV) (Bundesministerium für Gesundheit 2003). Degrees are mainly provided by technical colleges in partnership with hospital-based centres for nursing education (Di Luzio 2009). One major difference to Ireland is that nurse education in Germany is currently being reformed into a generalist programme; the content of initially three programmes including general, paediatrics and care of the older person are

merged into one (Steffen and Löffert 2010, Stöver 2010, Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012). In Ireland pre-registration nursing education is branch-specific and includes four separate programmes including general nursing, mental health, intellectual disability nursing and the combined children's and general nursing programme (Nursing and Midwifery Board of Ireland 2015c). The following section outlines the details in regards to the generalist programme in Germany.

2.4.2 Generalist nursing education in Germany

According to the Deutscher Pflegerat (2011) the main reason for the development of a generalist nurse education programme is the need to comply with EU directives. Most EU-countries, including Ireland, have integrated care of the elderly aspects into existing nurse education programmes. For Germany, this is a new departure, as a tradition of a separate care of the elderly programme including a separate job specification existed (Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012). Merging the two programmes (care of the elderly and general nursing) into one does not pose much of a challenge in terms of curriculum content, as they are similar in many parts (Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012). Kristl (2011) predicted in a discussion paper, that the quality of patient care in hospitals will decrease as the elements specific to adult nursing have been reduced to accommodate the aspects relating to care of the elderly. Considering that the duration of 3 years for the generalist programme in Germany is the same as the apprenticeship training in general nursing prior to the merger, Kristl (2011) may have a point. However the prediction so far is anecdotal and may need to be affirmed in future evaluation studies.

The working group Bund-Länder-Arbeitsgruppe für die Weiterentwicklung der Pflegeberufe (2012) stated that the generalist programme shows a commitment to a high quality of care, as student nurses are prepared to care for all age groups across the lifespan. Thus it will assist in creating a more flexible workforce (Deutscher Pflegerat 2011, Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012). A more flexible workforce is apparently required to prevent a shortfall in staff working in care of the elderly (Price Waterhouse Coopers 2010).

Price Waterhouse Coopers, in an economic study, estimated a shortfall of approximately 87,200 care of the elderly nurses by 2030, if no generalist programme is introduced (2010). This estimate, however, relates to North Rhine Westphalia which is only one state in Germany. While it is the largest state in Germany, it also has a large proportion (20%) of elderly people (3.6 million are 65year+) and a low proportion (18%) of young (25-40 years) people (Federal Statistics Office 2012). Some of the shortfall in care of the elderly nurses could perhaps also be compensated by encouraging nurses from states with younger populations such as Bavaria (28%) and Berlin (29%), for example, (Federal Statistics Office 2012) to work in North Rhine Westphalia. However without a mandatory nursing register it is very hard to estimate the size of current proportions of nurses in states with younger populations, and whether or not the shifting of nurses would be an adequate solution for any of the states mentioned here. The integration of paediatric nursing into the generalist programme appears to be based on the recognition of a need to make nurse education programmes more attractive and also to provide care for all age groups across the lifespan (Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012).

Since degree nurse preparation has only been introduced recently in Germany, and as it runs parallel to the apprenticeship training programme, it can be assumed that the current nursing workforce remains largely based on apprenticeship trained nurses. The contribution that apprenticeship trained nurses make in practice may depend on the approaches used during training. In the following sections the main programme elements of apprenticeship training in Germany are discussed.

2.5 Programme elements of apprenticeship training in Germany

Nursing students participating in apprenticeship training form part of the workforce in Germany. Students take clinical responsibility from the beginning of their training (Bundesministerium für Gesundheit 2003). This approach has the advantage that students receive remuneration for the work that they complete during their training, whilst Irish degree students do not receive any pay while on supernumerary placements. Being part of the workforce from the beginning of training may also assist students in developing their level of clinical expertise through real-life practice exposure, which has shown to be a crucial factor in safe and effective patient care (Benner, Tanner and Chelsa 1996, Bobay, Gentile and Hagle 2009). The downside to this approach can be seen when practice opportunities during apprenticeship training are based on hospital needs rather than students' need for learning. This would also contradict the argument put forward by the Commission on Nursing (Government of Ireland 1998) that the onus of practice placements should be on learning.

One of the key objectives in apprenticeship, as outlined in the training regulations KrPflAPrV is to train nurses in the recognition and prevention of disease (Bundesministerium für Gesundheit 2003). In line with this objective are the elements within KrPflAPrV, which relate to the development of a nurse-specific knowledge and skills. These include, for

example, ‘recognizing, recording and assessing nursing situations’ and ‘selecting, implementing and evaluating nursing measures’ (Bundesministerium für Gesundheit 2003). Other parts in KrPflAPrV stipulate that students should be trained to ‘take part’ in medical diagnosis and therapy and to ‘co-operate’ in developing and implementing rehabilitation concepts (Bundesministerium für Gesundheit 2003). This approach appears different to degree programmes in that it fosters the development of subordinate nursing roles. Within the Irish pre-registration degree programme, for example, students are prepared for ‘working together’ with other health professionals (An Bord Altranais 2005). It may therefore be argued that current training regulations in Germany assist in achieving one of the traditional aims of nurse training, which according to Scheckel (2009), is to provide services to hospitals through functions and roles. Future training regulations in Germany may not uphold traditional aims and objectives as those currently in place (Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012).

That there is more of an emphasis in apprenticeship training on the development of subordinate nursing roles is also evident from the breakdown of curriculum subjects in training regulations (Bundesministerium für Gesundheit 2003). In Germany one-quarter of curriculum subjects relate to developing knowledge in related subject areas such as in biological and medical sciences. This is in contrast to one-sixth biological sciences in the Irish degree programme (An Bord Altranais 2005). Nursing sciences account for half of curriculum subjects in Germany, while in Ireland it accounts for two-thirds of curriculum subjects. Subjects related to law, politics and economic are accounted for separately in the German apprenticeship training, which could be interpreted as nursing science subjects if they include nurse-relevant knowledge. Social science subjects in Germany account for one-seventh of the curriculum, whilst it adds up to one-sixth in the Irish programme. Theoretical

and practical elements of the German programme also differ slightly from the Irish programme. The following section provides an overview of the theory and practice elements.

2.5.1 Theory and practice elements

In contrast to Irish degree programmes, the KrPflAPrV refers to a ‘theoretical and practical part’ and a ‘practice training’ part. These terms appear somewhat clearer in that they include theory and practice in the hospital school-based part of the programme. The hours allocated to each part are similar. There are 4,600 total hours for theory and practice in both programmes, showing that both base their hours on the European Union Directives relating to nursing education. The hours in Germany are divided into 2,100 hours for the theory and practical part and 2,500 hours for practice, similar to Ireland (please refer to the following table on page 28 for details). During the practice part of their training, students are supported by preceptors who aim to move them gradually towards exercising professional functions independently (Bundesministerium für Gesundheit 2003). This is also similar to the Irish nurse education approach. Table 1 summarises the points discussed in the text above relating to the structures and elements of apprenticeship training in Germany and degree education in Ireland.

Table 1: Structures and elements of Irish and German nurse education programmes

	German apprenticeship training	Irish degree programme
Focus	Generalist	Branch-specific
Length	3 years	4 years
Programme aims and objectives	<ul style="list-style-type: none"> • To care for all age groups across the lifespan. • To recognise and prevent illness. • To take part in medical diagnosis and therapy. • To co-operate in developing and implementing rehabilitation. • To provide services to hospitals. 	<ul style="list-style-type: none"> • To develop professional knowledge, skills and attitudes necessary to meet the needs of patients who are acutely or chronically ill. • To work together with other health care professionals • To provide services to populations in need.
Hours allocated for theory and practice	Total: 4,600hrs Theory and practice: 2,100hrs Practice training: 2,500hrs	Total: 4,600hrs Theoretical instruction: no less than 1,533hrs Clinical instruction: no less than 2,300hrs Internship: 1,404hrs
Proportions of subjects taught in class	1/2 nursing sciences 1/4 biological and medical sciences 1/7 social sciences Others including law, politics and economics.	2/3 nursing sciences 1/6 biological sciences 1/6 social sciences.
Clinical learning environment	Students part of hospital staff compliment from beginning to end of training.	Supernumerary status for the first 3 years of programme, part of staff compliment in year 4 during 36 week internship.
Clinical learning support structure	Preceptorship	Preceptorship

As mentioned previously in this chapter, preparation at degree level through pre-registration degrees has become the route to register for practice in Ireland. Nurses who trained prior to 2002 by means of diploma or apprenticeship training have the option to upgrade by means of a post-registration degree. Nurses who joined the Irish workforce during an external recruitment drive from 2000-2006 were by and large degree educated (international degree). While a central register providing information on nurse education levels does not exist in Ireland, the proportion of degree educated nurses working in hospitals is presumably large. There might, however, remain a small proportion of apprenticeship trained nurses within the Irish workforce, which may contribute in their own ways to patient-related outcomes.

While degree programmes are increasingly available, the main route to practice in Germany remains apprenticeship training. Programme structures and elements appear similar to the degree. However, the approach is different in that the apprenticeship trains students to assist other health care professionals and to provide services to hospitals. Qualification by degree purports to enable nurses to work together with other health professionals, while responding to the health needs and demands of the population. The approaches to nurse preparation within the two countries under investigation may influence the processes used in the provision of nursing care, which in turn influence patient-related outcomes (Donabedian 2005). The care processes utilised and the patient-related outcomes achieved by nurses trained through apprenticeship and degree programmes are the central areas of examination in this case study. The way in which care is provided may also be influenced by hospital and country-specific contexts. The following section provides an overview of the main contextual features surrounding current nursing practice in Ireland and in Germany.

2.6 The context in which nursing is practiced

The core elements of nursing are not fundamentally different between Ireland and Germany. Both countries define nursing through the ICN as a profession that cares for the ill, disabled and dying people (International Council of Nurses 2010b). According to research carried out in both countries (Ireland and Germany) nursing includes essential care activities such as assistance with hygiene and elimination needs as well as therapeutic interventions including the administration of medications, controlling pain, patient surveillance, providing information and communication (Scott et al. 2006a, Deutscher Berufsverband für Pflegeberufe 2011). The context in which nursing is conducted such as the economy, the delivery of health care and the population is different among European countries (Davies 2008, Collins and Hewer 2014), and this is likely to impact on nursing practice. The following paragraphs outline the contextual setting in Ireland and Germany in relation to nursing and nurse education.

2.6.1 The economy and population

At the time of writing this chapter, Ireland is recovering from an economic recession, which began in 2007. The recession led the Government of Ireland to introduce a strict Austerity Plan (Government of Ireland 2010), which affected nursing through cutbacks in nurse staffing of approximately 7%. The Austerity Plan aimed at reducing nurse staffing levels from 36,782 Whole Time Equivalent (WTE) in 2011 to 34,313 WTE in 2015. Germany underwent similar cutbacks in nursing staff following the reformation of the hospital sector; hospital nurse staffing levels were reduced by 14.2%, which accounts for approximately 50,000 nurses (Isfort et al. 2010).

The reduction of nurse staffing in Ireland was achieved through an early retirement scheme, non-replacement of staff on maternity leave and through an embargo on the recruitment of new staff (Government of Ireland 2010). The recruitment embargo appears to have forced large proportions of Irish nurse graduates to leave the country. Furthermore, places for general nursing education were reduced by approximately 18.5% (197 places) from 1,057 in 2007, to 860 from September 2009 onwards due to the economic downturn (Health Service Executive 2009b). All these factors are likely to have added to the challenging working conditions of hospital nurses in which they are expected to provide high quality patient care.

The reduction in nurse staffing and nursing education places took place at a time when the population in Ireland continued to grow from 4,239,848 people in 2006 to 4,609,600 people in 2014 according to the *Statistical Yearbook* of the Central Statistics Office (CSO). This was different in Germany where the population fell during the time when nurse education places were cut back by 10% to 62,486 (Isfort et al. 2010). The population of Germany has slightly decreased over the past years from 81,752,000 in 2011 to 81,083,600 in 2014 according to the figures of the Federal Statistics Office (FSO) (Federal Statistics Office 2015). There has also been a birth deficit for some time where every year more people die than are born, in Germany (Federal Statistics Office 2015).

In terms of the population, Ireland is said to be unique in Europe in that there is an overall rise in the size of population despite the recent economic recession and despite the growing proportion of elderly people living within the country (Thomson, Jowett and Mladovsky 2014). The population aged 65 and over was approximately 11% in 2007, which is said to rise to approximately 13% in 2016. In Ireland there are stable fertility and moderating immigration rates (Thomson, Jowett and Mladovsky 2014). This could be of benefit to

nursing as the supply in population through inward migration and natural growth might cover the demands for care of the elderly.

In contrast, in Germany approximately one fifth of the population (21%) is currently aged 65 years and over, which is predicted to rise to one third (33%) of the population in the future (Statistisches Bundesamt 2015). Births, as in fertility rates, have decreased and are currently below the rate necessary for natural reproduction of the population at 1.4 (Statistisches Bundesamt 2015). For nursing in Germany this could result in various issues. Firstly, it could imply that fewer nurses will have to care for larger proportions of elderly patients, who are likely to have complex levels of health needs and increased numbers of diagnoses. Nurses' working conditions might intensify, if patients require more advanced interventions as a result.

As the population ages, it is likely that the nursing workforce is aging too. The Deutsches Institut für angewandte Pflegeforschung reported approximately 5 years ago in their national study that approximately one third 32% of 9,719 German hospital nurses were aged 50 years and over (Isfort et al. 2010); a number which is likely to have increased since. This could lead to staff being physically and emotionally more vulnerable and less able for roles involving direct patient care, as has also been shown in the Nurse Early Exit Study conducted by Hasselhorn, Müller and Tackenberg (2005). A decline in birth rates, and therefore in the younger population, could also imply that there will be fewer applicants to existing nursing education programmes in the future. This in turn could affect Germany in that they may have to rely on international recruitment to subsidise the nursing workforce. Immigration into Germany, however, is increasing which may help in regards to the recruitment of nurses with qualifications from abroad (Statistisches Bundesamt 2015). Another positive aspect in

Germany is that the economy has been stable for the past number of years (Federal Statistics Office 2015).

2.6.2 Delivery of health care

In Ireland, the State plays a major role in the delivery of health care. The Department of Health, headed by the Minister of Health, is responsible for the formulation and evaluation of policies for the health services. The Health Service Executive (HSE) is responsible for financing, managing and delivering hospital services. The economic crisis has had a profound impact on hospital services in Ireland. The Government's efforts to manage public expenditure has seen budget reductions in health care of €3.3bn (22%) since 2008 (Health Service Executive 2013). This led to the proposal for a new financial management system, which includes rewards for workforce and skills development (Health Service Executive 2013).

Health care in Ireland including out-patient, day-care and in-patient services is mainly provided through hospitals. This is similar to health care services in Germany. Although home healthcare services, semi-stationary and community-based services are common in Germany, the most important single health care facility remains the hospital (Eckert 2011). According to the 'The Transformation Programme' (Health Service Executive 2007), future Irish health care delivery will be based on community services; a change that is likely to impact on nursing. The focus on community and home healthcare services may require nurses holding wide-ranging skills and knowledge-bases to serve a variety of settings and populations. On a policy level, the delivery of health care in Ireland and in Germany differs substantially, as is shown in the following text.

Apart from the State (Bundesministerium für Gesundheit) and the Minister of Health (Bundesminister für Gesundheit), statutory health insurance plays a central role in Germany (Busse and Riesberg 2005, Eckert 2011). According to the National Association of Statutory Health Insurance Funds (GKV-Spitzenverband 2014) roughly 90% of the German population is covered by health insurance, which is utilised for financing hospital care (Busse and Riesberg 2005, GKV- Spitzenverband 2014).

The Scientific Council (Wissenschaftsrat) advises the Federal Government on all matters relating to the development of the higher education system, including the planning of individual areas and subject matters such as nursing. While there are various parliamentary state secretaries and permanent state secretaries within the Federal Ministry of Health in Germany, none of them appear to have a background in nursing. Currently there appears to be one member of the Scientific Council with a background in nursing (Wissenschaftsrat 2015). There are a number of associations, who view their function in representing the interest of its nursing members at policy level. Two of the main associations are the Deutscher Pflegerat (DPR) and the Deutscher Berufsverband für Pflegeberufe (DBfK). None of these associations appear to have a seat on the Scientific Council or within the Federal Ministry of Health. One of the items on the agenda of the German nurses associations is the establishment of a national nursing board, which currently does not exist in Germany (Deutscher Berufsverband für Pflegeberufe 2015a). The other item on the agenda is increasing professionalism in nursing through degree level education (Deutscher Berufsverband für Pflegeberufe 2015a), which is also promoted through the Deutscher Bildungsrat für Pflegeberufe (Deutscher Bildungsrat für Pflegeberufe 2006).

In comparison, Ireland has three nurses of the Nursing and Midwifery Board appointed by the Minister of Health to advise on nursing related issues (Nursing and Midwifery Board of Ireland 2015d). Decision making at policy level in regards to nursing issues, including nurse staffing and education, may therefore be more effective in Ireland compared to Germany. In Ireland the Nursing and Midwifery Board regulates nurse education at policy level, which ensures that educational standards are available on a national level (Nursing and Midwifery Board of Ireland 2015e). In addition, the Chief Nursing Officer in Ireland is appointed at Assistant Secretary level, which is one of the more senior appointments in the Irish Civil Service (Top Level Appointments Committee 2011/12). This post is designed to ensure that the nursing perspective is brought to bear on the development of policy (Department of Health 2013). As such, in Ireland the profession itself holds a stronger political influence over nursing and nurse education issues, compared to Germany.

Table 2, on the following page, summarises the information discussed in this section relating to the economy, general population and the delivery within the context of nursing and nurse education. Citations are based on relevant abbreviation such as, for example, CSO for Central Statistics Office and FSO for Federal Statistics Office for the purpose of space reduction.

Table 2: Economy, population and delivery of health care

Item	Ireland	Germany
Economy	Recovering from recession (CSO 2014)	Stable economy (FSO 2015)
In relation to nursing and nurse education	<ul style="list-style-type: none"> • Large proportions of newly qualified nurses had to emigrate • Nursing staff cutbacks during time of increase in general population • Nursing education places reduced by 18.5% (197 places) to 860 (HSE 2009). 	<ul style="list-style-type: none"> • Previous nursing staff cutbacks during time of decrease in general population • Nursing education places reduced by 10% to 62,486 (Isfort et al. 2010).
Population	<p>4,609, 600 (CSO 2014)</p> <ul style="list-style-type: none"> • Population increased (CSO 2014) • Increase in older and younger population <ul style="list-style-type: none"> ○ Population 65 years and over 11% (WHO 2014). ○ Fertility rate 2.1 (CSO 2011a, 2011b). ○ Moderating levels of immigration (WHO 2014). 	<p>81.083,600 (FSO 2015)</p> <ul style="list-style-type: none"> • Population decreased (WHO 2014) • Increase in older population, decrease in younger population. <ul style="list-style-type: none"> ○ Population 65 years and over 21% (FSO 2015). ○ Fertility rate 1.4 (Statistisches Bundesamt 2015). ○ Immigration levels increasing (Statistisches Bundesamt 2015).
In relation to nursing and nurse education	<ul style="list-style-type: none"> • Intensified working conditions due to increased numbers of older and sicker patients, and due to economic pressures. • Stable numbers of applicants for nurse education programmes from within Ireland and from abroad. 	<ul style="list-style-type: none"> • Intensified working conditions due to increased numbers of older and sicker patients. • Declining numbers of applicants from within Germany for nurse education programmes. • Might require nurses from abroad.
Delivery of health care	<p>State through the DoH, headed by Minister of Health who appoints 3 members of NMBI.</p> <ul style="list-style-type: none"> • 30% of population covered by insurance, 70% pay out of pocket or have private insurance • Main health care facility is the hospital including out-patient, day-care and in-patient services. <ul style="list-style-type: none"> ○ Development of community services (DoH 2012). • NMBI regulates nursing and nurse education. 	<p>State through Federal Ministry of Health headed by Minister of Health, very limited nursing representation.</p> <ul style="list-style-type: none"> • 90% of population covered by statutory health insurance (GKV-Spitzenverband) • Main health care facility is the hospital. <ul style="list-style-type: none"> ○ Home healthcare services, semi-stationary and community-based services (Eckert 2011). • National Nursing Board not established.
In relation to nursing and nurse education	<ul style="list-style-type: none"> • Political influence over nursing and nurse education issues from within the profession. • May require nurses with wide-ranging skills and knowledge-bases to serve a variety of settings and populations. 	<ul style="list-style-type: none"> • Less nurse representatives at political level may weaken decision making in regards to nursing issues including nurse staffing and education. • May require nurses with wide-ranging skills and knowledge-bases to serve a variety of settings and populations.

2.7 Conclusion

The core elements of hospital nursing are not fundamentally different between the two countries Ireland and Germany, but the context in which nursing is conducted varies in some ways. In particular the current state of the economy and the delivery of health care are somewhat different. Ireland is recovering from recession, which included an embargo on nurse recruitment and a reduction in places for nursing education programmes. Germany has a stable economy, but has experienced similar cuts in nurse staffing and nurse education places in previous years. The reduction of nurses and nurse education places is likely to have intensified working conditions for those currently in practice in both countries.

The delivery of health care appears to be more strongly influenced by representatives from within nursing on a policy level in Ireland, compared to Germany. Both countries are experiencing a rise in the aging population, although in Ireland there is a steady growth in the young population also, through births and immigration. Changes in population and the shift in the delivery of health services from hospitals to community services in both countries are likely to demand nurses with wide-ranging skills and knowledge-bases. The following section outlines the literature in regards to the impact of nurse education and factors other than nurse education on patient outcomes.

CHAPTER 3: LITERATURE REVIEW

3.1 Introduction

This chapter reviews the literature relating to the contribution of nurse education towards improved patient outcomes and patient satisfaction with nursing care. There are three main objectives in this review:

- 1. To examine the links between nurse education and improved patient-related outcomes.**

The existing research evidence in regards to the role of nurse education towards improved patient outcomes and patient satisfaction with nursing care will be critically examined for their methodologies, findings and underlying assumptions with a view to identifying strengths and shortcomings in the literature. Part of this section also includes a review of the skills developed during nurse education programmes. The idea behind this is that these skills may play a role in the provision of care. Apart from this goal, the literature review is also intended:

- 2. To evaluate the outcome measures applied in previous nurse education research.**

Throughout the review the various types of patient outcome measures, which have been utilised in previous research literature, will be critically reviewed. The positive and negative sides of outcome measures will be assessed, and their applicability to nursing research discussed. The final objective of this review is:

- 3. To identify the factors other than nurse education, which contribute to patient-related outcomes.**

Factors relating to nurse staffing, the managerial context of care and working conditions, which have been shown to influence nursing and the care of diversely educated nurses, will be identified from the existing literature. Hospital structures and patient characteristics, which have been shown to influence care, will be examined also. This part of the review will assist in developing a map of the factors, apart from nurse education, which are relevant to the subsequent case study.

3.2 Search Strategy

The literature in both English and German language was searched for this review. The literature published between 2000 and 2015 was searched using electronic databases including the Cumulative Index of Nursing and Allied Health Literature (CINAHL), Science Direct, The Cochrane Library, Google 'Scholar', the Journal of the American Medical Association (JAMA) and the British Medical Journal (BMJ). Keywords such as 'nurse' AND 'education' OR 'education levels', 'degree' OR 'bachelor's' OR 'baccalaureate', 'new graduates' OR 'graduate', 'diploma' OR 'apprenticeship' OR 'training' were used for the search.

Other keywords included 'competence' OR 'critical thinking' AND/OR 'decision making'. Keywords in relation to patient outcomes included 'mortality' AND/OR 'failure to rescue', 'quality of care', 'safety', 'falls' OR 'urinary tract infection' AND/OR 'pressure sore' OR 'pressure ulcer' OR 'medication' OR 'medication administration' OR 'medication management' AND/OR 'error', 'nurse-reported' AND 'nurse-sensitive' OR 'patient outcomes', and 'patient satisfaction' AND 'nursing' OR 'nursing care'. Scanning of the reference lists at the end of research articles produced more, sometimes older sources of literatures.

Another set of keywords related to the factors other than nurse education that contribute to improved patient outcomes. These included 'nurse staffing' OR 'nurse-to-patient ratio' OR 'patient-to-nurse ratio' AND 'patient outcomes' OR 'patient satisfaction'. In addition, the keywords 'workload' AND 'nursing' OR 'degree' OR 'nurse education', 'nursing duties' and 'non-nursing duties' were searched for research studies. Key words such as 'practice environment', 'work environment', 'nurse-physician relationship' and 'working relationship',

‘overtime’ and ‘working conditions’ and ‘long shifts’ were searched in regards to nursing and nurse education for hits on databases.

International reports were mainly sourced from the World Health Organisation and International Council of Nurses websites, and from the online search engine Google ‘Web’. Reports from the Health Service Executive and the Nursing and Midwifery Board of Ireland websites also provided some Irish national data related to nurse education. Some German websites such as the ones of the Deutscher Berufsverband für Pflegeberufe and the Federal Ministry of Health were searched for local reports relating to nursing education. Other, mainly German, sources were obtained through personal contacts. Some relevant textbooks examining the changes in nurse education were also found through electronic searching. In addition, a manual search of relevant textbooks, journals, reports, and the ‘grey literature’ was conducted. The publications sourced during this search were read and examined for this review.

3.3 The role of nurse education in improving patient-related outcomes

One of the initial studies in this area, namely Aiken et al. (2003) ‘*Educational Levels of Hospital Nurses on Surgical Patient Mortality*’ will be reviewed in greater detail at the beginning of this chapter, as its design and methodologies underpinned many of the subsequent studies reviewed. Subsequent studies, relating to the role of nurse education and relating to the skills developed through nurse education programmes, will be reviewed in a more cumulative manner. The final section of this literature review relates to the research which examined the factors other than nurse education, which impact on patient outcomes and patient satisfaction with nursing care. An increased research interest in the contribution

of nurse education towards quality patient care was evident from the beginning of the millennium.

3.3.1 Initial studies on nurse education

One initial cross-sectional survey study was conducted by Needleman et al. (2002a), who examined the contribution of nurse staffing towards quality hospital care. Findings showed that higher proportions of hours of nursing care provided by registered nurses were associated with improved patient care, which Needleman et al. (2002a) attributed to high levels of nurse education. The education levels of nurses participating in this study were not specifically identified. Rather the term ‘registered nurse’ was used as a proxy for nurse education.

Aiken et al. (2003) were probably the first team to specifically examine the contribution of nurse education towards patient outcomes in another cross-sectional survey study. They investigated a large sample of 10,184 nurses and linked the data to 232,342 administrative patient discharge sets from 168 general hospitals in Pennsylvania (Aiken et al. 2003). Findings showed that a 10% increase in the proportion of degree level educated nurses was associated with a 5% decrease in the likelihood of patients dying from complications (Failure-To-Rescue) or dying within 30 days of admission (mortality). Based on these results Aiken et al. (2003) advised that hospitals should strive towards employing 60% of degree educated nurses. The odds of mortality and Failure-To-Rescue (FTR) were found to be 19% lower in hospitals where 60% of nurses had a degree, compared to the hospitals which employed 20% of degree educated nurses (Aiken et al. 2003). The methods and approaches utilised in their study had strengths and shortcomings, which are discussed in the following sections.

3.3.2 Strengths and shortcomings of initial studies of nurse education

Aiken et al.'s (2003) study provided a crucial first piece of evidence in regards to the potential impact of degree nurse education on clinical practice. Their work was innovative in that they recognised nurse education as an indicator for clinical competence and for quality of care. One of the shortcomings in Aiken et al. (2003) related to the statement that '*all else being equal*' (p.1620) mortality and FTR rates were decreased by employing larger proportions of degree educated nurses. It may be difficult to find a situation in reality where all else, except nurse education, is equal. There may be many other factors relating to nurse characteristics and working conditions, which influence degree educated nurses' contribution towards improved mortality and FTR rates.

In their study, Aiken et al. (2003) ensured that some factors such as hospital structures (size, teaching status and level of technology) and nurse staffing were adjusted prior to linking nurse education to patient outcomes. Hospital structures have been shown to be important factors in health care research. Hospital size, for instance, has been found to influence the type of patients admitted. For example, hospitals with over 200 beds were more likely to admit larger proportions of patients with complex care needs compared to hospitals with less than 200 beds in a study conducted by Ghaferi et al. (2010). They used data from a 2000 to 2006 Nationwide Inpatient Sample and the American Hospital Association annual survey to examine the effects of hospital structures on patient outcomes.

Similarly high technology hospitals, such as those carrying out organ transplantations and open heart surgery, have been shown to care for more complex patients compared to low technology hospitals. Technology status has been shown to affect patient outcomes (Silber et al. 1992, Ghaferi 2010). Teaching status was associated with lower patient mortality and FTR

in Ghaferi et al. (2010), suggesting higher quality of care in university hospitals where specialist medical training was offered. Whilst the availability of specialist medical training might have limited influence over nursing, it could mean that there is a difference in patients between teaching and non-teaching hospitals. Anecdotal evidence suggests that university teaching hospitals attract sicker patients (Iezzoni 2003). This may be due to teaching status, particularly if specialist medical training is provided.

Another issue relates to the aggregation of responses, which meant that nurse education levels at 'degree or higher' were grouped together (Aiken et al. 2003). The aggregation of responses could have masked the true impact of degree educated nurses, as the sample would have included degree, masters and doctoral level educated nurses. Education levels in the sample of nurses in Aiken et al. (2003) should have been similar to that of US Department for Health and Human Services (2000) national sample; both sets of data were collected in 1999 and included the State of Pennsylvania. The US Department for Health and Human Services (2000) sample consisted of up to 10% of nurses with master's or doctoral degrees. Although the proportion of master's and doctoral degrees may have been small, it is suggested that the aggregation of responses into 'degree or higher' should not have been used to generalise findings to a target population of degree level educated nurses. Instead an additional part to the question could have assisted in determining the post-degree education status such as masters and doctoral degrees in this sample of nurses.

The aggregation of responses into 'degree or higher' also has a minor application to Ireland where, according to the *Report of the Post-Registration Nursing and Midwifery Education Review Group* (Health Service Executive 2008a), 0.5% (n=286) of nurses and midwives were enrolled for master's or doctoral degree programmes. The proportion of nurses holding

postgraduate qualifications might have grown since the collection of data for the report in 2007. It should be noted also that a central register for nurse education levels including postgraduate qualifications (such as master's and doctoral degrees) does not exist in Ireland, nor does it exist in Germany. This makes it difficult to estimate exact figures in regards to the percentages of nurses in Ireland and in Germany who hold postgraduate qualifications. In Germany, there were 79 master's programmes available for nurses during a recently conducted nation-wide inquiry (Ullmann and Lehwaldt 2013). In subsequent publications such as Aiken et al. (2008), Kutney-Lee, Sloane and Aiken (2013) and Aiken et al. (2014) the response for nurse education level was changed to 'degree' without the additional part '... or higher', which seems clearer in describing the target population.

Although Aiken et al. (2003) collected data on various levels of nurse education, findings were limited to predicting the contribution of 'degree or higher' level educated nurses. The full range of nurse education levels including apprenticeship training, and the various types of degrees was not explored. This was despite an average of more than 60 nurses per hospital who completed survey questionnaires (Aiken et al. 2003). There may have been a focus on degree or higher educated nurses, as there was a higher socio-economic status associated with them. Some of the research literature reviewed later in this chapter suggests that other education levels may also contribute positively to practice.

Another shortcoming in Aiken et al. (2003) was the way in which a random sample of nurses was linked to specialty-related patient outcomes. The use of a random sample implies that nurses surveyed could have been from any clinical area, particularly as no exclusion criteria were published in the report. The only aspect, which was communicated in terms of the composition of the random sample, was that they were hospital nurses. This is also shown in

their publication where Aiken et al. (2003) stated that a random sample of registered hospital nurses residing in Pennsylvania and on the register of the Pennsylvania Board of Nursing was taken.

In contrast to the random nurse sample, outcomes utilised in the study related to general surgery, vascular and orthopaedic surgery patients (Aiken et al. 2003); thus they were taken from a specific clinical field. Aiken et al. (2003) specified in the report that they developed their analytical approaches based on previous outcomes research conducted by a team of physicians from Pennsylvania (Silber, Rosenbaum and Ross 1995). Silber, Rosenbaum and Ross (1995) justified that their selection of surgical patient outcomes was based on the most common procedures performed by surgeons of participating hospitals. This implies that samples and patient outcomes in the original research matched specialty. This approach appears to have been lost in transition to the study conducted by Aiken et al. (2003), where a random hospital nursing sample was applied to surgical patient outcomes.

This approach implies that nurses working on, for example, stroke units could have contributed to surgical patient outcomes. This appears highly unlikely, and is probably not what the researchers intended to imply. To increase the validity of findings, nurses working in general surgical areas and the impact of their educational preparation on surgical patient outcomes should have been the sole focus of the study (Boggs 2004). In addition, the selection of a purposeful sample could have perhaps prevented some of the mismatch between nurse and patient specialty in Aiken et al.'s (2003) study. Aiken et al. (2004) defended their sampling methods in a subsequent discussion paper, where they claimed that when measures were derived from only general medical and surgical nurses the effect of education was still significant.

As the outcomes selected in Aiken et al. (2003) represented a specific group of patients, findings cannot be applied to larger patient populations (Polit and Beck 2009). Most patient diagnoses in Ireland and Germany relate to medical conditions including respiratory, cardiovascular and neurological conditions as shown by a report of the Economic and Social Research Institute of Ireland (ERSI) and the statistics published by FSO (Economic and Social Research Institute of Ireland 2010, Federal Statistics Office 2015). Additional research focusing on the contribution of nurse education towards improving medical patients' outcomes would perhaps be of value, given the contextual circumstances in regards to medical diagnoses in European countries such as Ireland and Germany. Some subsequent studies focused on medical specialty, and these will be discussed later in this chapter (please refer to page 52 for details). The implications of Aiken et al.'s (2003) study to Ireland and Germany (and elsewhere) are also unclear in regards to correlation between variables, as is outlined next.

A re-analysis of data conducted by Viterito (2006) affirmed the strong relationship between the variables 'degree level or higher' educated nurses and patient 'mortality', as previously identified as one of the main findings by Aiken et al. (2003). A strong relationship, however, was also found between the variables 'average patient age' and 'mortality'. This additional correlation introduced multicollinearity, which Viterito (2006) suggested, should have been corrected and controlled for.

A key assumption in regression analysis, such as utilised in Aiken et al. (2003), is that variables included in the statistical model are not highly correlated with each other (Hair et al. 2010). If multicollinearity such as a correlation between independent variables exists, the statistical model becomes invalid unless the problem is rectified (Hair et al. 2010). Average

age is one of the key patient factors, as well as the number of diagnoses, which need to be sufficiently controlled in order to prevent misinterpretation of findings (Silber et al. 1992, Siber, Rosenbaum and Ross 1995, Ghaferi et al. 2010). Average patient age is also an important covariant for studies conducted in other parts of the world such as Ireland and Germany.

In Ireland, for example, a rise in mortality was reported for the age group 55-64 years (Central Statistics Office 2011a, 2011b), suggesting that the two factors (mortality and age) may be linked to each other. These ages are also close to the lowest average age of 57.3 and the highest average age of 61.3 years in Aiken et al.'s (2003) study. Hair et al. (2010) suggested that a remedy for multicollinearity could be found in using a more sophisticated method of analysis such as Bayesian regression. This may also be the reason for some subsequent studies using this method of analysis in related nursing research (Diya et al. 2012, Boyle, Gajeswski and Miller 2012, Choi and Staggs 2014).

Utilising Bayesian regression, whereby a prior distribution of variables is assumed (Hair et al. 2010) could have assisted Aiken et al. (2003) in obtaining a model that more clearly reflected the interactions of patient 'age' and 'nurse education' level. Aiken et al. (2003) demonstrated in their paper that they controlled for more than 130 patient and hospital factors including age. Hence it could be argued that the correlations between nurse education level and mortality, the main variables of interest, should be viewed as the *net effect* of all of these factors (Aiken et al. 2004). Yin (2003, 2009) suggested that studies examining relationships often struggle to control factors correlated with the subject under investigation. Case studies are particularly well suited for the examination of complex phenomena, as they take related factors into account rather than trying to reduce them. Hence a case study could have been

another potential design, which could have assisted in overcoming the issue related to multicollinearity.

Aiken et al. utilised a case study approach in a study published at a later date (2008). The case study was primarily used to measure the impact of work environment improvements on quality of care in a single hospital in England. The design of the study included cross-sectional surveys of nurses employed at the hospital at two points in time (n=128, n=109), before and after the implementation of Magnet standards. While the proportion of degree nurses did not change dramatically over the course of a 2-year period, the study showed an improvement in education opportunities during the time of the study. Parallel to this finding, a significant increase was observed in the proportion of nurses reporting that care quality had improved. In the year 2000 23% of nurses said that care was improving, and this figure rose to 40% when nurses were re-surveyed in 2002. While this study demonstrated the usefulness of a case study approach, it was limited by the lack of comparative cases (Aiken et al. 2008). Comparative cases could have shown a similar improvement in educational opportunities for nurses in other hospitals across England, but without the same observation in regards to improvements in quality care.

Despite its methodological drawbacks, Aiken et al. (2003) demonstrated that degree educated nurses have an important role to play in the provision of safe and effective patient care. Their pioneering work has been recognised internationally and cited in numerous related nursing publications (Lang et al. 2004, Rassin and Silner 2007, Sun-Hyun, Jeong and Jaiyon 2008, Van Den Heede et al. 2009b, Twigg et al. 2011, Twigg, Gelder and Myers 2015). Their study may have also served as a catalyst for the Institute of Medicine (IOM) in their call for a ratio of 60% degree level educated nurses in North Carolina (2004). The IOM referred to the

results of Aiken et al. (2003) in their report (Institute of Medicine 2004). Other policy implications were outlined in Bernier (2004). Recommendations included a re-examination of the entry requirements for nursing in Pennsylvania and the possibility of a provisional licence for diploma and degree educated nurses in New York. However these recommendations do not appear to have been implemented (Pennsylvania Centre for Health Careers 2004, New York State Education Department 2010). Subsequent studies examining the contribution of nurse education towards patient outcomes were published in the USA. They are discussed in the following section.

3.3.3 Subsequent studies on nurse education

Aiken and her teams conducted a number of subsequent studies within the field of nursing education (Aiken et al. 2008, Aiken et al. 2012, Kutney-Lee, Sloane and Aiken 2013, Aiken et al. 2014). One of the methods that did not change from the initial study (Aiken et al. 2003) was the use of a cross-sectional design. The use of a cross-sectional design provided only one set of data at one point in time, which implies that data could not be used to infer causation of the relationship found (Rindfleisch et al. 2008) between nurse education and patient outcomes. The cross-sectional design, however, proved useful in creating awareness of the contribution of degree level educated nurses towards safe patient care.

Some more studies involved Aiken and her team. These focused on the contribution of degree education towards improved surgical oncology patient outcomes (Friese et al. 2008) and on the contribution of nurse education towards enhanced patient outcomes in surgical patients with comorbid serious mental illness (Kutney-Lee and Aiken 2008). The latter, however, did not show statistically significant results.

In another related study, Kendall-Gallagher et al. (2011) analysed a large sample of 28,598 nurses in a survey across California, Florida, New Jersey, and Pennsylvania. Survey data were correlated with surgical patient mortality. Methods and findings were similar to Aiken et al. (2003). They showed that every 10% increase in the percentage of degree nurses or higher was associated with a 6% decrease in the odds of general, orthopaedic and vascular surgical patients dying. One difference to Aiken et al. (2003) was that Kendall-Gallagher et al. (2011) also measured the impact of the proportion of nurses with speciality certification (with and without degree or higher) towards improved patient outcomes. Findings showed that every 10% increase in the percentage of degree nurses or higher, who also had speciality certification, was associated with a 2% decrease in the odds of surgical patient mortality. The percentage of associate degree and diploma nurses with speciality certification did not show a decrease in the odds of surgical patients dying. et al.No details in regards to the length or depth of speciality certifications were reported in Kendall-Gallagher et al. (2011) other than that data excluded American Heart Association competencies (such as Cardiopulmonary Resuscitation, Advanced Cardiac Life Support and Paediatric Advanced Life Support).

In a preceding paper, Kendall-Gallagher and Blegen (2009) examined the relationship between specialty certification of critical care nurses and patient outcomes in a cross-sectional survey conducted in 29 hospitals across the USA. They correlated specialty certification with nurse-reported patient outcomes, using a unique outcomes measure to explore the topic. Nurse-reported patient outcomes in Kendall-Gallagher and Blegen (2009) included medication administration errors, patient falls with injury, pressure ulcer development, and 3 types of hospital-based infections. No significant correlations were found between specialty certification and nurse-reported patient outcomes except for patient falls,

which showed an inverse relationship. The idea of nurse-reported patient outcomes in nurse education research is discussed below.

3.4 Nurse-reported patient outcomes

Further research affirmed the suitability of nurse-reported patient outcomes in nursing education research (Irvine, Sidani and McGillis Hall 1998, Irvine Doran et al. 2002, Golubic et al. 2009). Smith and Crawford (2003) examined, for example, the care activities adversely influenced through nurse education by means of nurse-reports. They found that only a small proportion of 19% of 655 sampled pre-registration degree educated nurses felt prepared for administration of medications. While this study did not attempt to measure the impact on patient care, it provided insights into nurses' views on their care processes, which could be understood as indicators for quality of care.

One possible explanation, for the limited utilisation of nurse-reports in research examining the link between nurse education and patient outcomes, might be perceived triviality. There seems to be more of an urgency attached to research that identifies a link between nurse education and mortality. In addition, nurses may be reluctant to report adverse patient outcomes (Fitzgerald, Cawley and Rowan 2011, Spence Laschinger 2014), perhaps out of fear of repercussion. Another reason for the underutilisation of nurse-reported patient outcomes was identified by Lucero, Lake and Aiken (2010) in their study on unmet nursing care. They found that nurse-reported patient outcomes varied considerably across their sample of 10,184 nurses, which probably created difficulties in the interpretation of results.

According to Kingston et al. (2004) and Evans et al. (2006) nurses are, however, more likely to report adverse patient outcomes in comparison to physicians. The use of nurse-reported

patient outcomes, despite their limitations, have become more widespread in research examining the impact of wider nursing issues on patient outcomes (Aiken et al. 2007, Thomas-Hawkins, Flynn and Clarke 2008, Stone et al. 2007, Lake et al. 2010, Trinkoff et al. 2011, Flynn et al. 2012, Witkoski-Stimpfel et al. 2013, Kelly et al. 2013, Henry 2014). These studies included nurse-reports mainly for patient outcomes related to medication errors, patient falls, nosocomial infections, and quality of care in general. This indicates an emergent significance of the utilisation of nurse-reported patient outcomes in nursing research, which could be extended to nurse education research. Much of the nurse education research sourced for this study continued a focus on measuring mortality, which is also shown in the section below relating to studies conducted outside of the USA.

3.5 Studies conducted outside the USA

Sasichay-Akkadechananunt, Scalzi and Jawad (2003) conducted another cross-sectional study on the role of nurse education and linked it to mortality. Their analysis included 425 nurses, and seven medical and ten surgical wards in Thailand. Findings did not show correlations between degree educated nurses and patient mortality, which may have been due to the lack of variability within the sample. Large proportions of 93-97% of participating nurses held a degree.

Two Canadian studies reported positive associations between the care received from degree educated nurses and patient outcomes; although this was not the primary focus of their research. They used similar approaches to the previous study from Aiken et al. (2003) such as a cross-sectional survey design, but their focus was on medical specialty. Estabrooks et al. (2005) reported that degree level education data received from 6,526 nurses surveyed were

associated with lower mortality rates (OR 0.81, 95%, CI 0.68, 0.96). They included patients from five DRGs, including myocardial infarction, congestive heart failure, chronic pulmonary lung disease, pneumonia and stroke, in the study. Similarly Tourangeau et al. (2007) found in another study that a 10% increase in the proportion of degree level educated nurses was associated with 9 fewer deaths for every 1,000 medical patients after myocardial infarction, stroke, pneumonia and septicaemia.

In another cross-sectional survey study, Tourangeau et al. (2007) struggled with similar issues as Aiken et al. (2003) in that their findings only explained 45% of variance in patient mortality. The aim of Tourangeau et al.'s (2007) study was to report on the structures and processes of hospital care that influenced patient mortality for acute medical patients. The recurrent issues in regards to variability signal the need for methodologies which take into account the multifaceted working conditions of nurses. According to Donabedian (1988) one of the challenges in health care research is to find a way to understand the influence of the multiple factors that make up each individual care environment, and this is likely to differ across hospitals and countries.

Tourangeau et al. (2007) considered hospital factors, the use of care plans, as well as patient and nurse demographical, and physician-related data in their study. Since the study took into account physician-related data, it is suggested that an examination of the interactions between generalists (general medical physician) and specialists (for example cardiologist, neurologist and clinical microbiologist) could have provided additional insights. In particular, the contribution of generalist compared to specialist physicians towards decreased patient mortality could have been explored. Such an exploration could have also helped in explaining some of the missing 55% variance in the study data.

Van den Heede et al. (2009a) published what appears to be one of the first European studies investigating the contribution of 1,403 degree educated nurses towards improved patient outcomes across 115 Belgian hospitals. Findings did not show significant correlations, which the researchers attributed to data being analysed at the hospital level. In a subsequent study Van den Heede et al. (2009b) analysed data from 9,054 patients from two sets including the Belgium Nursing Minimal Dataset and the Belgium Hospital Discharge Dataset at the unit level. Nurse education levels were measured by the proportion of registered nurses holding a degree in each of the 58 intensive care and 78 cardiac units. Findings showed that degree level education was associated with lower patient mortality in the cardiac units, which may have been due to a more varied nurse education sample in this area. Most (95%) of nurses in intensive care held a degree, while a smaller proportion (69%) of nurses working on cardiac units held a degree.

Van den Heede et al. did not attempt any comparisons between education levels (Van den Heede 2009a, Van Den Heede 2009b), although Belgium hospitals evidently employ nurses at degree and apprenticeship level (Robinson and Griffiths 2007). Van den Heede et al. (2009a) argued against analysing different education levels in their publication, as limited differentiation is made in the clinical responsibilities of hospital nurses. They argued that professional duties are similar regardless of which programme a nurse working in a hospital has undertaken. One of the studies discussed in this chapter contradicts this argument in that it showed that patient outcomes may differ even if duties among diversely educated nurses are similar (Kendall-Gallagher et al. 2011). Further research conducted in Europe showed differences between degree and apprenticeship trained nurses. Golubic et al. (2009) compared 1086 Croatian hospital nurses' work ability. Of those sampled, 27% (n=290) had a degree and 73% (n=796) were apprenticeship trained. Apprenticeship training was one of the factors

predicting low work ability. This suggests that apprenticeship trained nurses, despite having similar responsibilities in practice, are less able to satisfactorily complete their work with regards to current work demands and resources. The following section reviews the literature with regards to the contribution of diversely educated nurses.

3.6 Studies examining the contribution of nurses with different educational background

One set of studies identified for this review focused on foreign trained nurses working in the USA. Foreign trained nurses, in these studies, were nurses who had obtained their degree internationally, rather than in the country where they practiced during time of data collection. Nurses holding an international degree form a small part (8-15%) of the USA workforce (Aiken et al. 2007). Polsky et al. (2007) identified from a review of 1990 and 2000 census data that overseas trained nurses working in the USA were three times as likely to hold a degree compared to native nurses. This is in line with Irish and German data (please refer to page 11 details), where it was shown that internationally recruited nurses may be educated to degree level. Studies focused largely on economic effects such as lower wages (Schumacher 2010, Cortès and Pan 2012), occupational choice (Larsen 2007, Henry 2007, Cortès and Pan 2014) and on integration into practice (Blythe et al. 2009, Hunt 2007). They generally did not attempt to assess how international degree educated nurses performed.

Further evidence on the topic emerged from countries outside of the USA. These studies focused on similar issues to the research from the USA, such as skill underutilisation (Humphries, Brugha and McGee 2012, Adhikari and Melia 2013, Moyce, Lash and De Leon Siantz 2015) and lack of opportunities for professional growth (Vesperoni and Masera 2015). Some other studies included social issues relating to family integrity (Humphries, Brugha and McGee 2008, Moyce, Lash and De Leon Siantz 2015, Squires and Amico 2015).

Research literature relating to post-registration degrees focused mainly on investigating the learning needs of post-registration degree nurses (Hegge and Larson 2008, Rico, Beal and Davies 2010, McNiesh 2011) and on the suitability of various teaching strategies in post-registration degree nurse education programmes (Weitzel and McCahon 2008, Moughrabi and Wallace 2015). There was less of an emphasis on post-registration degree nurses' contribution to direct patient care evident from the research literature sourced and reviewed.

One of the earlier studies conducted by Youssef and Goodrich (1996) compared the marks achieved in a post-registration degree programme of a voluntary convenience sample of 94 apprenticeship trained and direct entry students. Findings showed that direct entry students achieved higher marks, suggesting lower levels of nursing knowledge in apprenticeship trained nurses. The finding of Youssef and Goodrich (1996) could also be interpreted as a case of 'more hours worked and less hours studied' for participating apprenticeship nurses, as suggested in another small-scale (n=56) study conducted by McDonald (1995) which showed similar results.

Based on a literature review, Kovner and Schore (1998) suggested almost 20 years ago that apprenticeship trained nurses are more involved in direct patient care compared to degree nurses. They found that apprenticeship trained nurses were more likely to be expected to practice within established protocols in hospitals, and with patients requiring mostly elective care. That apprenticeship trained nurses were expected to practice within established protocols, is perhaps due to the perception that their knowledge is limited in comparison to degree educated nurses. Degree nurses in contrast were described in Kovner and Schore (1998) as practicing more independently in administrative or non-hospital settings, or they

were described as working in specialist units with high risk patients. The latter is in line with the suggestions made by the WHO, that degree educated nurses are required to provide complex patient care (World Health Organisation 2001). As this was a review, Kovner and Schore (1998) did not observe actual nursing practice. The literature that they reviewed may also be viewed as outdated. Some of the findings may, however, still apply to places where degree education is in transition.

Developing a differentiated understanding of the influence of the care received from hospital nurses' with different educational levels on patient outcomes can have implications for practice, as it could show where apprenticeship trained and degree nurses are best placed within the team in providing safe and quality patient care. This also seems to be the point in Germany where the DBfK recommended a horizontal and vertical distribution of responsibilities within nursing teams based on nurse education level (Deutscher Berufsverband für Pflegeberufe 2015b). At a time where nurse staffing is reduced in Germany and in Ireland (please refer to page 30 for details), it may be useful to identifying strengths and weaknesses of diversely educated nurses to ensure that each member of the nursing team is used to the best of their potential. Most of the studies found for this review examined the contribution of degree educated nurses, and this kind of research derived from the USA. There were also some more studies sourced from outside of the USA, which the following section shows.

Some more research examining the role of nurse education in improving patient outcomes was conducted in Asia (Kanai-Pak et al. 2008, You et al. 2013, Cho et al. 2015). This work

derived from the RN4CAST¹ project, and was guided by the methods and designs of Aiken and her team. Analyses were aimed at linking data from South Korea (Cho et al. 2015) and Japan (You et al. 2013) to findings from Europe (RN4CAST) and the USA. This extended the evidence on the impact of nurse education in improving patient outcomes from local to global. Data in these kinds of studies were generally pooled across countries, in that the variables of interest were examined without fully elaborating on country-specific contexts.

Pooled data may lead to some of the country-specific nuances being left unexplained, as was shown in Aiken et al. (2001), Aiken et al. (2011) and Aiken et al. (2014). For example, Aiken et al. (2001) identified 43,000 nurses' job satisfaction levels in a study relating to five countries including the USA, Canada, England, Scotland and Germany. They found that job satisfaction was rated at 17% in German hospitals, compared to 30-41% in the remaining hospitals of the four other participating countries. There were differences within each country's hospitals in regards to job satisfaction, and the possible reasons for this were not further elaborated on in the study report.

One of the studies, which also pooled data from various countries, had a unique feature. You et al. (2013) examined the link between nurse education and patient satisfaction. They surveyed data from 9,688 nurses and 5,786 patients of 181 Chinese hospitals. Findings showed a strong correlation between the proportions of degree level educated nurses and patient satisfaction. Each 10% increase in the proportion of degree educated nurses resulted in an increase in patient satisfaction levels, particularly in regards to nurse communication

¹ RN4CAST, as stated previously, refers to the Registered Nurse Forecasting: Human Resources Planning in Nursing study conducted between 1st January 2009 and 31st December 2011 in 12 European and 3 co-operating partner countries. The aim of the study was to introduce an innovative approach to forecasting health workforce requirements by enriching standard forecasting methods with considerations of quality of both nursing staff and quality of patient care; including nurse education. Further details relating to the study can be found on the website <http://www.rn4cast.eu/en/>

(Odds ratio 1.12, p-value 0.008). This finding could be important to nurse educators as it highlighted one of the strengths of degree level educated nurses. Further evidence might be required to affirm You et al.'s (2013) finding. One of the reasons why patient satisfaction has been less often used in studies examining the contribution of nurse education might lie in its emergent nature, as the following section demonstrates.

3.7 Patient satisfaction as an outcome measure

The subjectivity of patient satisfaction has been highlighted in previous research. For example, Jibodh et al. (2010) maintained that patient satisfaction can depend on the state of recovery. They found in 8 out of a sample of 78 patients, surveyed after revision of hip arthroplasty, that moderate to severe pain negatively influenced patient satisfaction scores. In addition, patients who required an assistive device for most ambulatory activities (n=16) and those who were unable to walk for more than 30 minutes (n=41) reported significantly lower satisfaction scores.

Similarly, Lis, Gupta and Grutsch (2008) found in a study of 954 cancer patients, treated at various Cancer Treatment Centres across the USA, that insomnia was strongly correlated with patient satisfaction. Patient satisfaction has also been shown to correlate with age, gender and educational background in some further studies (Gonzalez-Valentin, Padin-Lopez and De Ratnon-Garrido 2005, Hekkert et al. 2009). Not knowing the name of the nurse who looked after them was also associated with lower patient satisfaction in a study of 1,648 patients in one university hospital in Spain (Gonzalez-Valentin, Padin-Lopez and De Ratnon-Garrido 2005).

According to the literature, unbiased patient satisfaction is best collected at a time when patients are less likely to be in physical or emotional discomfort, preferably at the end of the hospital stay (Han, Connolly and Canham 2003, Hekkert et al. 2009). Once limitations have received the required level of attention, they may provide crucial quality information (Irish Society for Quality & Safety in Healthcare 2003) especially in regards to the nursing care received (Han, Connolly and Canham 2003, Kutney-Lee et al. 2009, Weinberg, Cooney-Miner and Perloff 2012).

This was also shown in a study with 2,291 patients and 1,375 nurses, of which approximately 43% (42.8%) had a degree (Weinberg, Cooney-Miner and Perloff 2012). Data were collected after patients had been discharged from the hospital. Patients rating in the satisfaction survey were therefore less likely to be influenced by physical or emotional discomfort. Whilst findings did not show any positive associations between nurse education levels and patient satisfaction with nursing care, the study demonstrated how patient satisfaction with nursing care can be measured using a survey tool. The tool utilised in Weinberg, Cooney-Miner and Perloff (2012), namely the Consumer Assessment of Healthcare Providers and Systems Survey (CAHPS), was the same as the one used in RN4CAST (please refer to page 138 for details). The most commonly used patient outcomes in nurse education research are patient discharge data such as mortality and Failure-To-Rescue (FTR), as is shown below.

3.8 Patient discharge data

Patient discharge data in the nurse education literature mainly related to outcomes such as mortality (Needleman et al. 2002b, Aiken et al. 2003, Tourangeau et al. 2007, Kutney-Lee and Aiken 2008, Friese et al. 2008, Van den Heede 2009a, 2009b, Kendall-Gallagher et al. 2011, Aiken et al. 2012, Aiken et al. 2014, Cho et al. 2015) and FTR (Needleman et al.

2002a, Aiken et al. 2003, Kutney-Lee and Aiken 2008, Friese and Aiken 2008, Aiken et al. 2012). Patient discharge data such as mortality and FTR were administratively collected at the time of discharge from hospital. The use of administrative data has been described as particularly reliable, as it uses custom built software and specifically trained clinical coders for data entry (Iezzoni 2003, Wiley 2005). There is a potential for differences in completeness and consistency of administratively collected patient outcomes data, depending on coding and training (Shahian et al. 2007). Mortality, however, has been described as an unambiguous patient outcome, which is usually well recorded in administratively collected patient discharge data (Shahian et al. 2010). This may be one of the reasons why studies examining the link between nurse education and patient outcomes focused on mortality.

The mortality measure utilised in nurse education studies such as Aiken et al. (2003) was based on the definition provided by Silber et al. (1992). Silber et al. (1992) defined mortality as '*death within 30 days of admission to hospital* (p. 621). Silber and his teams were able to demonstrate in their studies that mortality measured the full impact for elective general surgical patients; thus providing an objective outcome measure for quality of care (Silber et al. 1992, Silber, Rosenbaum and Ross 1995). Some issues relating to the utilisation of mortality as an outcomes measure in nursing have been raised by other researchers, some of which are discussed next.

Donabedian pointed almost half a century ago (1966) towards a conceptual issue with mortality as a health care outcomes measure, and this argument may still apply today. If mortality is viewed as a negative patient outcome, such as has been done in Silber et al. (1992) and Aiken et al. (2003), survival would be the ultimate goal as it reflects success. This assumes that, for example, prolongation of life is evidence of quality of care. This may or

may not be the case, depending on the circumstances of patients (Donabedian 2005). The Division of Health Care Services of the Institute of Medicine maintained in a national round table discussion on health care quality, that the effects of nursing care on mortality may be quite small in comparison to the effects of the physical environment or a patient's genetic make-up (Donaldson 1999). Mortality also discounts the fact that patients are sometimes admitted to hospitals for end-of-life care. According to the National Audit of End-of-life Care in Hospitals (McKeon et al. 2010) approximately half (48%) of all deaths in Ireland occurred in hospitals, indicating that end-of-life care is ongoing in general nursing practice. Mortality may therefore not always be an indicator of quality of care, but could sometimes be viewed as an indicator of the type of care that nurses (and other health care professionals) provide.

The period of 30-days in the measurement of mortality proved difficult in studies involving specialist surgical procedures (Likosky et al. 2006, Skye et al. 2011) and in a study relating to stroke patients (Bae et al. 2005). Mortality rates in Skye et al.'s (2011) study on 2,597 patients undergoing hepatic resection showed that mortality rates were highest at 90 days after admission, thus these deaths could not be captured by the definition of mortality supplied by Silber et al. (1992). Likosky et al. (2006) also maintained, from a prospective cohort study of 31,592 patients treated in seven English hospitals, that the 30-day mortality measure was insufficient in capturing the deaths occurrences after Coronary Artery Bypass Grafting. Studies investigating specialist procedures may therefore benefit from a revised definition of mortality. Studies that examined the contribution of nurse education may have lent themselves more easily to using the original definition of mortality (Aiken et al. 2003, 2011, 2014), as the elective nature of procedures included in these studies meant that there was a definitive end point to when patients were planned for discharge from hospital. The

procedures included in these studies (Aiken et al. 2003, 2011, 2014) involved a lower risk of death compared to specialist procedures.

Failure-to-Rescue (FTR) was defined by Silber et al. (1992) as '*death following an adverse occurrence*' (p. 615). This definition has been criticised as imprecise in measuring the impact of nursing (Griffiths 1995, Schmid et al. 2007, Jones, Bottle and Griffiths 2011), as it was specifically developed to measure the impact of medical procedures (Silber et al. 1992, 1997). Consequently, Needleman et al. (2002a) developed Failure-To-Rescue in Nursing (FTR-N). FTR-N is a more nursing-friendly version of the original FTR in that it related to five life-threatening complications (pneumonia, shock, cardiac arrest, upper gastrointestinal bleeding, sepsis or deep vein thrombosis) for which early intervention by nurses could have prevented death (Needleman et al. 2002a). FTR-N is based on the belief that nursing surveillance (monitoring patients, attending to cues and recognising deterioration) and taking action when life-threatening situations occur are two crucial activities that assist in the prevention of death from complications (Needleman et al. 2002a, 2002b, Kutney-Lee and Aiken 2008).

Considering that nurses provide 24-hour direct care to hospitalised patients it makes sense to think that nurses should be able to detect clinical complications early enough to either prevent them from occurring, or to minimise the harm that they can cause (Manojlovich and Talsma 2007). The outcomes measure, however, should not be used to imply wrong-doing (Silber et al. 1992). While the nurses' role in providing care to patients whose death is imminent has already been discussed in the previous section relating to mortality (please refer to page 61 for details), it should be noted that this also applies to FTR-N.

In some cases including those with: ‘do not resuscitate orders’, ‘unsuccessful resuscitation or treatment’ ‘open and close procedures’, ‘patients identified for palliative care during their hospital stay’, ‘terminally ill patients’, ‘patients refusing treatments including blood products’ or ‘patients that have reached the end of line in the treatment options available to them’ clinical situations may require nurses to change their approach to care. This should not be used to imply that nurses failed to rescue. A delay in response to clinical complications may also have various reasons outside of nurses’ control including a lack of response from medical teams or miscommunication outside of the nursing team.

While the statistical model used in their study acknowledged the probability of death given no adverse occurrence, Needleman et al. (2002a) did not discuss either of the here mentioned possibilities including ‘a change of focus in the provision of patient care from surveillance and action to end of life care’ or ‘interdisciplinary miscommunication and physician response time’. Blegen and Vaughn (2001) also suggested that the contribution of nurse education would be better examined if it was measured in maximising patient outcomes rather than in minimising threats to patient safety. On the whole, it seems that no matter what quality indicators are utilised, careful consideration must be given to the underlying assumptions and the applicability to the target population. Further studies conducted within the European arena relate directly to the RN4CAST project. These studies are discussed below.

3.9 RN4CAST related studies

The RN4CAST project produced a large number of European publications including a *Special Issue on Nursing Workforce Research* in the *International Journal of Nursing Studies* (Van Den Heede and Aiken 2013). The nurse survey in particular did provide a means to gather compact data relating to other nursing structures, care processes and nurse-reported

patient outcomes, all in one research tool (Van Den Heede and Aiken et al. 2013). Only a few of the published papers in the Special Issue were dedicated to the topic of nurse education, which may be due to the focus on workforce planning.

Kirwan, Matthews and Scott (2013) examined the contribution of nurse education (at degree level) from existing RN4CAST data. Findings related to 1,406 Irish nurses supported previous research from the USA, in that a link between degree nurse education and nurse-reported patient safety outcomes was found. The different types of degree levels in Ireland, such as pre-registration, post-registration and international degrees, were not evaluated in the study as nurse education data were examined at an aggregate level.

One of the cooperatively published RN4CAST papers, Aiken et al. (2014) showed that the proportions of nurse education at degree level varied from 0-100% in participating countries. They viewed this variation as important predictors of patient outcomes. Aiken et al. (2014) established that every 10% increase in the proportion of degree educated nurses reduced the likelihood of mortality by 7%, similar to the previous publications by Aiken and her teams. No comparisons between nurses' different educational backgrounds were attempted in Aiken et al. (2014).

Since the publication of initial studies examining the impact of nurse education more than a decade ago, there is a growing body of local, national and cross-country evidence that degree level education contributes positively to patient-related outcomes. Much of the research literature on the topic stemmed from the USA, followed by Asia and Europe. Research examining patient-related outcomes other than mortality and FTR is rare. The role of nurse education in terms of the impact of different types of degrees and in terms of apprenticeship

training on patient-related outcomes has received less attention also. There are some studies which examined the skills developed through nurse education programmes, which are discussed in the following section below.

3.10 Skills developed through nurse education programmes

A number of studies examined the skills developed through nurse education programmes including critical thinking (Giot 2000, Shin et al. 2006a, 2006b, Suliman 2006), decision making (Pardue 1987, Giot 2000, Standing 2007, Wagensteen et al. 2010), and clinical competence (Robinson et al. 2003, Meretoja, Leino Kilpi and Kaira 2004, Berkow et al. 2008, Williams et al. 2008). The research relating to the development of critical thinking and decision making is reviewed next.

3.10.1 Critical thinking and decision making

The research reviewed suggested that critical thinking and decision making were skills developed through degree level nurse education programmes (Shin et al. 2006a, Standing 2007, Wagensteen et al. 2010). There was more of an emphasis on examining the effectiveness of the elements taught at degree level. Other studies compared degree and qualified nurses' critical thinking skills during the time when they were enrolled in post-registration nurse education programmes (Pardue 1987, Giot 2000, Shin et al. 2006b). Sample selection in these studies was limited to nurses undergoing degree programmes, and thus excluded apprenticeship trained nurses working in practice. Implications of findings were generally constrained by small sample sizes and lack of geographical spread.

The research tools in the studies reviewed utilised, by and large, paper and pen assessments such as, for example, the Watson-Glaser Critical Thinking Appraisal (Giot 2000), the

California Critical Thinking Disposition Inventory (Wagensteen et al. 2010) and the Jenkins' Clinical Decision-Making in Nursing Scale (Girod 2000). As such they investigated participants' cognitive abilities in regards to critical thinking and decision making. Some studies utilised vignettes (Standing 2007) and videos (Fero 2009, 2010) to create a more realistic environment for participants, and to engage them in critical thinking and decision making throughout data collection (Fero 2009, 2010). These findings provided more practice-based insights into the problem-solving abilities of study participants, which was also useful in learning about the processes involved in the development of decision making skills. To this end Fero et al. (2009) identified, in a sample of 2,144 new graduates, that students required confidence to develop their decision making skills. Further observation studies could assist in affirming Fero et al.'s (2009) findings. There were no tangible attempts, in the studies reviewed, to examine the links between the skills acquired through nurse education and the direct impact on care and patient outcomes.

The focus on degree education could imply that apprenticeship training has less of a focus on the development of critical thinking and decision making skills. This notion is in line with a chapter on general nursing published by Ryan (2000), who described the ethos of apprenticeship training in Ireland as being controlled by rules and routines. On practice placements, the emphasis was on students learning hospital routines and carrying out nursing work for which they were accountable to their superiors. Ryan (2000) suggested that this ethos led to student nurses accepting tasks without questioning; critical thinking was not encouraged. Although this is only anecdotal evidence from one textbook, it provides a glimpse into a possible explanation for the limited development of critical thinking and decision making skills during apprenticeship training. Research evidence appears to be incomplete, in that a limited amount of literature in regards to apprenticeship trained nurses'

development of critical thinking and decision making skills could be found. Another set of studies examined nurses' development of clinical competence, which is outlined below.

3.10.2 Clinical competence

Some of the research literature examined nurse and nurse managers' perceptions in regards to clinical competence (Robinson et al. 2003, Berkow et al. 2008, Williams et al. 2008). Berkow et al. (2008) found in a survey involving 5,700 nurse managers from across the USA that clinical competence was more highly rated on wards staffed with predominantly degree educated nurses. In another cross-sectional survey conducted across the United Kingdom, Robinson et al. (2003) found no differences in perceived clinical competence between 166 degree and 188 diploma nurses. Similarly, Williams et al. (2008) found no significant differences in perceived clinical competence between 134 pre-and post-registration nursing students.

The reliance on self-reports in the studies reviewed above could have also led to response biases due to socially desirable responding (Van De Mortel 2008). Participating managers in Berkow et al. (2008), for example, could have been aware of what performance was expected on their predominantly degree staffed wards. Thus they may have unintentionally presented a socially acceptable image of their wards (and their degree nurses) in the questionnaire. Van De Mortel (2008) suggested using Social Desirability Scales in parallel to other questionnaires to assess for response bias in studies using self-reports.

The research tools assessed clinical competence cognitively through pen and paper questionnaires including New Graduate Nurse Performance Survey (Berkow et al. 2008), the Nursing Competencies Questionnaire (Robinson et al. 2003) and Student Perception of

Clinical Competence Scale (Williams et al. 2008), similar to the studies examining the development of critical thinking and decision making. Berkow et al. (2008) developed their own questionnaire based on a literature review and an expert panel. This approach could have limited the reliability of the study, particularly as reliability scores were not published in the report of the study. In comparison, Robinson et al. (2003) and Williams et al. (2008) modified existing tools which had previously been tested and had shown reliable scores, which increased the reliability of their research.

One limitation outlined by Robinson et al. (2003) related to their questionnaire. Basing the questionnaire solely on positive statements may have led to biased responses (Robinson et al. 2003). The participating nurses could have developed a pattern of positive answering, because all of the statements were framed in that way. To break this pattern and to enhance reliability of the findings, Robinson et al. (2003) could have introduced some reversal questions, where the sense of the statement was reversed (Van De Mortel 2008). On a positive note, the questionnaire (Student Perception of Clinical Competence Scale) utilised in Williams et al. (2008) was a dual response scale, which included positive and negative statements. The inclusion of positive and reverse questions should have assisted in minimising socially desirable responding in Williams et al. (2008). None of the studies found attempted to relate perceived clinical competence to patient outcomes.

Another set of studies examined the development of clinical competence in clinical practice (Meretoja, Leino Kilpi and Kaira 2004, Salonen et al. 2007), which might have enhanced the applicability of findings to patient care. Samples utilised in these studies included nurses with various educational backgrounds, however, differentiation between nurse education levels were generally absent from study reports. One of the main findings of these studies was that

nursing experience formed a crucial requirement in the development of clinical competence. Nursing experience, as a factor in the development of clinical competence and subsequent improved patient outcomes, is discussed next.

3.11 Nursing experience

This notion, that nursing experience is an important factor in the development of clinical competence, is in line with the seminal work of Benner (1984) and other researchers (Blegen and Vaughn 2001, Morrison et al. 2001, Higgs and Titchen 2001), who found that nursing experience and clinical competence were linked to each other. Tourangeau et al. (2002) also found, in a sample of 3,998 nurses working in 75 hospitals across Ontario, that nursing experience was significantly related to decreased patient mortality. This suggests that nursing experience is not only an important factor in the development of clinical competence; it also influences patient outcomes directly. Aiken et al.'s (2003) study suggested that nursing experience was not a significant predictor of patient mortality. The finding of Aiken et al. (2003) was affirmed in some further studies (Sasichay-Akkadechananunt, Scalzi and Jawad's 2003, Kendall-Gallagher et al. 2011).

One possible explanation for the inverse relation between nursing experience and patient outcomes in previous research might relate to the way in which nursing experience was measured. Aiken et al. (2003), for example, measured nursing experience as the years spent in nursing practice. This measurement assumes that nurses automatically learn while adding on years in clinical practice. Jarvis (2004), in his textbook relating to adult education and lifelong learning, made the critical point that people may not always learn from their experiences. There is a chance that people, who adopt a ritualistic non-learning approach, repeat 10 years of 1 years learning (Jarvis 2004). This suggests that it is not only the length of

experience but also the quality of the experience that influences the development of clinically competent care.

Another possible explanation for this finding, that nursing experience was not a predictor of improved patient outcomes, could relate to sampling issues. Nursing experience levels in some of these studies (Aiken et al. 2003, Sasichay-Akkadechananunt, Scalzi and Jawad's 2003) were generally high. In Aiken et al. (2003), for example, the average length of nursing experience was 14.2 years (Standard Deviation SD 2.7). In Sasichay-Akkadechananunt, Scalzi and Jawad's (2003) nursing experience ranged from 8.36 to 10.08 years. The 10-year rule has been widely accepted as a minimum length of experience required to master highly complex clinical endeavours (Weisberg 2003). It is possible that the extended period of around 10 years nursing experience in previous studies meant that participating nurses had learnt to master their care competently; hence no differences could be detected between samples. Later studies examining the contribution of nurse education to patient outcomes did not include nursing experience in their statistical models (Aiken et al. 2012, 2014), which suggests that they did not consider it to be an impacting factor on patient outcomes between samples.

Lack of nursing experience (inexperience) has been found to be an impacting factor on clinically competent care. Kanai-Pak et al. (2008) found in their cross-sectional survey of 5,956 staff nurses in 19 Japanese hospitals, that each 10% increase of inexperience in nursing (4 years and below) increased the odds of nurses reporting poor or fair quality of care by a factor of approximately 1.24. If, or to what extent, inexperienced nurses lacked confidence in regards to their ability to provide high quality of care could not be established from the study report. Another study of 107 nurses in two hospitals in Sydney, conducted by Westbrook et

al. (2011), demonstrated that inexperience in nursing (0-6 years) resulted in more medication errors. These studies implied that inexperienced nurses lack some of the clinical competence required to provide safe and effective care, which could be explored further considering the limited amount of evidence found on this topic. In a separate set of research literature the level of international work experience has been shown to promote adaptability in those who worked abroad (Michel and Stratulat 2010). The literature in regards to international work experience is reviewed in the following section.

3.12 International work experience

Adaptability, developed from international work experience (Michel and Stratulat 2010), may contribute to safe patient care, as it could assist in improving nurses' abilities to plan and problem-solve (Houser 2003, Yang, Webster and Prosser 2011). Hence international work experience could potentially be an important aspect in the development of clinical competence and in achieving improved patient outcomes. The studies found on international work experience were mainly carried out in the disciplines of business and computer sciences (Gasta 2008, Santiago 2008, Michel and Stratulat 2010). As such, limited sources of research evidence in regards to the contribution of international work experience in nursing could be found. One study conducted with 214 degree students in China was located (Yang, Webster and Prosser (2011). Findings supported the notion that international work experience develops clinical competency. A small proportion of students (9.7%) commented in the open part of the nurse survey that the international work experience made them become more independent problem solvers. Participating nurses in Yang, Webster and Prosser (2011) spent one year, 2007-2008, abroad.

An Irish study signified that Irish nurses, in particular, hold international work experience (Scott, Matthews and Corbally 2003). The study did not attempt to relate international work experience of nurses to patient outcomes. Scott, Matthews and Corbally (2003) found in a sample of 1,781 nurses surveyed nationally that almost half (49%) had gained international work experience. Of those 49%, 40% had been on international work experiences for 2 years or less, 44% 3-9 years, 13% for 10-19 years, and 2.5% had worked outside of Ireland for 30 years or more. The current economic circumstances in Ireland (as outlined previously, please refer to page 30 for details) may have contributed to an increase in nurses who spend time abroad to gain international work experience since Scott, Matthews and Corbally's (2003) study was conducted.

While the NMBI nursing register does not account for the nurses returning back to work in Ireland, there is some anecdotal evidence which suggested that Irish nurses tend to return to Ireland following a period of gaining nursing experience abroad (Robins 2000, Yeates 2009). There is also some research evidence supporting this notion. A study conducted with 73 nurses and 8 midwives by McAleese et al. (2015) showed that 47% (n=36) of Irish nurses and midwives currently working abroad intended to return to work in Ireland in the future. One fifth (22%, n=17) of participating nurses and midwives in McAleese et al. (2015) reported that they did not intend to return to work in Ireland. This finding indicates that clinical expertise within the home country can also be lost, if nurses stay abroad on international work experience. Humphries et al. (2015) identified in a follow-up publication on the same sample as McAleese et al. (2015) that working conditions can prevent nurses from returning back to work in Ireland.

This is in line with a publication relating to the push and pull factors for German nurse migration. A large sample of 33,541 nurses in 486 hospitals, from across eight countries, was examined for reasons for staying in or leaving the home country including Germany (Zander, Blümel and Busse 2013). Data were drawn from two of the largest EU nursing workforce studies, namely the Health Professional Mobility in the European Union (PROMeTHEUS) and the RN4CAST study. Data from interviews and surveys were triangulated for the study. Findings showed that the work environment including ‘adequate nurse staffing and resources’ was perceived to be better abroad than in Germany. Poorer rated work environments in Zander, Blümel and Busse (2013) were correlated with an intention to leave; hence it was identified as one of the push factors. That working conditions and nurses’ perceptions of their work environment are factors which may interact with nurse education, has also been demonstrated in other research. The following section reviews the research literature on the factors other than nurse education that contribute to patient outcomes.

3.13 Factors other than nurse education that contribute to patient-related outcomes

Some of the factors, other than nurse education, that contribute towards patient outcomes and patient satisfaction with nursing care, have already been identified in the previous sections. These include internal factors such as hospital size, teaching status, technology level and bed occupancy greater than 50% (Silber et al. 1992, Silber, Rosenbaum and Ross 1995, Ghaferi et al. 2010). Other factors that were identified in the previous sections of this review include patient characteristics such as average patient age (Viterito 2006) and number of diagnoses (Silber et al. 1992, 1995, Ghaferi et al. 2010). This section reviews the research literature in relation to nurses' working conditions, nurse-to-patient ratios and nurses' perceptions of their work environment.

3.13.1 Working conditions

Adverse working practice such as long hours of work and overtime can influence the quality of care provided by nurses, which in turn may affect patient outcomes. Research showed that the risk of making errors was significantly increased when nurses worked long shifts of 13 hours or more (Scott et al. 2006b, Estabrooks et al. 2009, Trinkoff et al. 2011, Witkoski-Stimpfel et al. 2013) or when they worked overtime (Rogers et al. 2004, Stone et al. 2007, Griffiths et al. 2014, Kunaviktikul et al. 2015).

Trinkoff et al. (2011) found, in a cross-sectional survey incorporating data from 663 nurses of 71 hospitals in Illinois and North Carolina, that pneumonia deaths were significantly more likely to occur in hospitals where nurses worked long days (defined as 13 hours or more at a time). Similarly, Stone et al. (2007) conducted a study with 1,095 nurses working in 51 adult intensive care units of 31 hospitals across the USA. Findings showed that an increase in

overtime was associated with higher rates of catheter-associated urinary tract infections and the development of pressures ulcers (Stone et al. 2007). Kunaviktikul et al. (2015) added that overtime was positively correlated with the development of pressure ulcers and with a lack of nurse communication. They based their findings on data gained in a survey of 1,524 nurses in 90 hospitals across Thailand.

One study found correlations between overtime and lower rates of mortality in medical and surgical patients (Berney and Needleman 2006). The researchers attributed this inverse association to the sporadic and ward-specific nature of their data (Berney and Needleman 2006). It could also be argued that working long shifts assisted the nurses in this study in getting to know their patients, and that this impacts positively on patient outcomes. This notion was, however, not further explored in the study.

The hypothesis in some studies is that there are correlations between nurses' level of fatigue, based on working long shifts, and decreased levels of patient safety. Fatigue has been identified as a factor that leads to performance deficiency in nurses (Pasupathy and Barker 2012). This has also been shown in studies examining the impact of burnout on patient outcomes, where fatigue formed part of the research tool. For example, Cimiotti et al. (2012) utilised the Maslach Burnout Inventory (MBI) to investigate the origins for nosocomial infections across 161 hospitals in Pennsylvania. Fatigue was one of the Likert-type items measured in the MBI under the sub-scale of emotional exhaustion. Findings relating to 7,076 nurse surveys revealed a significant link between burnout, urinary tract and surgical site infection. The extent to which fatigue (or emotional exhaustion) contributed to urinary tract and surgical site infections in Cimiotti et al. (2012) was not identifiable from the research report. This may have been due to the integration of the item into MBI.

Other studies utilising MBI found similar correlations. For example Van Bogaert et al. (2010), who linked emotional exhaustion to a decrease in quality of care, and Vahey et al. (2004) who related lower levels of burnout to increased levels of patient satisfaction. The MBI, including the items on fatigue, was also used in RN4CAST, and will be discussed later in the research tools section (please refer to page 134 for details). On the whole, the research evidence in regards to the influence of nurse overtime and long shifts on patient outcomes showed tentative results. Fatigue and emotional exhaustion, which subsequently affect patient-related outcomes, may also be attributed to the array of tasks that nurses perform during shifts.

This is shown in a set of research papers relating non-nursing duties. Studies imply that the range of tasks performed during shifts influence the level of care that nurses can provide to their patients (Bruyneel et al. 2013, Scott, Matthews and Kirwan 2013). The concern is that nurses may have less time to attend to direct nursing care if they are frequently distracted by non-nursing duties. Equally, it is argued that performing non-nursing duties may reduce patient surveillance time, thus impacting on patient safety (Scott, Matthews and Kirwan 2013). Nurse-reported tasks left undone due to lack of time are other relevant factors that have been shown to impact on nursing care (Ausserhofer et al. 2014, Zander et al. 2014, Ball et al. 2014). The studies sourced for this review generally did not distinguish between nurse education levels. In a related set of studies the subject of nurse-to-patient ratios was examined for its contribution towards enhanced patient care. The research in regards to this subject area will be reviewed in the following section.

3.13.2 Nurse-to-Patient Ratio (NPR)

Nurses represent the largest division in the hospital workforce (World Health Organisation 2009a, World Health Organisation 2010, International Council of Nurses 2010a), which was estimated at 35% in Ireland (Department of Health and Children 2005) and 44% in Germany (Isfort et al. 2010). Hence nurses play a crucial role in ensuring that patients receive the best possible outcomes from the care received. How effective their care can be may depend on the number of patients that nurses have to look after. A large amount of research literature relating to NPR was found, some of which is reviewed next.

The interpretation of NPRs was generally complicated by the various different approaches used to define it. Schwab et al. (2012) calculated NPR per shift such as the number of nurses per day divided by 3 shifts using monthly census data. Others used similar approaches (Hugonnet, Chevrolet and Pittet 2007, Hugonnet, Uckay, and Pittet 2007, Meyer et al. 2009, O'Brien Pallas et al. 2010, Ghaferi et al. 2010) in that they divided the total number of nurses working during a 24-hr period by the patient census of that day. Nurses' shifts were assumed equal in length; that is 8 hours. The length of 8 hours may correspond to the common notion of nursing shifts in some countries. As has been shown in the previous paragraph, there are places where nurses regularly work 13 hours in one shift. Long shifts are also common in Ireland as some studies have shown (Keogh, O'Brien and Neenan 2009, Hyde and Brady 2002), although this was not the primary focus of this research. There may be times within any shift, where nurse staffing falls below the target level. To include the measure this event, Needleman et al. (2012) utilised a more comprehensive method to define NPR.

In their study of 43 wards at one large general hospital in the USA, they examined associations between mortality and patient exposure to nursing shifts during which nurse

staffing was 8 hours or more below a set target (Needleman et al. 2012). The target was estimated based on a local patient classification system, and revised multiple times depending on the time patients spent away from participating wards. Findings revealed a significant association between increased mortality and patient exposure to shifts during which nursing staffing was 8 hours or more below the target level. This implies that nurse surveillance declines during times when NPR are low, leaving patients at risk of developing adverse outcomes. Needleman et al.'s (2012) calculation of NPR was more in line with the National Institute for Health and Care Excellence (NICE) *Guidelines for Safe Staffing for Nursing in Adult Inpatient Wards in Acute Hospitals*. NICE recommended basing calculations on the average nursing hours per patient per day multiplied by average daily bed utilisation (National Institute for Health and Care Excellence 2014). Average daily bed utilisation takes into account patients who left the ward, and the nursing work involved in that, similar to NPR calculations in Needleman et al. (2012).

Some studies found associations between NPR and improved patient outcomes related to nursing interventions (Twigg et al. 2011), improved nurse-reported quality of care (Kalish and Lee 2011, Zhu et al. 2012), reduced emergency department visits within 30 days of discharge (Bobay, Yakusheva and Weiss 2011) and enhanced patient satisfaction ratings (Zhu et al. 2012). Aiken et al. (2002) found an increase in mortality and FTR when NPR was modified from 6 patients per nurse to 8 patients per nurse. Their calculation of NPR related to nurses involved in patient care at the bedside during the last shift, as reported by participating nurses. One study also found a rise in adverse patient outcomes as NPR increased (Bae, Mark and Fried 2009). Otherwise results seem to be consistently positive towards the contribution of increased NPR towards enhanced patient outcomes.

This was despite the various approaches used in retrieving nursing samples such as nursing registers, hospital and unit specific data. Outcomes were measured in various ways including nurse-reports and administratively collected data (mortality and FTR). Studies were conducted in various settings including general hospital, surgical, and specialist areas such as critical care and emergency departments. A lack of NPR research in the community setting was noted (Ball 2011). Overall, this review indicates that NPR is a factor, which may interact with nurse education in practice. Another factor, which has gained recent attention, relates to nurses' perceptions of the working environment. The research literature in regards to this topic is reviewed in the following section.

3.13.3 Nurses' perceptions of the working environment

The working environment can be described as the managerial context of the workplace, which either supports or constrains nursing practice. The idea is that providing nurses with better resources and with more time for patient care within a flat managerial structure improves nurse-patient interaction and nurse-reported quality of care (Aiken et al. 2012, Kelly et al. 2013). Research in this area stretches over decades, and it appears largely based on the seminal work of McClure et al. (1983). In their study of 2,297 nurses from 39 hospitals across the USA, McClure et al. (1983) found that when nurse-physician relationships, nurse leadership and management and foundations for quality of care were perceived positively by nurses, hospitals had less difficulty in recruiting and retaining nurses. The satisfaction gained from practicing in what was perceived by nurses, as a good working environment, showed a positive contribution towards patient outcomes (McClure et al. 1983, Kramer and Hafner 1989). Further studies explored this topic.

Apart from their research in regards to nurse education, Aiken and her team examined the effects of nurses' working environment extensively. Publications in this area include Aiken et al. (1994), Aiken et al. (1999), Aiken et al. (2001) and Aiken et al. (2008), all of which found positive correlations between nurse working environments and quality care. Aiken et al. (2008), for instance, found that the likelihood of patients dying within 30 days of admission (mortality) was 14% lower in hospitals with better nursing work environments.

While this study related to data collected in the USA, Aiken et al. (2011) compared data from nine countries including Germany. Ireland was not part of this investigation. The study was a collaborative research project based on the International Hospital Outcomes Study, which utilised a nurse survey and a cross-sectional design. Findings of Aiken et al. (2011) showed that participating nurses from Germany (n=2,676) rated their hospitals (n=27) similarly compared to nurses from other participating countries. The following sub-scales: 'nurse-physician relationships', 'foundations for quality care' and 'staffing resource adequacy' were rated lowest within the German arm of the study. This implies that collegial working relationships and the managerial context support German nurses in the provision of quality care, despite the issues in regards to nurse staffing. The findings for Germany in Aiken et al. (2011) related to data collected in 1999. The nurses' working environments may have changed since. Collegial nurse-physician relationships were also reported from 59% (n=5,747) participating nurses in a more recent nation-wide German study (Isfort et al. 2010).

One study was found that compared data from 368 Irish nurses, working in 11 hospitals, to previous data collected in the USA by Aiken and Haven (2000) (Flynn and McCarthy 2008). Findings showed slightly higher scores for 'nurse-physician relationship' for the Irish data, indicating collegial working relationships between doctors and nurses in Ireland also (Flynn

and McCarthy 2008). To what extent collegial working relationships between doctors and nurses influenced patient care, in Ireland or Germany, was not measured in these studies.

Aiken et al. (1999) found that nurse-physician relationships were perceived more positively in dedicated AIDS units, compared to general medical wards caring for AIDS patients. They examined 820 nurses' views of 20 general hospitals in Pennsylvania. This suggests that specialised units support collegial working environments, a finding which was affirmed by Kelly et al. (2013). Their study related to 3,217 critical care nurses from 320 American hospitals, and showed that nurses had collegial working relationships with physicians. This finding may also suggest that working in collegial working environments supports adverse patient outcome reporting. Kelly et al. (2013) found that nurses working in well managed environments, including collegial nurse-physician relationships, were up to 41% more likely to report that nosocomial infections occurred frequently. In addition, Kutney-Lee et al. (2009) found, in 430 Pennsylvanian hospitals, that patient reports of satisfaction were higher in hospitals where nurses worked in well managed environments.

Researchers examining nurses' perceptions of the work environment mainly utilised the Practice Environment Scale-Nursing Work Index (PES-NWI), a tool that has been validated in the USA and elsewhere. PES-NWI was also used in the RN4CAST study. Details relating to PES-NWI will be discussed in the research tools chapter (please refer to page 131 for details). PES-NWI continues to be a research tool in studies examining nurses' perceptions of the work environment such as Kutney-Lee, Sloane and Aiken (2013), Kirwan, Matthews and Scott (2013) and Kelly et al. (2013). Findings are consistent in suggesting enhanced patient outcomes in areas where nurses perceive their working environment positively.

This concludes the section on factors other than nurse education that contribute towards improved patient outcomes. The following summarises the literature reviewed and the main strengths and shortcomings found in the sourced research studies.

3.14 Conclusion

In the first section, the research examining the contribution of nurse education towards improved patient-related outcomes was reviewed. The research is mainly based on the seminal work by Aiken et al. (2003). The study linked hospital nurses' degree education to surgical patient outcomes. Subsequent studies in this field often adapted the design and methods of Aiken et al. (2003). There is international evidence to suggest that degree level education of nurses benefits patient outcomes.

The main strength of the studies reviewed relate to the use of surveys and a cross-sectional design. Nurse surveys appeared to be useful in yielding compact findings in regards to nurse education and patient-related outcomes within and across countries. Despite its drawback of collecting data on only one occasion, the cross-sectional design assisted in creating an awareness of the positive role of degree education to safe patient outcomes. One of the shortcomings identified in the research literature reviewed related to sampling in that nurse samples sometimes did not directly relate to patient samples. To increase validity of findings, nurse samples should coincide with the patient specialty.

Another issue identified from this review related to multicollinearity. It is suggested that to overcome issues related to multicollinearity, studies should take a more explorative approach. Instead of trying to account for all of the factors that might impact on patient outcomes, as in

most of the research reviewed, it is suggested that factors should be explored for their interaction with nurse education levels. Not only should this assist in avoiding multicollinearity, it should also assist in advancing the knowledge on the role of nurse education in real-life hospital-based care. It is suggested from this review that the context needs to be considered more often in studies relating to nurse education to ensure that country-specific nuances are taken into account also. Nurse education research stemmed largely from the USA. The contexts assumed in previous studies conducted in the USA may not readily fit into the European arena.

The majority of studies, reviewed in this chapter, utilised mortality and FTR as outcome measures for nurse education. It is suggested from this literature review that the role of nurses with regards to mortality and FTR needs to be clarified before researchers continue to use them as indicators for quality of nursing care. Some nurse-reported patient outcomes relating to nurse communication, medication management and hospital-acquired complications in particular have been shown to relate to nurse education in some studies reviewed in this chapter. The knowledge in this area of patient-related outcomes could be developed to consolidate existing evidence.

Very few studies examined the impact of nurse education on patient satisfaction with nursing care. This may be due to potential subjectivity of patient reports. It is suggested, based on the literature reviewed, that once limitations are taken into consideration during data collection, patient satisfaction data may provide some crucial quality information in regards to the role of nurse education in the provision of safe and effective patient care. The research literature reviewed focused largely on examining the contribution of degree education, without fully exploring the variety of education levels available in nursing. It is suggested from this review

that nurses may have different strengths and weaknesses in practice depending on their educational background, and these may contribute to improved patient-related outcomes.

Another set of research literatures reviewed in this chapter was dedicated to the skills developed through nurse education programmes. On the whole these studies suggested that degree education fosters the development of critical thinking and decision making skills. Research evidence appeared to be incomplete in the sense that critical thinking and decision making abilities of apprenticeship trained nurses were rarely examined. The development of clinical competence was less clearly attributed to nurse education in the literature reviewed in this chapter. The link between the skills developed through nurse education programmes to improved patient-related outcomes was also less often subject to research investigations.

Factors other than nurse education, which contribute to improved patient-related outcomes, were reviewed in the final section of this literature review. It was apparent that aspects including NPR, working conditions, non-nursing duties and the working environment may influence nursing care. Other factors, which have been shown to interact with nurse education, include hospital factors (size, teaching status, technology level and bed occupancy), patient factors (average age and number of diagnoses), nursing experience and international work experience.

It is evident from this literature review that many questions in regards to the contribution of nurse education to improved patient-related outcomes remain unanswered. Whilst there is evidence to support the contribution of nursing degrees towards improved outcomes at large, less is known about particular aspects such as specific patient-related outcomes and the contribution of nurses with various educational backgrounds. Exploring more of the

particular aspects of nurse education suggests the need to deviate from the large-scale approach taken in most of the reviewed literature to a smaller sized research study. The following chapter outlines the methodology for a multiple case study, exploring the role of nurse education within nursing teams of three hospitals in Ireland and Germany in selected patient-related outcomes.

CHAPTER 4: DESIGN AND METHODOLOGY

4.1 Introduction

This chapter presents a detailed account of the study's design and methodology. It begins with a discussion about case study designs. The strengths and weaknesses, and elements of a good case study are outlined and the rationales for using an exploratory multiple case study design are provided. This is followed by the theoretical propositions for the study. The aims, objectives and research questions for the study are then presented. The Structure-Process-Outcome (SPO) Model for Health Care Practice (Donabedian 2005) is the analytical framework for this study. The rationale for choosing this framework and the factors of each domain of the framework are presented. The research methods including ethical issues and approval processes, access to hospitals and participants, data collection and analysis are presented in the final section of this chapter.

The study, in particular the formulation of theoretical propositions, research questions and data analysis are guided by various publications in the field of case study designs and methods. The works of three established case study researchers, namely Robert K. Yin, Gary Thomas and Robert Stake, provided the basis for the chosen design and methodology in this study. Reference is made in this chapter to the RN4CAST project, as this study draws on its approaches and research procedures.

4.2 Case Study Design

Every research study has its own design. In the most elementary sense, the design is the logical sequence that connects all parts of the study (Yin 2009). A case study design may be used in various situations regardless of the philosophical underpinnings of the research (Yin 2014). One of the most common philosophical underpinnings utilised in research is the positivist paradigm. Within a positivist paradigm, research is viewed as a systematic, objective investigation (Polit and Beck 2009). The researcher follows a deductive process to examine specific factors for cause and effect. The main purpose of this type of research is to explain and predict. The methods used in positivist research are quantitative, and they include experiments and survey measures. Within positivist research there is a focus on value-free and unbiased findings (Polit and Beck 2009).

Another common approach is the interpretivist paradigm, which is concerned with the views and experiences of participants in a given situation (Stake 2010). Within the interpretivist paradigm the aim is to generate or inductively develop a theory or pattern of meanings (Stake 2010) throughout the research process. Findings may be value-laden and personal, and captured using interviews or observations. According to Yin (2014), a case study is not committed to any one research paradigm. Within a case study, the research problem is the central concern (Yin 2009); various approaches to understanding the issue may be applied (Yin 2009, 2014). In this particular study, exploring the role of nurse education, the focus was on gathering value-free data on nurse education and factors other than nurse education that influence patient-related outcomes. Hence the use of survey data was favoured over interviews and observations.

A case study design is justified if all of the following three conditions are met. Case studies are the preferred choice if (i) the research uses exploratory research questions, (ii) when a contemporary issue is examined and when (iii) this contemporary issue cannot be manipulated (Yin 2014). This study utilised exploratory research questions. It was investigated ‘what’ the nurse education levels, care processes and patient outcomes were in selected hospitals and teams, and ‘how’ they compared (please refer to page 110 for details). In addition, the aim of this case study was to advance the understanding of a contemporary phenomenon such as the role of nurse education in improving patient care within its real-world contexts ‘the hospital’ and ‘the country’. In this study the role of nurse education was not manipulated, none of the factors including those other than nurse education were excluded from the investigation. Apart from these conditions Yin (2014) described five elements of a good case study design, which are presented next.

4.2.1. Elements of a good case study design

According to Yin (2014), the first element of a good case study design is that the cases are unusual and that they are of general interest to the public and policy makers. In this study, the cases (please refer to page 141 for details) were unusual as they were selected by the proportions of degree and apprenticeship trained nurses. This allowed for direct comparisons of nurses practicing from different educational backgrounds, their care processes and patient-related outcomes. Previous studies (as outlined in Chapter 3: ‘Literature Review’ see page 38) excluded direct comparisons of nurse education levels and focused on examining data at an aggregate ‘degree’ level.

The topic of degree nurse education is of interest to the general public in Ireland and Germany. In Ireland the pre-registration nursing degree programme has come under scrutiny during times of economic pressures (please refer to page 30 for details), which led to a nationwide review conducted by the Department of Health (2012). In Germany, the transition to nurse education to degree level is ongoing (please refer to page 20) and there is a constant debate about the appropriate deployment of graduate nurses (explained in detail on page 20). This case study developed new insights about the role of both degree and apprenticeship nurse education in practice, hence it should be of interest to the public and policy makers.

The second element of a good case study is that it has to be complete. This includes the collection of all relevant data given the boundaries of the study (Yin 2014). In this study, particular attention was placed on collecting all of the critical pieces of evidence required. Data from hospitals, nurses and patients were collected (please refer to the section beginning on page 125 for details) to ensure that the views of all relevant stakeholders were taken into account in this study. Pieces of evidences that were outside of the boundaries of the study were not collected i.e. there was no need to collected data from relatives, for example, as the focus was on investigating patient satisfaction with nursing care.

A good case study must consider rival propositions, which provide an alternative perspective on the topic under investigation (Yin 2014). This was achieved in this case study through the use of theoretical propositions and cases which either fitted or ill-fitted the propositions. One of the theoretical propositions in this case study was based on the literature (as reviewed in Chapter 3: 'Literature Review' starting on page 38), which suggested that degree nurse education improves patient outcomes. By carefully selecting nursing teams with large,

medium and small proportions of degree and apprenticeship trained nurses, the study considered the various perspectives on the topic of nurse education.

Another element of a good case study relates to the presentation of findings in that it must display sufficient evidence (Yin 2014). The display of study findings should enable the reader to reach an independent judgement (Yin 2014). This was achieved in this study by presenting findings in a neutral manner with both kinds of findings, (i) findings which supported the study's theoretical propositions and (ii) findings that challenged the study's theoretical propositions. Through the presentation of findings the reader could also gain confidence that I had a good level of knowledge on the topic of the role of nurse education in patient care and outcomes. My personal background with nursing experience in Ireland and Germany (please refer to section 1.6 'Personal background' on page 5 for details) also assisted in achieving this element of a good case study.

The fifth and final element of a good case study is that the report must be presented in an engaging manner (Yin 2014). For this study, this meant that the report had to be written in a way that constantly enticed the reader to continue reading. I believe that I achieved this goal in that I showed my enthusiasm about the topic throughout the thesis report. I articulated my personal interest in the topic and I tried to engage the reader by designing an original study. Apart from placing attention to the five elements, there were further reasons for adopting a case study approach. The rationales for choosing a case study design are outlined next.

4.2.2 Rationales for choosing a case study design

A number of views on case studies exist in the literature. Stake (1995, 2010), in his textbooks, took the view that case studies are drawn from holistic research paradigms. He

suggested that the depth of each case under investigation should be captured (Stake 2010). In his early work, Stake (1995) described a case study as: ‘the study of the particularity and complexity’ (p.xi). Within this definition, there are at least two important statements that support the use of a case design for this study. The definition also leads to the first two rationales for choosing a case study design, which are outlined next.

The first justification for choosing a case study designs relates to Stake’s (1995) statement that it enables studying the particular. In this study, nursing teams and hospitals have their own particular ‘make-up’ in regards to the features that illustrate them. Each case will have particular factors which interact with nurse education and patient-related outcomes. As such, a case study design is useful in learning about the factors which either support or inhibit the provision of improved patient care. In this study, nursing teams are also particular in that nurses are educated at various levels from apprenticeship training to various types of degrees. Exploring each type of nursing education will yield nuanced findings in regards to the level and type of nursing education which, in the hospitals examined, contribute to enhanced patient care. Most likely there will also be some country-specific findings, which also add to the particularity of the study.

The second point in Stake’s (1995) definition of the design is that case studies take into account the complexity of each case. Exploring the role of nursing education within its complex structures will assist in developing insights into the culture of hospitals and nursing in different countries. This is in line with a later statement made by Stake (2010) that the main aim of case studies is to learn about a specific issue (nursing education) within a culture (hospitals and countries). Stake (2010) suggested the use of observation to yield findings that advance the knowledge about an issue. On the whole, he emphasised the use of ethnographic

methods for case studies such as observation and interviews (Stake 1995, 2010). Other designs relating to the qualitative paradigm also aim at understanding issues by means of using interviews (Stake 2010). A conscious decision was made at the beginning of this study to utilise the survey data gathered in the RN4CAST project. The idea was to explore RN4CAST survey data in more depth through a case study design to discover new insights and to add to the knowledge on the role of nurse education in the provision of patient care.

Yin (2014) and Thomas (2011) supported the use of quantitative methods such as surveys in case study designs, especially when there is little preliminary knowledge on a topic. The literature reviewed in the previous chapter showed limited knowledge in regards to the contribution of differently educated nurses to nurse-reported patient outcomes and patient satisfaction with nursing care. It is envisaged that an in-depth investigation of RN4CAST survey data will yield insightful results, which may advance the understanding on the role of nurse education in practice.

Another reason for using this approach is that I am a novice in the area of nurse education research. Being a novice researcher, according to Yin (2014), is another qualifying factor for the use of quantitative data in a case study. Novice case study researchers, like me, are less likely to have preconceived notions about the connections of factors. Without preconceived notions about connecting factors, quantitative (survey) case study data can be used to develop new ideas for subsequent research studies (Yin 2014). I will try to use my newness in the area of nurse education research to develop insights into the factors interacting with nurse education, using a case study design. According to Ragin (1999), Gerring (2004) and Thomas (2011) it is the researcher's starting point that matters most in choosing the appropriate

design. In this study, my starting point was the desire to explore the ways in which nurses with different educational background contribute to improved patient-related outcomes.

Various case study approaches are described in the literature including intrinsic, evaluative and exploratory designs. In an intrinsic design the case itself is of interest (Stake 1995, 2010). A case of interest may be followed over an extended period of time so that the researcher can learn about its features (Stake 1995). Thomas (2011) called this design ‘blue sky’ research, as there are no obstacles to block the view of the researcher. The study is conducted for the sake of finding out about the case (Stake 1995, 2010, Thomas 2011). This study, exploring the role of nurse education is more specific in that it is limited to patient-related outcomes. An intrinsic design therefore appears less useful. It is envisaged that another design, other than an intrinsic one, might be more suited for this study.

An evaluative case study design is where a researcher wants to find out if something has worked (Yin 2014). Evaluative case studies might, for example, examine if the introduction of a new idea has had the desired impact on a business (Thomas 2011, Yin 2011). While this design is closer to the purpose of this study, it still does not entirely fit. In this study the nurse education at degree level has not been introduced to all of the hospitals under investigation. One of the cases in this study is entirely based on nurses who are apprenticeship trained (please refer to page 155 for details). Hence degree education has not been introduced everywhere in this study, which makes an evaluative design less useful.

An exploratory design assists in investigating an unclear situation (Yin 2003, Thomas 2011). From the outset of this study there are a number of situations which are unclear. Firstly, it is unclear what types of nurse education are actually present in the participating hospitals and

within selected nursing teams. It is also unclear if and how patient-related outcomes other than mortality and FTR can be influenced through various types of nurse education, as there was inconsistent evidence in the literature reviewed. Finally, it is unclear which and how factors other than nurse education influence the care provided by nurses with different educational background in the selected hospitals and countries. It is envisaged that an exploratory case study design will assist in identifying the ways in which factors interact with each other, although findings may be tentative and context-specific (Thomas 2011).

An exploratory design also suits this study, as it will assist in generating new ideas for subsequent research (Yin 2014). It is envisaged that this case study will assist in identifying hospital-based and context-specific factors, which can inform the approaches of subsequent studies. For example, the study may find factors which are particularly relevant to selected hospitals and nursing teams. Some findings may appear to be locally influenced, while others may be country-specific. Finding out about these factors will assist in developing the approaches of subsequent studies, in that local and country-specific factors may be further tested. Subsequent studies may or may not be a case study (Yin 2011). The exploratory design in this study may also assist in identifying new research questions, which can become the focus of subsequent studies. It is envisaged that through the exploratory design some new research questions in regards to the skills and work practices of nurses with different educational background may emerge.

An exploratory case study design was also chosen because it allows for exploration of factors rather than controlling them (Yin 2009, Stake 2010). Case studies diagnose a situation, screen for alternatives and assist in discovering new ideas (Yin 1981, 2003, Thomas 2011). This aspect of case study design is particularly suited to this study, where only very few factors

will be controlled, compared to previous research on the topic of nurse education (please refer to page 41 for details). Exploring rather than controlling factors also supports the notions of considering the real-life context in case study designs (Yin 2003, 2014). Apart from the exploratory design frame, there are two main variations described for case study research.

One variation is a single case study design, whereby one case is examined in depth. The single case study design could be viewed as the classic case study (Yin 1981, Thomas 2011, Yin 2014). A single case is studied for its features and characters, with the emphasis on what is going on (Stake 1995, Thomas 2011). A single case design could be an option for this study, though it means finding one team that consists of nurses with educational backgrounds ranging from apprenticeship to various types of degrees. From my past experience and based on the education context reviewed (please refer to page 10 for details), it seemed less likely that such a team could be found. Going beyond a single case design is more feasible for this study, as more of a spread of education levels can be expected. A wider spread of education levels will assist in exploring the differences in care and patient-related outcomes in a number of teams. Indeed it was the range of educational arrangements within RN4CAST consortium members that inspired me to conduct this study in the first instance (please refer to page 4 for details).

A multiple case study design was chosen, as data from three hospitals can be studied for differences and similarities in nurse education levels and for the role in improving patient-related outcomes. Including multiple cases in this study also allows for data to be compared (Stake 2006, Yin 2014). In fact, it has been said that deviant, diverse or extreme cases lead themselves to comparisons (Seawright and Gerring 2008, Stake 2006, Yin 2014). In this

study cases will be deviant, as teams of nurses with different educational backgrounds are selected. The data from multiple cases will be explored and compared to gain an understanding of what is going on in nursing teams with different educational backgrounds. In contrast to multiple case studies, the rare and the critical case lead themselves to a single case study design (Seawright and Gerring 2008, Yin 2014).

The findings from a single case study can be regarded as a particularly weak evidence-base (Stake 1995, Yin 2003). One of the advantages of using a multiple case study design in this study was described by Yin (2009), as the evidence-base is more compelling and is regarded as more robust. On the other hand, the selection of three hospitals and three nursing teams in this case study is highly unlikely to produce generalisable findings. Generalisability, according to Yin (2014), is the logic whereby findings from a large sample are claimed to apply to the population of interest. In his textbooks, he distinguished between two types of generalisations, statistical and analytical.

Yin (2003, 2014) explained that *statistical* generalisability is usually not relevant to case studies due to the methods and small number of cases used. The goal in case study research is to strive towards *analytical* generalisability. Analytical generalisability is where findings are interpreted in the light of theoretical propositions, which may have wider applicability than the cases studied (Yin 2003, 2014). The theoretical propositions of this study will be presented later in this chapter (please refer to page 101 for details). It is envisaged that the use of multiple cases will assist in understanding the findings of this study in a wider conceptual sense.

According to Yin (2014), a design that calls for multiple cases does not eliminate variations within cases. This is also true for this study. A selection of nursing teams, which practice in separate hospitals, will be investigated in this study. As such the nursing teams form the embedded cases of the hospitals (cases) considered in this study. An embedded case study also allows for the use of surveys at each study site (Yin 2014). In this study, each hospital (case) completed an organisational survey. Another separate survey was conducted with each nursing team (please refer to page 111 for details). Data will be compared to find similarities and differences in the care provided and the patient-related outcomes reported by nurses with different educational backgrounds.

A number of rationales for choosing a case study design have been identified in this section. Firstly, a case study design will assist in exploring relevant RN4CAST survey findings in more depth to develop new insights. The use of multiples cases and embedded cases will assist in comparing data within their hospital-based and country-specific contexts. Comparisons will be made to identify similarities and differences in nurse education levels, hospital backgrounds, supporting and inhibiting structure and care processes, and patient-related outcomes. For these reasons a multiple case study design with an aim to explore and compare is adopted. Within the design there are also weaknesses. The following text will outline some of the weaknesses of case study designs, and it will show how obstacles are overcome in this study.

4.2.3 Overcoming the obstacles of a case study design

One weakness of case study designs relates to a possible lack of objectivity. Researchers who employ case study designs could be regarded as having insufficient objectivity (Yin 2003). Objectivity in research relates to the idea that, as far as possible, researchers should remain

distanced from participants so that findings depend on the nature of what was studied rather than on the beliefs and values of the researcher (Payne and Payne 2004). Objectivity may be compromised in case studies especially if the researcher becomes involved in the activities of the case being studied (Yin 2014).

One way in which objectivity is ensured in this study is through the use of confidential surveys (Hair et al. 2010). The nurses and patients participating in this study did not record their name on the survey. In addition, my involvement with study participants was kept to a minimum to increase objectivity (please refer to page 111 for details). Procedures and research protocols were followed (please refer to page 111 for details) for the same reason, which is to increase objectivity. In regards to educational levels, all of the participating nurses were treated neutrally. It did not matter what educational background participating nurses had, all completed surveys were analysed. In fact, I was hardly aware of what the educational background of nurses was during data collection. It was only through the analysis of data, that participating nurses' educational backgrounds were revealed. This approach has assisted me in staying objective.

On the other hand, it could be argued that the researcher must actively participate to conduct a study, hence introducing a degree of subjectivity (Polit and Beck 2009, Stake 2010). Data collection in this study involved travelling to each hospital, delivering surveys and providing a 'Question & Answer' session to potential study participants (please refer to page 111 for details). This personal involvement may have motivated some nurses to participate in the study, who otherwise could have opted not to participate in the survey (Edwards et al. 2002, 2009). The personal involvement during nurse survey data collection related exclusively to information giving. I remained neutral at all times and did not overly encourage survey

participation. No formal fieldwork or recordings of nurse-patient interactions were undertaken in this study either. As such the data were collected objectively.

Case studies, similar to other studies, are vulnerable to ethical issues (Trellis 1997, Stake 2010, Yin 2009, 2014). One ethical issue relates to dependent relationships between the researcher and study participants. Stake (2010) provided some examples of case studies that were financed by people who had, either directly or indirectly, power over those conducting the investigation. Such conflict of interests has the potential to affect the credibility of the study. Although I do have a keen interest in nursing and nurse education, I remained an independent investigator. Financial sponsors of RN4CAST (please refer to page 111 in this chapter for details on funding for the RN4CAST study) did not guide the design or my case study in any way. This approach is in line with Stake's (2010) recommendation that case study researchers need to ensure that they are independently examining their area of interest if the researcher's and the study's credibility is to be maintained.

Another weakness relating to case study is that investigators may change direction during the course of the study, due to its evolving nature (Seawright and Gerring 2008). Thus, the case study researcher may leave unknown gaps in the study. To avoid this problem, researchers should report preliminary findings so that the likelihood of bias will be reduced (Yin 2003, 2009). I tried to overcome this obstacle by articulating the anticipated added knowledge of this case study's findings prior to data analysis. I also presented the design, methods and preliminary findings to fellow students and colleagues at various research meetings to develop my research approaches without losing track of the general direction of the study. Apart from other benefits such as learning from the feedback from the audience, this was also an effort to keep me on track. The presentations also assisted me to refine study approaches

through the discussions with fellow-students and research colleagues, which developed after presentations.

To maintain the direction originally set out, I engaged in monthly supervision meetings with two experienced nurse academics. In addition, I followed a design which was recommended by renowned case study researchers (Stake 2010, Thomas 2011, Yin 2014). Another measure that helped me to staying focused was the development of theoretical propositions, which are outlined next.

4.3 Theoretical propositions

According to Yin (2014) the development of theoretical propositions are highly desired for case studies, as they assist in developing *analytically* generalisable findings. The theoretical propositions that go into the initial design of a case study may form the basis for analytical generalisations, if they are supported by case study findings (Yin 2003, Thomas 2011, Yin 2014). In addition, new generalisations may emerge from case study findings alone (Yin 2014). Analytical generalisability is different to statistical generalisability. Case study findings may not be statistically generalisable (Yin 2014). In this study, findings are not statistically generalisable due to the small number of hospitals (cases) and the small numbers of nursing teams (embedded cases) selected. Instead the findings of the case study are compared to the theoretical propositions outlined in the next paragraph. Theoretical propositions in a case study do not need to have the formality of a grand theory, nor is the researcher asked to become a masterful theoretician (Yin 2014).

In this study, the first theoretical proposition is based on the nurse education literature reviewed (please refer to the review starting on page 38 for details). Degree educated nurses

are more likely to achieve improved patient-related outcomes, compared to apprenticeship trained nurses. The assumption is that adverse outcomes generally occur, but that the risk of them occurring can be reduced through nurse education. The second theoretical proposition is based on one of the theories for quality of health care, the Donabedian (2005) Structure-Process-Outcome model as it was suggested that the researcher should always be aware of the theories relevant to the case study (Yin 2014). Donabedian's (2005) theory implies that there are structures as well as processes involved, which influence how healthcare practitioners such as nurses with different educational backgrounds provide care. Based on this theory, it was envisaged that patient-related outcomes in this study will reflect what precedes them. Nurses practice within distinctive structures, which influence their care processes. Together the structures and processes influence nurses with different educational backgrounds and the patient-related outcomes reported by them. As such findings will show that contexts, such as hospital-based and country-specific factors, matter. The Structure-Process-Outcome model (Donabedian 2005) is presented in the following text, as it also is the analytical framework for this study.

4.4 Analytical framework

The Donabedian (2005) Structure-Process-Outcome (SPO) model is a framework for evaluating quality of health care. The framework was originally published in the year 1966, and was reprinted in the year 2005. There are a number of reasons for the use of the framework in this study. For one the model has been widely used to examine the practices of health care professionals' in improving patient outcomes (Closs and Tierney 1993, McGillis Hall and Doran 2007, Hong et al. 2008, Qu et al. 2010, Liu, Edwards and Courtney 2011), which implies that it has served previous researchers well. Another reason for the use of the SPO model is that it takes into account the context of health service provision through the

domains (structure-process-outcome) included. The model is based on the idea that a relationship exists between the structures, processes and outcomes of care. It suggests that outcomes are reflective of what precedes them, which is in line with one of the theoretical propositions in this case study (please refer to page 101 for details).

A number of other health care frameworks exist, one of which is the Nursing Role Effectiveness model (Irvine, Sidani and McGillis Hall 1998). The model is based on the same theoretical idea as Donabedian's (2005) framework that a relationship exists between the domains of health care practice. As such the framework could have also been suitable for this study. The process component in the Nursing Role Effectiveness model consists of various role functions of nurses. These include independent role functions (for which only nurses are responsible), dependent role functions (which are implemented based on medical orders) and interdependent role functions (which are shared with other health care professionals) (Irvine Doran et al. 2002). As it was beyond the scope of this study to distinguish between nurses' role functions, it was decided that the Nursing Role Effectiveness model (Irvine, Sidani and McGillis Hall 1998) would not be used. Instead the SPO model (Donabedian 2005) is utilised as a framework for this study. The factors identified in the literature reviewed (please refer to the review starting on page 38 for details) are sorted under the domains of the framework to guide the analysis and the interpretation of findings. Factors relating to structures, processes and outcomes are also available in the RN4CAST surveys, which is useful and which is outlined in the next chapter (please refer to page 121 for details). For the purpose of this study, the SPO model (Donabedian 2005) is modified to incorporate the following RN4CAST structure, process and outcomes factors under each domain:

4.4.1 Structure

The first domain of framework is ‘structure’. Structure relates to any factors that direct the provision of care (Donabedian 2005). In this study, the main structural factor is nurse education including degree and apprenticeship training. It is envisaged that this part of the framework may be revised following data analysis to include types of degrees, if they are found to vary. Structural data in this study also includes hospital management factors and demographic data of participating nurses. Other structure factors include nursing experience and international work experience. Working conditions, NPR and nursing and non-nursing tasks are further structure factors. The whole PES-NWI scale and its five sub-scales are included in the framework to generate and compare findings relating to nurses’ perceptions of their working environment. Figure 1 maps the factors included under ‘structure’.

Figure 1: Map of structure factors

Nurse education

- Apprenticeship training
- Degree

Other factors

- Nursing experience
- International work experience
- NPR
- Working conditions
 - Shift length
 - Overtime
- Non-nursing tasks
- Hospital management
 - Support for nurse education
 - Continuous professional development
- Work environment
 - Staffing adequacy
 - Nurse-physician relationships
 - Management and leadership
 - Foundations for quality of care
 - Nurse participation in hospital affairs

4.4.2 Process

The second domain in Donabedian’s (2005) framework is ‘process’. Process relates to the factors that demonstrate how patients are cared for. According to Closs and Tierney (1993)

there is some ambiguity surrounding the process and outcome domain, as it can be difficult to decide under which domain a particular factor fits. Whether or not one emphasises process or outcome in the analysis depends, according to Donabedian (1969), on the nature of enquiry. As the main objective of this case study is to explore the role of nurse education in improving patient-related outcomes, the focus is on measuring outcomes. Process factors give some indications as to how nurses delivered care in order to achieve improved patient-related outcomes. As such, process factors in this study can be viewed as intermediate nursing outcomes rather than patient-related outcomes. One of the process factors included in this study is fatigue, which is measured through emotional exhaustion (EE) data. The idea is that fatigue and EE may be influenced by structure factors such as nurse-to-patient ratio and working conditions. EE may lead to deficiencies in nurse performance, which in turn may affect patient-related outcomes.

The other process factor relates to the 'tasks necessary, but left undone due to lack of time'. Similar to EE it is envisaged that the 'tasks necessary, but left undone due to lack of time' are intermediate nursing outcomes. Structure factors may have influenced nurses to leave undone some of the tasks that were necessary. The tasks which were necessary, but were left undone due to lack of time may have affected patient-related outcomes in some of the nurses with different educational background. To increase legitimacy, specific 'tasks necessary, but left undone due to lack of time' from the RN4CAST nurse survey (please refer to page 128 for details) are matched to patient outcomes measured in this study. The 'tasks necessary, but left undone due to lack of time' are matched to relevant patient outcomes in the best possible way.

Three process ‘tasks necessary, but left undone due to lack of time’ that best matched the patient outcomes measured in this study include the following: 1. ‘Adequate patient surveillance’, 2. ‘Frequent changing of patient position’ and 3. ‘Administer medications on time’. Three more ‘tasks necessary, but left undone due to lack of time’ match patient satisfaction with nursing care items. These include 4. ‘Comfort/talk with patient’, 5. ‘Pain control’ and 6. ‘Educating patient and family’. These tasks were matched to the outcomes measured in this study, which are outlined next.

4.4.3 Outcome

The domain ‘outcome’ consists of the end results of care (Donabedian 2005). In this study, the end results of care are nurse-reported patient outcomes and patient satisfaction with nursing care. Nurse-reported patient outcomes include 1. ‘Falls with injury’, 2. ‘Pressure ulcers developed after admission’ and 3. ‘Patient received wrong medication, time or dose’. Outcomes relating to patient satisfaction with nursing care include 4. ‘Nurse communication’, 5. ‘Pain control’ and 6. ‘Discharge information’. The following Table 3 shows the matched process and outcome factors. It should be noted that matches depended on the availability of relevant RN4CAST nurse and patient survey data, and were not always perfect.

The outcome factors included were chosen for two main reasons. Firstly, the outcomes were measured in previous research and were partially found to correlate with nurse education (please refer to page 38 for details). Secondly, the outcomes were the best match for the process factors available in RN4CAST.

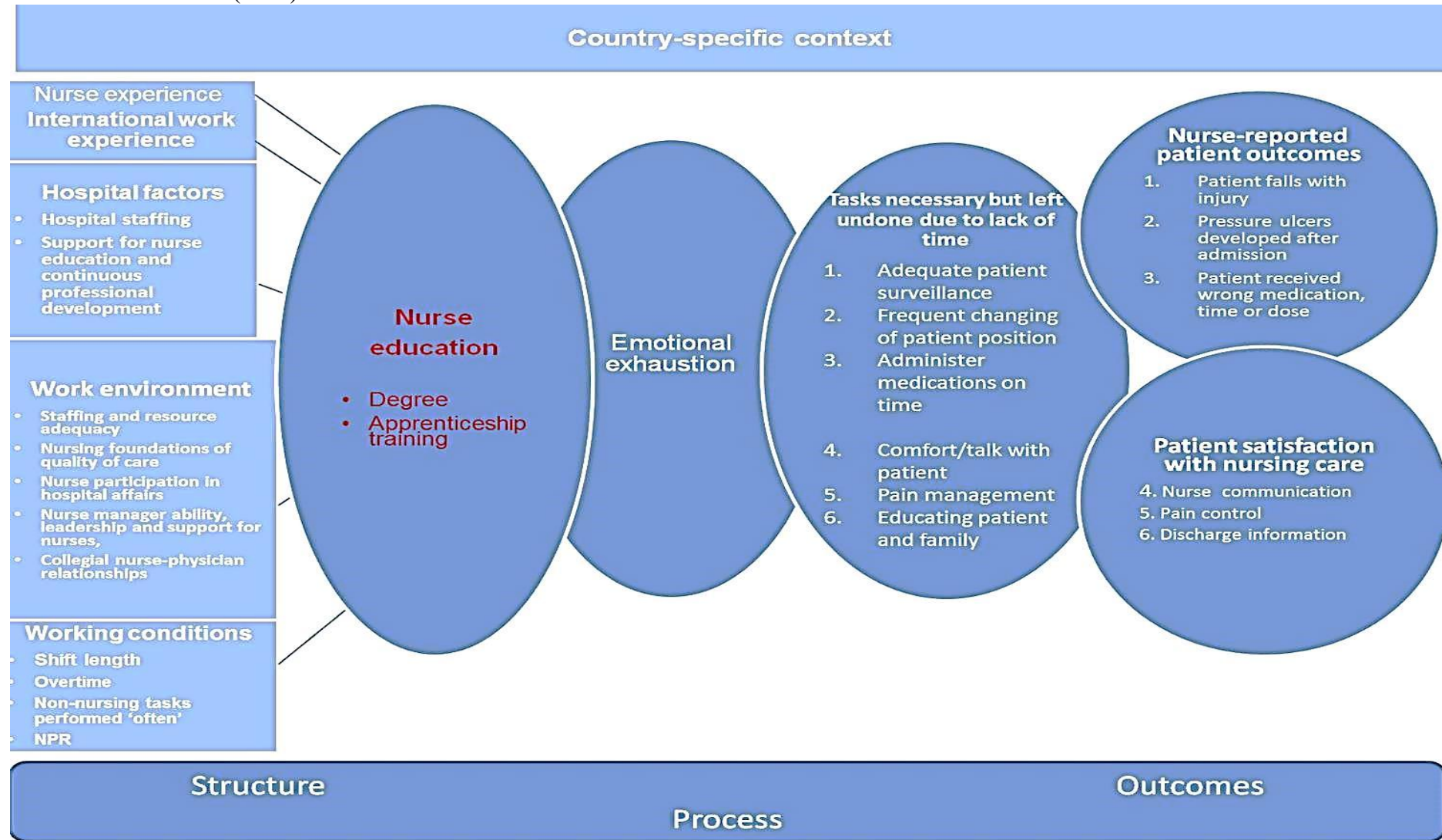
Table 3: Process and outcome factors

Process	Outcome
'Tasks necessary, but left undone due to lack of time' (nurse survey)	Nurse-reported patient outcomes (nurse survey)
1. Adequate patient surveillance	Falls with injury
2. Frequent changing of patient position	Pressure ulcers developed after admission
3. Administer medications on time	Patients receiving wrong medication, time or dose
	Patient satisfaction with nursing care (patient survey)
4. Comfort/talk with patient	Nurse communication
5. Pain management	Pain control
6. Educating patient and family	Verbal discharge information

The complete analytical framework comprises the structural, process and outcome factors that were found to be relevant from the literature reviewed in one of the previous chapters. Figure 2 shows the analytical framework for this study in a diagrammatic format. The main structure factor 'nurse education' is highlighted with a darker colour for convenience. It was unclear from the review of the literature, which factors were country-specific. This was the reason for an overarching box in the framework. It is envisaged that country-specific factors may be found during the analysis, and that these can be added into the framework at a later stage.

Figure 2: Modified analytical framework

Based on Donabedian (2005) Structure-Process-Outcome Model for Health Care Practice



The analytical framework in this case study gives the data structure and consistency for data analysis and for the interpretation of findings. The framework was also useful in the development of the aims, objectives and research questions for this study, which are presented next.

4.5 Aim and objectives

The aim of this study was to explore the role of nurse education in improving patient outcomes and patient satisfaction with nursing care, within different hospital-based and country-specific contexts. Findings generated from the Irish and German arms of the RN4CAST (Registered Nurse Forecasting: Human Resources Planning in Nursing) project were explored in depth to develop new insights into the interactions between the composition of nursing teams, the types of degrees, nurse demographic profiles, working conditions and care outcomes.

The objectives for this study were developed with the exploratory design, the theoretical propositions and with the multiple cases in mind. They were as follows:

- (1) to explore and compare nurse education levels, hospital and nurse structures, care processes and patient-related outcomes for selected nursing teams from the Irish and German arms of the RN4CAST project;
- (2) to explore factors other than nurse education affecting patient outcomes, including country-specific factors.

Based on the aims and objectives I developed the study questions, which are presented next.

4.6 Research questions

Both, Yin (2003, 2014) and Stake (2010) explained that the use of case study research is justified when ‘*how*’ questions are being asked. ‘How’ questions are exploratory in that they assist in investigating (Yin 2003, 2014). In this study ‘how’ questions assisted in exploring the role of nurse education within complex hospital structures. ‘How’ question, in this study, were also useful in comparing findings from hospitals and nursing teams (Yin 2003). They provided insights into the processes of care, as well as exploring how factors were interconnected.

Thomas (2011) added ‘*what*’ questions as another type of question, which are useful in creating an understanding in an exploratory case study. The idea is to find out more by asking ‘*what ?*’ (Thomas 2011). As the idea behind this case study was to find out more about the role of nurse education, ‘what’ questions were also used. The following four research questions guided the investigation:

1. What are the Irish and German RN4CAST findings on nurse education, hospital and nurse structures, care processes and patient-related outcomes, and do they compare?
2. What are the types of nurse education, hospital and nurse structures reported in selected hospitals and nursing teams, and how do they compare?
3. How do care processes, patient outcomes and patient satisfaction with nursing care compare across selected nursing teams, and according to nurse education levels?
4. What factors other than nurse education interact with the care provided by selected nursing teams, and how do they compare across selected nursing teams, hospitals and countries?

Before presenting the case selection process for this study, the approaches relating to RN4CAST are presented next, as data are drawn from this project.

4.7 RN4CAST project approaches

RN4CAST, the Nurse Forecasting: Human Resources Planning in Nursing study, was conducted over a 3-year period between 2009 and 2011. The study was funded under the 7th Framework Programme of the European Commission. It was coordinated by Professor Walter Sermeus, Catholic University Leuven, Belgium, with Professor Linda Aiken, University of Pennsylvania, as Vice-Coordinator. The RN4CAST consortium consisted of 12 European research teams including Belgium, England, Finland, Germany, Greece, Ireland, the Netherlands, Norway, Poland, Spain, Sweden and Switzerland. Three international co-operating partner countries of the European Commission (Botswana, China and South Africa) provided a broader perspective to the study. As such RN4CAST is the largest nurse workforce planning study that has been conducted to date. Further countries such as Italy and the USA have joined the consortium after the completion of the original study.

Dublin City University was the Irish member of the consortium in the original study. The Irish team was led by Professor P. Anne Scott, Principal Investigator, and involved Professor Anne Matthews, project coordinator, Dr. Roisin Morris, research fellow, Professor Anthony Staines, expert on administratively collected patient discharge data, and Dr Marcia Kirwan and Ms. Daniela Lehwaldt, research assistants / PhD students on the project. I was involved in RN4CAST from the beginning of the project. I prepared ethical applications for half (15) of the thirty acute public general hospitals, I negotiated access with the Directors of Nursing and I collected the data in these hospitals. I also entered data into the statistical data analysis package SPSS, cleaned and analysed data.

The aim of the RN4CAST project was to introduce an innovative approach to forecasting health workforce requirements by enriching standard forecasting methods with considerations

of quality of both nursing staff and quality of patient care; in addition to focusing on traditional supply and demand factors. The educational arrangements within hospitals and the influences that educational arrangements have on patient-related outcomes were of particular interest to me. This interest prompted me to design my own study and approaches to data analysis within RN4CAST for my PhD work (please refer to page 4 ‘Impetus for the study’ and page 141 ‘Case selection’ for further details).

A common protocol guided all aspects of the study for RN4CAST consortium members including sample determination, access to hospitals and data collection. This approach was taken to ensure comparability of data across all European research sites (Sermeus et al. 2011). At the same time, the study protocol integrated flexibility to allow for differences in the health systems.

Sample size determination within the Irish arm of the study was based on the target group ‘acute public hospitals’, as per RN4CAST research protocol (Sermeus et al. 2011). As the time of the commencement of the study, there were 51 acute public hospitals in Ireland. Only public hospitals submitted routine administrative patient discharge data, therefore we excluded private hospitals. When specialist hospitals, hospitals with fewer than 100 beds and hospitals without routine administrative/discharge data were excluded (as per RN4CAST protocol see Sermeus et al. 2011), there were 31 remaining hospitals. We applied for ethical approval in all of these hospitals (please refer to page 116 for details).

Within RN4CAST we identified all medical and surgical wards and then randomly selected 2 medical and 2 surgical wards per hospital, where 2 of each were available. All nursing staff in

direct patient care in each chosen ward was asked to participate (please refer to Appendix H: ‘RN4CAST study protocol’ for further details).

While sample size determination may include statistical calculation large-scale studies (Polit and Beck 2009), the number of cases included in a multiple case study depends on the certainty required from the findings (Yin 2014). Sample size determination, in case study research, is a discretionary and not a formulaic procedure (Yin 2014). In order to make comparisons across sites in this PhD study, a small selection of three hospitals and nursing teams was selected by means of multi-stage purposeful sampling (please refer to page 144 for details). It was decided that the number of three hospital cases and three embedded nursing team cases would be sufficient to yield insightful results, without losing the rich contextual background surrounding each case.

Any differences in data collection procedures had to be reported to and approved by the coordinating centre in Belgium through the consortium leaders (Sermeus et al. 2011). Survey data from hospitals, nurses and patients were collected in RN4CAST, which presented some ethical issues. The ethical issues relating to RN4CAST, and subsequently to this case study, are outlined in the following paragraphs. How ethical issues were addressed is also outlined.

4.8 Ethical issues

Ethical issues are present in any kind of research. They are generally the tensions created between the research aim and the rights of the participants, such as to remain private and autonomous, not to experience any harm and to benefit from the study (Polit and Beck 2009).

A number of ethical issues had to be addressed in the RN4CAST study, and subsequently for this case study.

Within the RN4CAST project participants' right to remain private was achieved by protecting confidentiality. Within the nurse and patient survey, confidentiality for patients and nurses included that no names were recorded on the survey or otherwise (please refer to Appendix F and G for details). It was necessary for the purposes of the study to link all data sources such as findings from the nurse survey, hospital survey, patient satisfaction survey and patient discharge data by hospital. For this reason the research team used identifiers to link the data. Following completion of the linking exercise, all identifiers were removed and replaced by codes. No hospitals, nurses or patients are identifiable in any reports. Within the patient discharge data, no name or identifiable data was accessed by the team. Access to this data for the purposes of this study was under the control of the Health Atlas/HSE personnel.

Data from all surveys is managed securely. It is stored in locked and password controlled storage systems for the duration of the project and for five years after its completion. Data will be securely destroyed after this timeframe has elapsed. In order to facilitate collaborative cross-country comparisons of RN4CAST, a copy of each database containing these data was sent to the consortium leaders (the co-ordinating centre in Leuven, Belgium) who stored a linked inter-country database on a secured server that was only accessible for researchers of the consortium leader team of the project. A copy of the data stored on the central server was sent to each team with data of their own country only. Data was only used for purposes within the scope of this project and will not be shared with third parties.

Participants' right to remain private was also protected in this study. Participation in this study was entirely voluntary. Nurses and patients were informed in a letter of their right to withdraw from the study at any point in time (please refer to Appendix F and G for details). Participation as well as withdrawal from the study did not affect nurses' employment status in any way nor did it affect patients' treatment in hospital in any way. Patients' and nurses' consent were assumed by completion and returning of the survey questionnaire.

Nurse participants are expected to benefit from this study through the data gathered in this study. It is envisaged that the knowledge gained in regards to nurse education and the contexts within which they provide care will assist in creating an awareness of the role of positive hospital-based factors and enhanced country-specific care environments. With this study, nurses also have an opportunity to influence national and international policy about nursing and health care by providing information to help improve the conditions of nursing practice, make health care safer for patients, and inform public policy decisions about nurse education.

Nurses and the hospital management also benefited from the feedback on the study findings, which were provided by the research team in the final phase of the study. Feedback was provided by way of presentation and a written report which was sent to participating hospitals and which is freely available on the World Wide Web. The idea of feedback provision is deemed important in terms of ensuring that participants have access to the outcomes of their participation in the study, as well as keeping them active and interested in research. It is envisaged that the study will ultimately impact positively on patient care in Ireland, Germany and all participating RN4CAST countries. This study will assist RN4CAST benefits through the insights developed in selected hospitals and nursing teams. The

following outlines the ethical approval procedures, which were completed prior to the commencement of RN4CAST data collection.

4.9 Ethical approval procedures

The RN4CAST protocol stipulated local (through the hospitals) and/or central (through universities) applications to research ethical committees (Sermeus et al. 2011). In order to safeguard the process of ethical approval, the consortium leaders developed strict criteria relating to sampling of hospitals, nurses and patients.

In Germany, research ethical procedures were consistent in that all participating hospitals accepted the approvals granted by the University Research Ethics Committee (U-REC). In Ireland, U-REC approval (please refer to Appendix A for details) was not accepted by hospitals. This meant that separate applications had to be submitted to the Research Ethics Committee (REC) of relevant hospitals. Hospital research ethical procedures varied in the sense that some hospitals had a local REC, whilst other RECs were part of hospital groupings. Responses from RECs in Ireland varied also.

While some Irish RECs found the information provided in the applications sufficient, others interviewed the researcher team at their meetings. One Irish REC also requested a revised application form. The inconsistency in research ethical procedures meant that applications took longer than originally anticipated in Ireland, reaching from 1.5 weeks to 26 weeks. All RECs approached for this study eventually granted research ethical approval (Scott et al. 2013). Following ethical approval, access to hospitals and their nurses was sought through the Director of Nursing (DoN). The access phase in RN4CAST is outlined in the following text.

4.10 Access to hospitals

During the access phase, hospital ‘link persons’ were identified (please refer to Appendix C for details). Both Ireland and Germany used the same approach. Link persons were the first point of contact for the research team during the data collection period. Hospital link persons were generally members of the nursing management team such as Assistant Directors of Nursing or Nursing Practice Development Co-ordinators. As with research ethical procedures, access to hospitals in Ireland was delayed in some instances due to meetings and clarifications requested by the DoN (Scott et al. 2013). Once access had been gained, the next step was data collection.

4.11 Data collection

The RN4CAST protocol stipulated that nurse survey data were to be collected in at least 30 hospitals in each of the participating consortium members. For a hospital to be eligible to participate, they had to have 100 or more beds. The type of hospital chosen for RN4CAST was general adult hospitals. This type of hospital was chosen, as they were viewed as the largest employers of nurses across Europe (Sermeus et al. 2011).

In some countries such as Ireland and Norway all of the hospitals within the country were invited to participate, as their total number of hospitals was close to the 30 hospitals required for RN4CAST data collection. For Ireland this meant that all 31 general adult hospitals with over 100 beds were invited to take part in the study. In Belgium, Germany, the Netherlands, Switzerland, England and Spain hospitals were selected randomly within strata, as they had more hospitals to choose from. A random within-strata sample means that hospitals were randomly selected within selected geographical locations (Polit and Beck 2009). In Germany,

where some randomly selected hospitals declined to participate, a second wave of hospitals was randomly selected for participation in the study. In addition, hospitals were given the opportunity to participate on a voluntary basis in Germany also. In the end, 30 hospitals participated in Ireland and 51 in Germany.

Data were collected on 2 to 6 general medical and surgical wards. Due to the limited number of wards available, 2 to 4 wards were generally included in the Irish arm of RN4CAST. In Germany 2 to 6 wards were included, depending on the hospital. Specialised wards such as intensive care and high dependency units, transplant units, paediatric wards, geriatric and long-term care areas were excluded from the sampling frame. The decision to focus data collection on general medical and surgical wards was based on the recognition that these areas were available in all of the participating countries including Ireland and Germany (Sermeus et al. 2011).

Data collection in Germany was conducted by means of a postal survey. The reason for this approach was the geographical distance between hospitals. Hospital link persons in Germany distributed the hospital and nurse surveys to relevant areas in the hospital and nurses sent their responses back in pre-paid envelopes. Reminder letters were sent by post, after 2 to 4 weeks into data collection (Sermeus et al. 2011).

A slightly different procedure was adopted in Ireland, where distances between hospitals were smaller. I travelled to each to me allocated hospital to deliver surveys. The link person of the hospital introduced me to relevant nursing teams. I then introduced the study and answered any relevant questions. The appropriate amount of surveys for each nursing team was identified with the help of the link person or the ward manager, and the surveys were left

on the wards. Nurses dropped the completed surveys in sealed envelopes into designated research boxes, which I collected at the end of the data collection period. In Irish hospitals, link persons were also involved in distributing reminder letters to the wards. Advice was sought from link persons regarding the timing of the sending of reminder letters, usually following a 2 to 4 week interval.

Patient satisfaction surveys in Germany were mailed to a selection of 12 hospitals (Sermeus et al. 2011). Patients were asked to return the completed surveys by pre-paid envelopes. In Ireland, patients of 10 hospitals that had taken part in the RN4CAST nurse survey were approached by the research team and asked to participate in the patient satisfaction survey. In all of the allocated wards I spoke with the ward manager in order to determine which patients would be able to complete the survey. At the end, I collected the completed patient satisfaction surveys from relevant wards (Scott et al. 2013). The following response rates were achieved.

4.12 Response rates

In both countries, Ireland and Germany, all participating hospitals completed the hospital (organisational) survey. The response rate for nurse surveys in Ireland was 56% (Scott et al. 2013) and 47% in Germany (Sermeus et al. 2011). Response rates per hospital ranged from 38-78%, while those at ward level ranged from 5% to 100% i.e. from 1 to 24 participants (Scott et al. 2013). The personal engagement of the researchers in Ireland may have contributed to achieving slightly higher response rates (Edwards et al. 2002, 2009). A total of 1,406 nurses working in 112 medical and surgical wards were included in the Irish arm of RN4CAST. In Germany a total of 1,492 nurses returned the survey.

Patient satisfaction data were sought in a sub-sample of RN4CAST countries, including Ireland and Germany, using a one-day approach to capture the experiences of nursing care (Sermeus et al. 2011). A total of 285 patients responded to the Irish patient satisfaction survey, yielding an overall response rate of 93%. The response rate varied between hospitals ranging from 83%-100% of patients approached (between 25 and 30 patients per ward) (Scott et al. 2013). A total of 262 patients returned patient satisfaction surveys in Germany. Table 4 provides an overview of response rates for the three sets of survey data (hospital, nurse and patient surveys).

Table 4: Response rates

Irish data	Response rate	Numbers administered	Numbers participated	Information on non-responders
Hospital (organisational) survey	100%	30	30	--
Nurse survey	56%	2,495	1,406	Response rates ranged from 38-78% on hospital level, while those at ward level ranged from 5% to 100% (i.e. from 1 to 24 participants) (Scott et al. 2013).
Patient satisfaction survey	93%	306	285	Response rate varied between hospitals ranging from 83%-100% of patients approached (between 25 and 30 patients per ward) (Scott et al. 2013).
German data	Response rate	Numbers administered	Numbers participated	Information on non-responders
Hospital (organisational) survey	100%	51	51	--
Nurse survey	47%	3,174	1,492	Not reported
Patient satisfaction survey	Not reported	Not reported	262	In order to complete the survey, patients had to be able to speak, read and understand the language of the questionnaire and to respond to the questions (Sermeus et al. 2011).

In order to use any of the data, including nurse and patient satisfaction survey data, from Germany for this study I had to negotiate permission to access data. The following outlines the use of a Memorandum of Understanding (MoU) to access German RN4CAST data.

4.13 Memorandum of Understanding

As the idea to include nurses' reports and patient ratings from Germany only arose following RN4CAST data collection, access to German data had to be negotiated with the German team. A Memorandum of Understanding (MoU) was agreed (please refer to Appendix E for details), which outlined the datasets required for the study. The MoU also clarified how I would approach related presentations and publications during and after the completion of the study. Some of the datasets required for the case study, especially patient discharge data, were large in electronic size. Patient discharge data was required to calculate patient factors during the case selection process (please refer to page 146 for details). The Belgian team (in their function as project leaders) provided me with access to a password protected web link where the German data were stored. Other than patient discharge data, I required access to the three German surveys such as the findings from hospital, nurse and patient surveys. Once access to German data had been established and the Irish data were collected, the next phase of data analysis began. Data analysis procedures for RN4CAST and for this case study are outlined next.

4.14 Data analysis

According to Stake (2005) data analysis in multiple case studies is mainly about comparing. This line of argument was continued by Yin (2011), who suggested that data analysis for multiple case studies should include case comparisons. For this study, this meant to generate findings relating to nurse education, nurse characteristics, hospital backgrounds, working

conditions, professional working relationships, care processes and patient-related outcomes, and to compare them.

Data analysis involved descriptive statistics, which were used to illustrate comparisons across Irish and German data sets. These included percentages and frequencies relating to the factors measured in this study. In addition, I generated a table of hospital profiles as contextual background data including percentages, frequencies and text relating to hospital bed occupancy, hospital staffing, management support for nurse education and hospital-based factors that influenced care.

Nursing teams' case comparisons in this study were largely based on Yin's (2011, 2014) templates for analysis. He suggested that if there are large numbers of individual responses available, comparisons may incorporate quantitative analytical techniques similar to other large-scale studies. If the numbers of responses are smaller, like in this study's nursing teams, word tables that display the data from individual cases according to one or more category should be used (Yin 2014). In this study a number of tables relating to various relevant categories were developed and used for the comparison of findings. As such there was a focus on the factor nurse education and the factors other than nurse education which assisted in improving patient-related outcomes.

The analysis was based on theoretical propositions, which is one of the recognised strategies for case study research (Yin 2014). The study's design and questions were based on theoretical propositions (please refer to page 88 and page 110 for details), which in turn reflected the findings from the review of the literature (please refer to page 101 in this chapter for theoretical propositions, and page 38 for the literature review). The theoretical

propositions, in this study, helped to organise the analysis and assisted in interpreting findings.

Each case's individual circumstances were also considered during data analysis. This is in line with one of Stake's (2006) statements where he recommended keeping an interest in each case during analysis. Each text and frequency table provides not only comparative but also individual findings relating to each participating team and hospital. It was envisaged that a combined individual-case and comparative approach would yield context-relevant findings.

4.15 Differentiating the work of RN4CAST from my own study

In RN4CAST the main focus was on modelling of relationships between independent and dependent variables. Regression models estimated the average differences in outcomes and the differences in the odds of various negative events. Nurse education levels were analysed in an aggregated way i.e. all degrees were pooled together into one independent variable. In this case study, nurses' education levels were examined together as well as separately. The impact of various types of degrees and apprenticeship on patient outcomes was examined, including sometimes very small numbers of participants. As such this study did not utilise inferential statistics but rather focused on achieving analytical generalisability (please refer to page 101 for details), as common in case study research (Yin 2014). There were no control variables in this study other than the ones used to determine cases (please refer to page 146), which is different to regression analysis where control variables apply (Hair et al 2010). While the analysis was partially variable-oriented, this case study also took into account the context in which differently educated nurses practiced, by comparing data in a more holistic approach.

4.16 Conclusion

This multiple case study draws on existing RN4CAST data. It has its own design and analysis strategy. The aim was to conduct case-comparisons between Irish and German survey responses in a unique way to yield insightful and context specific data on the role of nurse education in improving patient-related outcomes. An exploratory design was chosen as it assisted in studying the role of nurse education in improving patient-related outcomes in depth and based on relevant RN4CAST data. The design and methodology was guided by the works of renowned case study researchers. The study's aims, objectives and research questions were developed with the design, theoretical propositions and the analytical framework in mind. The approaches of the RN4CAST project guided the study in terms of ethical approval procedures, access to hospitals and study participants and in regards to data collection. Data were analysed using case comparisons based on theoretical propositions, a strategy recommended for multiple-case study designs (Yin 2014). The following chapter presents the research tools and case selection process utilised in this study.

CHAPTER 5: RESEARCH TOOLS AND CASE SELECTION

5.1 Introduction

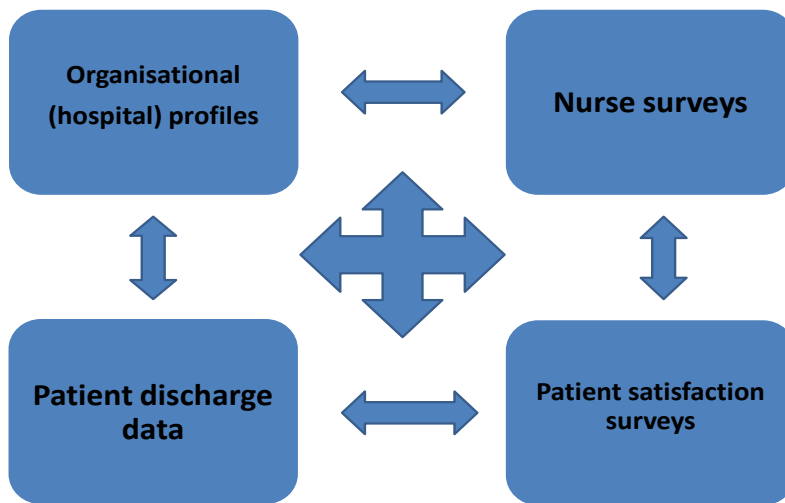
This chapter presents the RN4CAST research tools, as data in this case study are drawn from this project. Emphasis is placed throughout the chapter on the parts that are of particular relevance to this case study. The case selection process, including multi-stage purposeful sampling, is outlined after the research tools have been presented. This includes a detailed account of hospital case selection and the selection of nursing teams according to education level and specialty. At the end of this chapter, the final three cases (hospitals) and embedded cases (nursing teams) are presented. The research tools are outlined first.

5.2 Research tools

This case study has its own design and analysis approaches, as outlined in the previous chapter (pages 89-99). The study draws on the research tools of the RN4CAST project, as the idea is to explore Irish and German data in more depth. Three of the four research tools in RN4CAST were surveys. Hospital (organisational), nurse and patient satisfaction data were collected in separate survey questionnaires. An example of the three survey questionnaires can be found at the end of this document in the Appendix section (please refer to Appendix B, F and G). The fourth research tool related to patient discharge data, which was collected administratively through the HSE Health Atlas, after seeking permission from Hospital Managers to access the data (please refer to Appendix D for an example).

The information gathered from the four research tools was linked via common identifiers to examine links between nurse qualifications, work environments and nurse and patient outcomes. The following figure illustrates how RN4CAST research tools were linked.

Figure 3: RN4CAST research tools



According to Stake (2006) and Yin (2009) a hallmark of case study research is it explores phenomena in consideration of the contexts in which they occur. It is envisaged that contextual details can be unlocked through the exploration of RN4CAST survey findings. For this case study, the three surveys such as the hospital, nurse and patient satisfaction surveys were utilised for the exploratory part. Patient discharge data was utilised during the case selection process only. The following text outlines the content of RN4CAST research tools, with an emphasis on the parts relevant to this case study. Patient discharge data is outlined first.

5.3 Patient discharge data

Patient discharge data, specifically administrative hospital discharge data sets, were used in RN4CAST to estimate hospital-specific patient outcome measures such as mortality and failure-to rescue (Sermeus et al. 2011). In this study, patient discharge data were used during the selection process. Patient average ages and number of diagnoses were determined from this data and compared across potential cases (please refer to page 126 for details). All RN4CAST countries, except Greece, had some type of hospital discharge datasets in use

(Sermeus et al. 2011). Patient discharge data from the Irish and German arms of RN4CAST were utilised. The next research tool that was used in this case study was the hospital (organisational) survey, which is presented in the following paragraph.

5.4 Hospital survey

The hospital (organisational) survey is a detailed questionnaire (please refer to Appendix B for details). Each participating hospital received one hospital survey. The questionnaire was completed by a member of the nursing management team, usually the Director or the Assistant Director of Nursing. The survey provides data about general hospital factors including ownership (public or private), teaching status and technology level. In this study this information was utilised for case section, as is outlined later in this chapter. Information in regards to in-patient admissions, bed numbers and occupancy rate, medical and surgical bed capacity and hospital staffing was also captured in the hospital survey. This data was used to determine the contextual hospital-based background.

Other RN4CAST hospital survey data utilised in this case study related to management support for nurse education, and regular performance appraisal. Most questions in the survey had closed response options in that managers had to tick the relevant box or fill in the relevant number in the appropriate places on the questionnaire. There were a few areas, which allowed for comments. For example, comments could be added under Question 14: ‘Recent changes that help understanding nurse survey and patient outcome data’. Information in this question related, for instance, to ward mergers or the opening of new facilities. The comments that managers of selected hospitals recorded provided useful additional background data for this case study. The next RN4CAST research tool was the nurse survey, which is outlined in the following text.

5.5 Nurse survey

The nurse survey is an 8-page questionnaire (please refer to Appendix F for details). Only staff nurses in direct patient care roles were invited to complete the nurse survey, as is outlined in the nurse invitation letter (please refer to Appendix F for details). Nurses were invited to record their answers in regards to four sections, namely:

Section A: ABOUT YOUR JOB

Section B: QUALITY AND SAFETY

Section C: ABOUT YOUR MOST RECENT SHIFT AT WORK IN THIS HOSPITAL

Section D: ABOUT YOU

An additional section in the nurse survey (Section E) included questions for the Irish arm of the RN4CAST project. These were less useful to this case study, as they lacked a comparative data set from Germany.

The nurse survey captured demographic data relating to participating nurses such as their age, gender, nursing experience, international work experience and nurse education level (Section D). Nurses were also asked about their working conditions such as the hours worked in the most recent shift, the number of patients cared for and nurses' role in caring for patients on their most recent shift were collected (Section C). Nurses reported on their perceptions of quality of care and the culture of patient safety (Section B). These were measured using single item questions. Another set of single item questions related to nurses' level of job satisfaction. A number of specific aspects of job satisfaction including work schedule flexibility, opportunities for advancement, independence at work, professional status and educational opportunities were measured. The published reliability coefficients for single-item job satisfaction ranged from 0.70-0.80 (Sermeus et al. 2011), which can be considered

adequate (Polit and Beck 2009). Nurses were also asked about their perceptions on aspects relating to their job (Section A) such as the work environment and levels of burnout.

5.6 Specific nurse survey data of interest

Most of the data explored in this case study stem from the **nurse survey**. Data relating to nurse demographics (Section D) including age, nursing experience, international work experience and nurse education levels were utilised. In order to obtain the required level of detail in regards to nurse education levels, a number of calculations had to be carried out prior to exploring the findings. The calculation of nurse education levels is presented next.

5.6.1 Calculation of nurse education levels

The number of nurses with a pre-registration degree was calculated from the following three RN4CAST nurse survey questions in Section D, including:

D6: Do you have a baccalaureate degree in nursing?

D3a: Did you receive your basic nursing education in the country where you currently work as a professional nurse?

D9: How many years have you worked as a registered nurse in your career?

The first question established if the nurse had a degree. Nurses' answers to the second and third question were used to identify the type of degree. The first graduates of the pre-registration degree programme entered the workforce in 2006. As RN4CAST data were collected in 2009, nurses with a degree in nursing obtained in Ireland in the past 3 years were selected for the category 'pre-registration degree'.

The number of nurses holding a post-registration degree was calculated from the same RN4CAST nurse survey questions, namely D6, D3a and D9. Nurses with a degree obtained

in Ireland more than 3 years prior to data collection were categorised into ‘post-registration degree’.

The numbers of nurses with an international degree were calculated from the following RN4CAST nurse survey questions:

D6: Do you have a baccalaureate degree in nursing?

D3a: Did you receive your basic nursing education in the country where you currently work as a professional nurse?

D3b: If no, in what country did you receive your basic nursing education?

As with the other two categories, question D6 was utilised to establish if participating nurses had a degree. The second and third question (D3A and D3b) assisted in identifying that the degree was obtained outside of Ireland. Nurses who reported holding a degree from outside of Ireland were categorised into ‘international degree’.

The number of apprenticeship trained nurses was calculated from RN4CAST nurse survey question **D6**. A negative response to this question indicated that the participating nurse practiced without a degree, which was the categorised into ‘apprenticeship training’.

I was potentially interested in all of the RN4CAST data, but specifically I was interested in investigating the factors that directed the provision of care of differently educated nurses in selected hospitals. Demographic profile data such as age, nursing and international experience were determined through single question where nurses could either record the relevant number or where they provided a tick box response. Other factors such as non-nursing duties and nurses’ perceptions on the work environment were measured differently,

which will be shown in the following paragraphs. Non-nursing duties in the nurse survey are outlined next.

5.6.2 Non-nursing duties

A list of items which might be interpreted as “non-nursing” duties was provided in the RN4CAST nurse survey in Section C in question: **C11:** On your most recent shift, how often did you perform the following tasks?

Participating nurses were asked to rate how often they performed these tasks on their most recent shift on a 3 point Likert scale ranging from ‘never’ over ‘sometimes’ to ‘often’. Items included the following:

- Answering phones and clerical duties
- Obtaining supplies and equipment
- Filling in for non-nursing services not available at the end of the shift or at the weekend
- Cleaning patient rooms and equipment
- Performing non-nursing care
- Transporting of patients within the hospital
- Routine phlebotomy for tests
- Arranging discharge referrals and transportation
- Delivering and retrieving food trays.

Non-nursing duties, in this case study formed part of the structures as they were interpreted as guiding the care provided by nurses with different educational background. The following explains the Practice Environment Scale – Nursing Work Index (PES-NWI).

5.6.3 Practice Environment Scale - Nursing Work Index

To examine nurses’ views relating to the supporting and inhibiting structure factors of their work environment in RN4CAST, the 32-item Practice Environment Scale-Nurse Working

Index (PES-NWI) was utilised. PES-NWI was developed by Lake (2002), which means that an existing tool was used in the RN4CAST project and in this case study. Using an existing tool is advisable particularly if it has been widely tested (Hair et al. 2010). PES-NWI has repeatedly been tested and has shown to be a reliable tool (Lake 2002, McCusker et al. 2004, Leiter and Spence Laschinger 2006, Lake 2007, Hanrahan 2007, Liou and Chen 2009, Bruyneel et al. 2009, Byron et al. 2010, Parker et al. 2010). Within PES-NWI nurses' perceptions of their work environment was measured in five sub-scales. The sub-scales included the following:

1. Staffing and resource adequacy
2. Nurse manager ability, leadership, and support of nurses.
3. Collegial nurse-physician relations
4. Nursing foundations for quality of care
5. Nurse participation in hospital affairs.

A number of questions on the survey related to each of the sub-scales. Table 4, on the following page, outlines the questions under each PES-NWI sub-scale:

Table 5: PES-NWI nurse survey questions for each sub-scale

PES-NWI Sub-scale	Nurse survey question
1. Staffing and Resource Adequacy	A1: Adequate support services allow me to spend time with my patients. A8: Enough time and opportunity to discuss patient care problems with other nurses. A9: Enough registered nurses on staff to provide quality patient care. A12: Enough staff to get the work done.
2. Nurse manager ability, leadership, and support of nurses	A3: A supervisory staff that is supportive of nurses. A10: A nurse manager who is a good manager and leader. A14: Praise and recognition for a job well done. A22: A nurse manager who backs up the nursing staff in decision making, even if the conflict is with a physician.
3. Collegial nurse-physician relationships	A2: Physicians and nurses have good working relationships. A17: A lot of team work between nurses and physicians. A26: Collaboration between nurses and physicians. A7: Physicians value nurses' observations and judgments. A13: Physicians recognize nurses' contributions to patient care. A21: Physicians respect nurses as professionals. A30: Physicians hold nurses in high esteem.
4. Nursing foundations for quality of care	A4: Active staff development or continuing education programs for nurses. A15: High standards of nursing care are expected by the management. A19: A clear philosophy of nursing that pervades the patient care environment. A24: An active quality assurance program. A27: A preceptor program for newly hired nurses. A28: Nursing care is based on a nursing rather than a medical model. A31: Written, up-to-date care plans for all patients. A32: Patient care assignments that foster continuity of care (i.e., the same nurse cares for the patient from one day to the next). A20: Working with nurses who are clinically competent.
5. Nurse participation in hospital affairs	A6: Opportunity for registered nurses to participate in policy decisions. A5: Career development/clinical ladder opportunity. A11: A chief nursing officer who is highly visible and accessible to staff. A16: A chief nursing officer is equal in power and authority to other top level hospital executives. A18: Opportunities for advancement. A23: Management that listens and responds to employee concerns. A25: Registered nurses are involved in the internal governance of the hospital (e.g., practice and policy committees). A29: Registered nurses have the opportunity to serve on hospital and nursing committees.

Whilst all sub-scales were potentially of interest, the most relevant for this case study was PES-NWI sub-scale 4. 'Nursing foundations for quality of care'. This sub-scale contains questions relating to nurse education and working with clinically competent nurses.

Nurses rated PES-NWI total scale and sub-scales on a Likert scale from ‘strongly disagree’ to ‘strongly agree’, 1-4, poor to good. PES-NWI was the one out of the two scales used in this study. The following section outlines the Maslach Burnout Inventory (MBI).

5.6.4 Maslach Burnout Inventory

Nurses’ levels of burnout were measured in the RN4CAST nurse survey in Section A under question: **A9:** Please mark the response that best described how frequently you have each feeling in relation to your current job in this hospital.

Data were collected through the Maslach Burnout Inventory (MBI) originally developed by Maslach et al. (1996). MBI is a 22-item scale which includes the following three sub-scales:

1. Emotional Exhaustion (EE)
2. Depersonalisation
3. Nurses’ level of personal accomplishment.

Nurse responses in MBI are measured on a 7 point Likert scale ranging from ‘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’. The most utilised and tested sub-scale of MBI is EE (Bruyneel et al. 2009). The EE sub-scale has also shown to be the most reliable measure of work-related burnout (Maslach 1996, Bruyneel et al. 2009, Poghosyan, Aiken and Sloane 2009). The maximum score for this scale is 54. Findings may be interpreted in the following way.

A score of 0-16 may be interpreted as ‘low emotional exhaustion levels’, a score of 17-26 may be interpreted as ‘medium levels of emotional exhaustion’ and a score of over 27 may be interpreted as ‘high levels of emotional exhaustion’. The higher the score on the sub-scale, the more increased is the degree of emotional exhaustion (Maslach 1996). Through the

literature review conducted previously, I became particularly interested in the items under the sub-scale EE of MBI relating to fatigue, which are outlined below.

5.6.5 The sub-scale emotional exhaustion and items relating to fatigue

It was decided that these items will be used in this case study, as previous research has shown links between EE and patient outcomes (please refer to pages 75 for details). Findings relating to emotional exhaustion in this study provide indications i.e. they are viewed as intermediate nurse outcomes. As such they form part of the process factors explored in this case study. The sub-scale EE contains 9 items, which are as follows:

1. I feel emotionally drained from my work (Question A9.1 on the nurse survey).
2. I feel used up at the end of the workday (A9.2).
3. I feel fatigued when I get up in the morning and have to face another day on the job (A9.3).
4. Working with people all day is really a strain for me (A9.6).
5. I feel burned-out from my work (A9.8).
6. I feel frustrated by my job (A9.13).
7. I feel I'm working too hard on my job (A9.14).
8. Working directly with people puts too much stress on me (A9.16).
9. I feel like I'm at the end of my rope (A9.20).

MBI, including the items relating to the sub-scale EE, has been tested for validity and reliability in previous research (Poghosyan, Aiken and Sloane 2009). In order to further validate both of the scales such as PES-NWI and MBI, the RN4CAST team conducted Content Validity Indexing (CVI). The process of CVI is outlined in the following section.

5.6.6 Content Validity Indexing Processes

During CVI, independent experts evaluated the content of the two main scales utilised in the RN4CAST nurse survey. In Ireland the experts were 8 hospital-based nurses. They were identified by the research team through personal contacts. Experts were invited to rate each

item on a scale from 1 to 4, with 1 = not relevant and 4 = highly relevant. The rating process was completed online, anonymously, in September 2009. Ratings were then analysed for chance agreement between raters. The CVI ratings indicate whether or not the research tool measures what it is intended to measure, and the likelihood that the data collected reflects the context under analysis (Polit, Beck and Owen 2007). CVI for PES-NWI was 0.79 and 0.64 for MBI. Both ratings were deemed acceptable (Scott et al. 2013). Before research tools could be used in non-English speaking countries such as Germany, they had to be translated. The process of translation is outlined in the following section.

5.6.7 Translation

To enable usage in Germany, the translation of the original survey into German was required. The translation-back translation method was used (Sermeus et al. 2011). This meant that surveys were translated from English into German, and then back into English again. No changes to the original template, single item questions, scales and items in scales were allowed. CVI was conducted following the translation process in Germany. The aim of CVI was to assess the degree to which the survey maintained appropriate items to represent the construct of interest (Polit, Beck and Owen 2007). CVI process was similar in Germany, compared to Ireland in that a panel of experts anonymously rated each item on a scale from 1 to 4, with 1 = not relevant and 4 = highly relevant. CVI was found to be within acceptable ranges (Sermeus et al. 2011). The following text relates to the process factors explored in this case study.

5.6.8 Tasks necessary, but left undone due to lack of time

For this question (Section C Question 12), nurses were asked to rate the activities that were, in their opinion, necessary but left undone because they lacked the time to complete them. Nurses could tick multiple answers (mark all that apply). The list related to thirteen tasks, including the following:

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
12. Planning care
13. Frequent changing of patient position

Tasks necessary, but left undone due to lack of time during the most recent shift were part of the process factors in this case study. The tasks indicated how patients were cared for by selected nursing teams, hence providing intermediate outcome data. Findings relating to the domain outcome were also obtained through the nurse survey, and this is outlined in the next section.

5.6.9 Nurse-reported patient outcomes

Nurse-reported patient outcomes were measured in the nurse survey in Section B under question: **B7**: How often would you say each of the following incidences occur involving you or your patients?

For this question, nurses were provided with a list of adverse patient outcomes and asked to indicate how often each incident occurred. Nurse-reported outcomes included ‘pressure ulcer development after admission’, ‘patient received wrong medication, time or dose’ and ‘patient falls with injury’. These patient outcomes were used as they relate to direct patient care provided by the nurses who participated in this study. The three outcomes were also used in this case study, as they related well to the selected process factors (please refer to page 107 for details). Other outcomes in RN4CAST measured the incidences relating to various hospital-acquired infections including ‘pneumonia’, ‘bloodstream infection’ and urinary tract infection’. Nurses rated their answers on a 7 point Likert scale ranging from ‘never’ to ‘every day’.

For the purpose of this study, a frequent occurrence of nurse-reported patient outcomes is interpreted as unfavourable. The idea is that adverse incidences should occur less frequently and therefore should be reported less frequently, if care is safe and effective. Nurses’ reports of adverse patient outcomes are not interpreted as formal incidence reports, as this would go beyond the scope of this question. Another tool in RN4CAST that provided findings related to the domain outcome was the patient satisfaction survey, which is outlined next.

5.7 Patient satisfaction survey

The patient satisfaction survey (please refer to Appendix G for details) used in RN4CAST was a modified version of the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey. In the USA the HCAHPS (Hospital Consumer Assessment of Healthcare Providers and Systems) survey was the first national and standardised survey of patients’ perspectives of hospital care. The survey measures patients’ perceptions of their hospital

experience. The items of the survey included six summary measures, two single items and two global ratings (Sermeus et al. 2011). A cross-cultural evaluation of CAHPS conducted by Squires et al. (2012) suggested that translations and content of the patient satisfaction survey are relevant across countries and languages of the countries participating in RN4CAST.

Within the survey, patients rated their general experience of their hospital stay, but also specific experiences relating to physician and nurse communication. Patients also rated the information received in relation to new medicines and discharge nurses' level of responsiveness in regards to bells and toileting requests and nurse assistance with regards to pain control.

In five of the RN4CAST countries (Belgium, Poland, Greece, Finland and Switzerland) all selected hospitals were included in the patient satisfaction surveys. In most other countries, including Ireland and Germany, patient satisfaction surveys were distributed in a selection of hospitals (please refer to page 119 for details). The criterion used in the RN4CAST study was that respondents had to be an inpatient for at least three nights to be eligible to complete the questionnaire. This criterion was used to ensure that patients were able to form a judgment based on the nursing care received and that patients had overcome the initial phase of recovery.

For this case study only the nurse specific parts of the **patient satisfaction surveys** were of interest. These included patient ratings on nurse communication. Question 1 to 3 were selected, which read as follows:

1. During this hospital stay, how often did nurses treat you with courtesy and respect?
2. During this hospital stay, how often did nurses listen carefully to you?

3. During this hospital stay, how often did nurses explain things in way that you could understand?

Other patient satisfaction with nursing care items utilised for this case study relate to pain control. This includes question 13 and 14 on the patient survey, which read as follows:

13. During this hospital stay, how often was your pain well controlled?
14. During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?

While it is acknowledged that various hospital staff may have been involved, pain control is considered a main aspect of nursing care in this study. The same view, that nurses are key players in the provision of care, is taken in regards to information provided at discharge. Patients were asked the following question:

19. During this hospital stay, have doctors, nurses or other hospital staff talked with you about your care after you leave the hospital?

Patients rated their satisfaction with nursing care on a scale from 1-4, poor to good (1. Never 2. Sometimes 3. Usually 4. Always). The following section is a detailed account of the case selection process in this study.

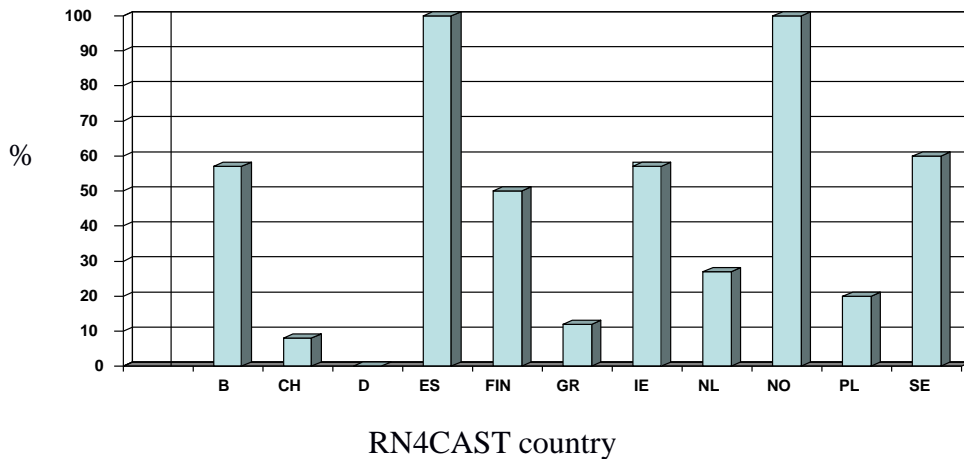
5.8 Case selection

According to Stake (2010), case selection usually begins with cases already at least partially defined. This is also true for this study. The difference in nurse education levels became apparent when the first preliminary cross-country findings were presented at an RN4CAST consortium meeting. Nurses participating in the Irish arm of RN4CAST reported large proportions (58%) of degree education. As such, the level of degree educated nurses reported for Ireland was higher than the level of degree educated nurses in the overall RN4CAST project. A recent report published by Aiken et al. (2014) showed that on average 52% of nurses participating in RN4CAST had a degree. The data also suggests that a proportion of approximately 42% (in the Irish arm of RN4CAST) and 48% (in the overall RN4CAST project) of respondents were apprenticeship trained nurses.

Germany was the only consortium member in RN4CAST reporting no (0%) degree educated nurses. Considering the nurse education context in Germany (please refer to page 20 for details), this finding implied that nurses in the German arm of RN4CAST were exclusively apprenticeship trained. The wish to finding out more about the implications of this discrepancy between nurse education levels in Germany and Ireland on patient care prompted me to design and conduct this study as my doctoral thesis.

The following figure is a re-creation of a slide which presented the percentages of nurses with degree by RN4CAST country at the consortium meeting in October of the year 2010. The countries included in this presentation were Belgium (B), Switzerland (CH), Germany (D), Spain (ES), Finland (FIN), Greece (GR), Ireland (IE), the Netherlands (NL), Norway (NO), Poland (PL) and Sweden (SE). Data relating to nurse education levels from England were unavailable at this stage.

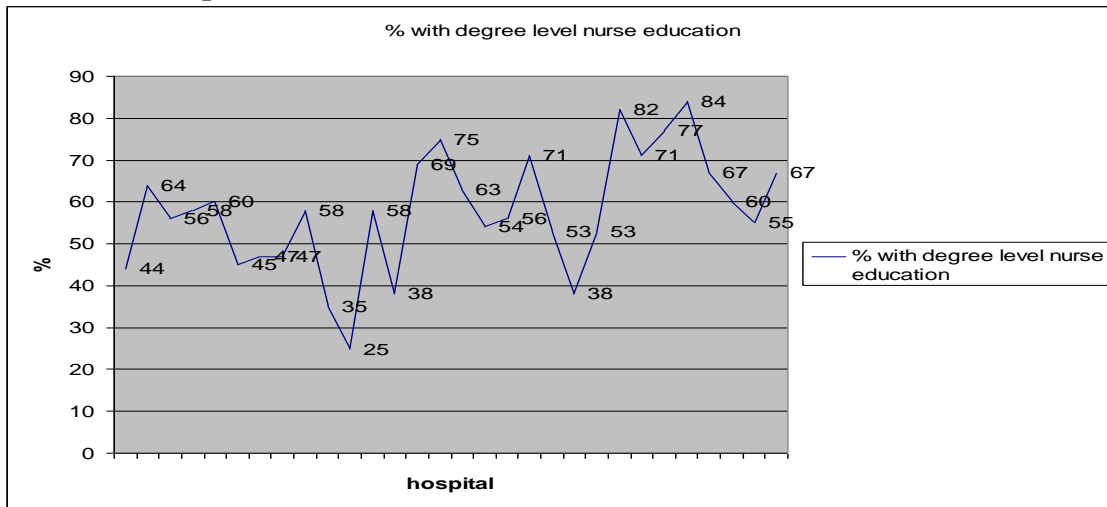
Figure 4: Percentages of nurses with degree by RN4CAST country²



Another observation that was made during the time of preliminary data analysis in Ireland was that there were *between*-hospital variations. This meant that although degree nurse education in the Irish arm of RN4CAST were on average 58%, the proportions of degree educated nurses varied from 25% to 84% between Irish hospitals. Data relating to *in*-hospital variations, such as the variations in the proportions of degree educated nurses from one team working on a ward to another had not been analysed at that stage. Based on my past experience of working in clinical practice, I assumed that the proportions of degree educated nurses (and apprenticeship nurses) would also vary within hospitals. The following Figure 2 depicts between-hospital variations in the proportions of degree educated nurses in Ireland. Data relates to the 30 participating hospitals in the Irish arm of RN4CAST.

² Figure 4 is a re-creation of the slide from an RN4CAST consortium meeting presentation. Handout received on 12.10.2010

Figure 5: Between-hospital variations - percentages of degree educated nurses in Irish RN4CAST hospitals



Taking between-hospital and in-hospital variations in the proportions of degree educated nurses into consideration, the hospitals and nursing teams for this case study had to be selected carefully. This was a challenging process, as it meant deciding on a small number of hospitals and nursing teams that represented the population (nurses with different educational background) under investigation.

The challenge in selecting cases also related to identifying hospitals that were similar in regards to size, teaching status and technology level, patients' average age and number of diagnoses. It had been decided that these factors would be controlled for to ensure that the type of patients would be similar for each hospital and nursing team. At the same time the nursing teams should be dissimilar in terms of nurse education levels. It was hoped that nursing teams with various education levels, ranging from teams with large proportions of degree educated nurses to teams with fewer and no degree educated nurses, would be found in hospitals which matched in terms of hospital and patient factors. The following outlines the steps taken in a multi-stage purposeful sampling procedure.

5.9 Multi-stage purposeful sampling

For most studies, which involve surveys, random sampling would probably be considered the most robust method (Polit and Beck 2009). As this was not a typical survey-based study, but a case study, random sampling was unlikely to yield a sample representative of the population (Seawright and Gerring 2008). The sample of cases and embedded cases in this study was small, which is common in case study research (Stake 2010, Yin 2009, Sharp et al. 2012). Sharp et al. (2012) also suggested that no universal rule exists in regards to selecting the number of cases for multiple case studies. Yin (2009) maintained that the number of cases depends on the amount of certainty required for the research findings. For this study, it was envisaged that the number of three cases and embedded cases would be sufficient to explore the role of nurse education in improving patient-related outcomes. It was envisaged that the number of three cases and embedded cases would assist in developing insights into hospital-based and country-specific contexts in which nurses with different educational backgrounds provide care.

Hospital cases, in this study, had to be similar in terms of size, teaching status and technology level and in regards to the patient factors such as average age and number of diagnoses. Similarity in regards to these factors ensured that the type of care provided by nurses was comparable between hospitals. The nursing teams in this case study, in contrast, would be different in regards to education levels to ensure that new insights about their contribution to care may be discovered.

The different sets of requirements for hospitals and nursing teams prompted me to take a multi-stage approach to hospital case and embedded nursing team case selection. In total there were five stages in the case selection process, which are outlined next.

5.9.1 Sampling procedure

The first four stages of the multi-purposeful sampling procedure allowed for the selection of **hospital cases**. The purposes of these stages were:

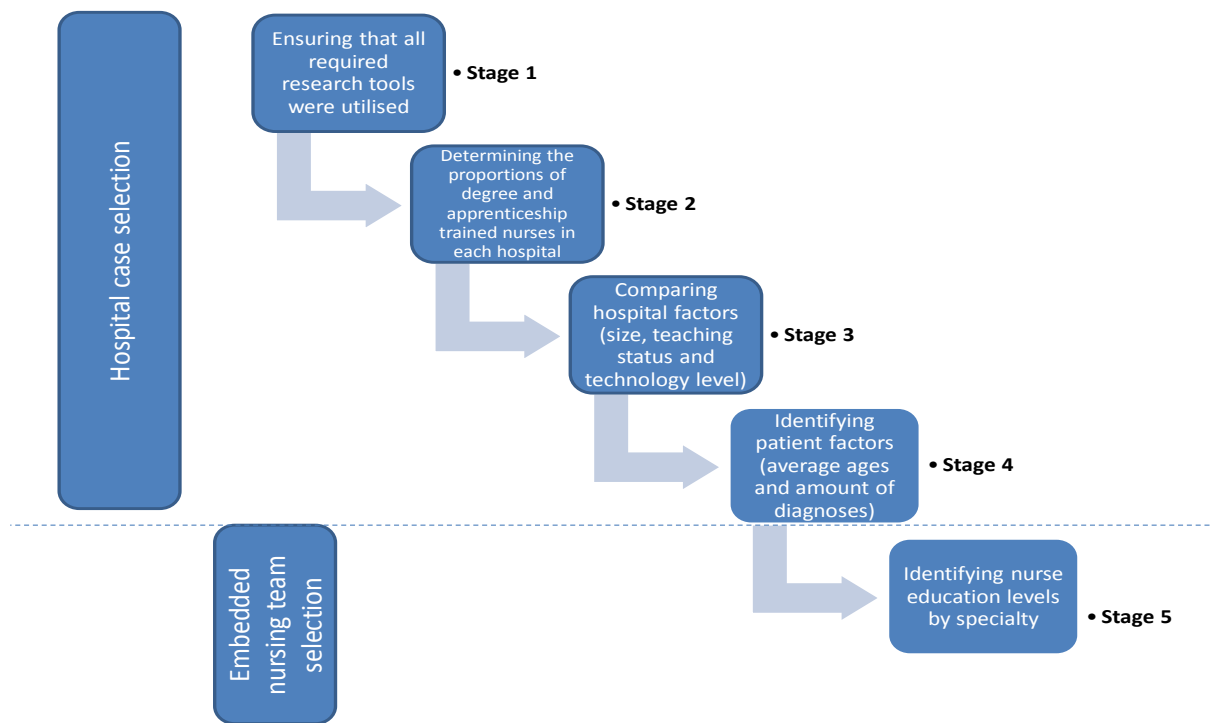
1. 'Ensuring that all required research tools were utilised within the cases'
2. 'Determining the proportions of degree and apprenticeship trained nurses in each hospital'
3. 'Comparing hospital factors'
4. 'Identifying patient factors' within hospital cases.

From the hospitals selected through the first four steps, embedded nursing teams were identified in stage five of multi-stage purposeful sampling. Embedded case selection was based on levels of degree and apprenticeship trained nurses and the specialty (i.e. medical or surgical) in which they practiced. In short, the final step involved:

1. 'Identifying nurses' education levels by the specialty'.

Embedded nursing team cases consisted of those nurses who took part in the RN4CAST nurse survey. Nurses who did not participate in the survey could not be considered for embedded team selection, as their education levels were unknown to me. Specialty, in this study, means that participating nurses worked at the time of data collection as a team on a ward within the same nursing specialty. For instance, they may have worked as a team on a general medical or general surgical ward. The following Figure 6 outlines the multi-stage purposeful sampling procedure utilised in this study, which assisted in determining hospital cases and embedded nursing team cases.

Figure 6: Multi-stage purposeful sampling procedure



The hospital (case) and nursing team (embedded case) selection process, including its criteria for selection, is outlined next. To protect confidentiality no names of hospitals and nursing teams are included. Instead hospitals and teams were coded with identification numbers and alphabetical codes.

5.9.2 Hospital case selection

Apart from structures and nurse education levels, the practicality of available RN4CAST data was a driving force in the purposeful selection of cases for this study. For example, there was no point in exploring the role of nurse education in hospitals for which the relevant patient-related outcomes data were missing. In particular, it needed to be ensured that patient satisfaction survey data were available within all hospital cases selected for this study, as these data were only collected in a sub-set of RN4CAST hospitals (please refer to page 111 for details).

Stage 1 The availability of the patient satisfaction survey data was the first consideration within case selection, as this data provided part of the patient outcomes measurement for this study. Nurse-reported patient outcomes were available for all participating hospitals in RN4CAST. Patient satisfaction survey data was only collected in 10 out of the 30 Irish RN4CAST hospitals and in 12 out of the 51 German RN4CAST hospitals (please refer to page 117 for details). The 10 Irish hospitals with patient satisfaction data were identification (ID) number 2, 3, 12, 14, 15, 16, 23, 24, 25 and 26. The 12 German hospitals with patient satisfaction data were ID number 1, 6, 11, 15, 16, 22, 34, 37, 38, 42, 46 and 51. The availability of patient satisfaction data immediately reduced the number hospitals suitable for this study. The second stage of purposeful sampling related to nurse education levels.

During **Stage 2** the proportions of degree and apprenticeship trained nurses per hospital were calculated for the remaining hospitals. Education levels were identified from the RN4CAST nurse survey (please refer to page 129 for details). It was assumed, for this study, that all nurses who did not report having a degree were apprenticeship trained. The following two tables show the data for Stage 2 of case selection for Irish and German data. The proportion of nurse education is depicted in percentages (%), followed by the number of nurses who reported the given education level (n) and the total number of participating nurses (total).

Table 6: Case selection stage 2 - Irish data

Hospital ID	Proportion of degree nurses % (n/total)	Patient satisfaction data
2	72 (38/59)	√
3	60 (33/59)	√
12	61 (28/46)	√
14	72 (38/54)	√
15	76 (45/60)	√
16	64 (35/56)	√
23	46 (19/41)	√
24	84 (35/41)	√
25	83 (24/29)	√
26	77 (23/30)	√

Table 7: Case selection stage 2 - German data

Hospital ID	Proportion of apprenticeship trained nurses % (n)	Patient satisfaction data
1	100 (40)	√
6	100 (36)	√
11	100 (59)	√
15	100 (32)	√
16	100 (24)	√
22	100 (29)	√
34	100 (40)	√
37	100 (28)	√
38	100 (67)	√
42	100 (56)	√
46	100 (33, 1 degree nurse)	√
51	100 (56)	√

The Tables 5 and 6 provide an overview of the proportions of nurses educated at apprenticeship and degree level in both of the participating countries. In the German Table 6 there was a hospital with one degree nurse (ID 46). This hospital was excluded from the next stage of case selection, as there was a sufficient number of hospitals with exclusively apprenticeship trained nurses. Stage 3 was dedicated to comparing hospital and patient factors.

Stage 3 of the case selection process involved identifying hospitals that were similar in size, teaching status and technology level. The following Table 7 shows the results for hospital factors considered in the case selection process. Hospital size relates to each hospital's bed number. The teaching status was identified from hospitals' reports (Yes or No) in regards to their university teaching status. The technology level was categorised by the availability of organ transplantation or open heart surgery in the hospital. Technology level was categorised into 'low' (no organ transplantation and/or open heart surgery) or 'high' (organ transplantation and /or open heart surgery available), as per categorisation in previous research (please refer to page 41 for details). At this stage, hospitals were provided with a new ID. Hospitals were sorted in numerical order, with the RN4CAST ID in brackets.

Table 8: Case selection stage 3 - Hospital factors

IRELAND					
ID (RN4CAST Hospital)	Proportion of degree nurses % (n/total)	Patient survey	Hospital size	University hospital	Technology status
1 (2)	72 (38/59)	√	474	No	Low
2 (3)	60 (33/59)	√	332	No	Low
3 (12)	61 (28/46)	√	246	No	Low
4 (14)	72 (38/54)	√	402	√	Low
5 (15)	76 (45/60)	√	620	√	High
6 (16)	64 (35/56)	√	349	√	Low
7 (23)	46 (19/41)	√	324	No	Low
8 (24)	84 (35/44)	√	612	√	High
9 (25)	83 (24/29)	√	115	No	Low
10 (26)	77 (23/30)	√	122	No	Low
GERMANY					
ID (RN4CAST Hospital)	Proportion of apprenticeship trained nurses % (n)	Patient survey	Hospital size	University hospital	Technology status
1 (1)	100 (40)	√	514	No	Low
2 (6)	100 (36)	√	447	No	Low
3 (11)	100 (59)	√	1,132	No	Low
4 (15)	100 (32)	√	412	No	Low
5 (16)	100 (24)	√	429	No	Low
6 (22)	100 (28)	√	618	No	Low
7 (34)	100 (40)	√	128	No	Low
8 (37)	100 (28)	√	1,384	√	High
9 (38)	100 (67)	√	804	√	High
10 (42)	100 (56)	√	1,139	√	High
11 (51)	100 (56)	√	1,769	No	High

From this overview of hospital factors, developed in Stage 3, it is apparent that the majority of participating German hospitals were non-university teaching and operated at a low technology level (highlighted in bold fonts). The decision was made to exclude university teaching hospitals and high technology hospitals. The focus from this point onwards was on non-university teaching hospitals with low technology status, highlighted in bold fonts in the following Table 8 with hospital factors.

As only one of the remaining German hospitals had less than 200 beds, and to further ensure comparability, only hospitals with more than 200 beds were considered from now on for this study. This ruled out two of the Irish hospitals ID 9 (25) and 10 (26).

It was decided that only hospitals with more than 200 beds and less than 500 beds were included in the next stage of case selection. It was felt that some of the German hospitals were incomparable to Irish hospitals due to their large bed numbers. For example, one of the remaining German hospitals had 1,132 beds, whilst the largest Irish hospital had 474 beds. Following this selection there were three German and four Irish hospitals left for stage 4. These were Hospital ID 1, 2, 3 and 7 in the Irish arm of the study and Hospital ID 2, 4 and 5 for Germany. In the next stage, the patient factors were identified.

Stage 4 of the case selection process related to patient factors. Patients' average ages (years) and the number of diagnoses were calculated from RN4CAST data. Data were calculated from patient discharge datasets. The average number of diagnoses was the sum of the primary diagnosis and secondary diagnoses. Data relating to Stage 4 of the case selection process is summarised on the next page.

Table 9: Case selection stage 4 - Patient factors

IRELAND							
ID (RN4CAST Hospital)	Proportion of degree nurses % (n/total)	Patient survey	Hospital size	University hospital	Technology status	Patient average age in years	Number of diagnoses
1 (2)	72 (38/59)	√	474	No	Low	53	4
2 (3)	60 (33/59)	√	332	No	Low	54	2
3 (12)	61 (28/46)	√	246	No	Low	56	5
7 (23)	46 (19/41)	√	324	No	Low	52	4
GERMANY							
ID (RN4CAST Hospital)	Proportion of apprenticeship trained nurses % (n / total)	Patient survey	Hospital size	University hospital	Technology status	Patient average age	Number of diagnoses
2 (6)	100 (36/36)	√	447	No	Low	53	4
4 (15)	100 (32/32)	√	412	No	Low	57	3
5 (16)	100 (24/24)	√	429	No	Low	55	6

The average patient ages were similar in all of the hospitals included in Stage 4. The average number of diagnoses was lowest (2) in one of the Irish hospitals ID 2 (3). The highest average number of diagnoses (6) was found in one of the German hospitals ID 5 (16). Both of these hospitals were excluded from the study from this point onwards. The average number of diagnoses was in the range of 4 in two of the Irish ID 1 (2) and ID 7 (23), and one German hospitals ID 2 (6). It was decided that these three hospitals (highlighted in bold fonts) would form the cases for this study, particularly as the proportions of nurse education levels varied also.

Hospital ID 1 (2) had the largest proportions (72%) of degree educated nurses. This was followed by Hospital ID 7 (23), which had medium proportions of degree (46%) and apprenticeship trained nurses. Hospital ID 2 (6) had the largest proportions (100%) of apprenticeship trained nurses. With a decision made in regards to the hospitals included in this case study, the next step would relate to selecting the nursing teams. This process is outlined in the following section.

5.9.3 Selection of nursing teams

While hospitals formed the cases for the study, nursing teams formed the embedded cases, which are mini cases within the larger cases (Stake 2006, Yin 2014). Nursing teams were already pre-shaped in that nurses were employed by hospitals to work on a ward related to a nursing specialty. I had no influence over the composition of nursing teams, nor was I in a position to influence the specialty area in which participating nurses worked. What mattered to the study was that the nursing specialty was comparable, whilst nurse education levels within a specialty varied. There were only two options in regards to specialty that were available, as RN4CAST collected data in medical and surgical specialty (please refer to page 111 for details).

Stage 5 of the multi-stage process included the selection of nursing teams by specialty. The following Tables 9, 10 and 11 provide a breakdown of nurse education levels for the three hospitals chosen for this study according to nursing specialty. The proportion of nurse education is depicted in percentages (%), followed by the number of nurses who reported the given education level (n) and the total number of participating nurses (total). From this point onwards, hospitals will be depicted in numerical order, as in Hospital 1 (largest proportions of degree nurses), Hospital 2 (medium proportions of degree and apprenticeship trained nurses) and Hospital 3 (largest proportions of apprenticeship trained hospitals). To protect confidentiality no names but generic descriptions are used for nursing teams. Nursing teams were categorised into Team A, B, C and D for the purpose of embedded case selection.

Table 10: Embedded case selection - Nurse education levels by specialty - Hospital 1

ID 1 (2)	Team A	Team B	Team C	Team D
Proportions of degree nurses in % (n / total)	65 (8/13)	56 (10/18)	91 (10/11)	91 (10/11)
Specialty	Surgical	Surgical	Medical	Medical

Table 11: Embedded case selection - Nurse education levels by specialty - Hospital 2

ID 7 (23)	Team A	Team B	Team C	Team D
Proportions of degree nurses in % (n / total)	55 (6 /11)	50 (1/2)	50 (6/12)	38 (6/18)
Specialty	Surgical	Surgical	Medical	Medical

Table 12: Embedded case selection - Nurse education levels by specialty - Hospital 3

ID 2 (6)	Team A	Team B	Team C	Team D
Proportions of apprenticeship trained nurses in % (n / total)	100 (10/10)	100 (11/11)	100 (8/8)	100 (7/7)
Specialty	Surgical	Surgical	Medical	Medical

There was no difference in nurse education between medical or surgical specialty in Hospital 3, as all nurses were apprenticeship trained. Medical specialty showed the greatest variations in regards to nurse education levels among those with degrees (Hospital 1 and 2). It was decided that the focus of this study would be on medical specialty. This meant that one of the possible two medical nursing teams from Hospital 1 could be selected. Both had the same proportions of degree educated nurses. Team C of Hospital 1 was randomly selected for this study (highlighted in bold fonts). Similarly, Team C of Hospital 2 was selected and finally, Team C of Hospital 3 was also selected (highlighted in bold fonts). This left three cases (hospitals) with one embedded case (nursing team) in each. These are as follows:

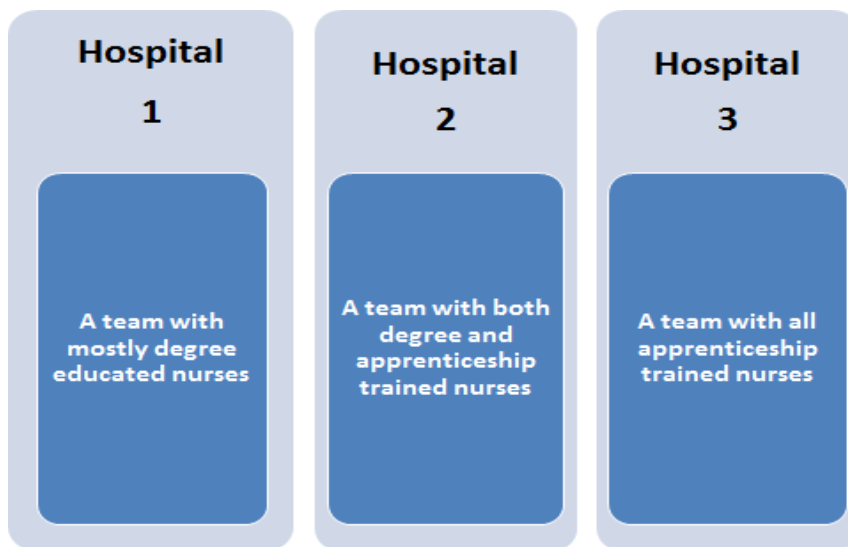
Hospital 1: a team with mostly degree educated nurses

Hospital 2: a team with both degree and apprenticeship trained nurses

Hospital 3: a team with all apprenticeship trained nurses

Figure 7 depicts the cases and embedded cases elected for this study.

Figure 7: Cases (hospitals) and embedded cases (nursing teams)



5.10 Conclusion

The impetus for this study came from my involvement in the RN4CAST study, where it became apparent that patient outcomes may be influenced by nurse education levels.

A multi-stage purposeful sampling process allowed for the selection of three cases and embedded cases. The first case is a hospital with a team of mostly degree educated nurses. The second case is a hospital with a team of both degree and apprenticeship trained nurses. The final case is a hospital with a team of all apprenticeship trained nurses. The following chapter presents the findings of this study.

CHAPTER 6: FINDINGS

6.1 Introduction

This chapter presents the findings of this study. Data relating to the following three cases will be generated and compared:

Hospital 1: a team with mostly degree educated nurses

Hospital 2: a team with both degree and apprenticeship trained nurses

Hospital 3: a team with all apprenticeship trained nurses

These cases (hospitals) and embedded cases (nursing teams) were selected in the previous chapter by way of multi-stage purposeful sampling. The proportions of degree and apprenticeship trained nurses in each team are based on those who responded to the RN4CAST nurse survey questionnaire. The chapter consists of two sections.

In the first section (Section A), a comparison of Irish and German RN4CAST data is presented. Findings are summarised in percentages and numbers, averages and the Standard Deviations (SD) in the tables within the chapter. Followed on from the presentation of RN4CAST findings is a presentation of the case study findings in Section B. Hospital profiles provide a contextual background in relation to the three cases explored. Each participating nursing team's nurse education levels, demographic profile data and other structure factors including working conditions and work environment are then compared. Findings relating to the process domain include emotional exhaustion data and the 'tasks necessary, but left undone due to lack of time'. Nurse-reported patient outcomes and patient satisfaction with nursing care findings are then presented. The theoretical propositions and the Structure-Process-Outcome framework (Donabedian 2005) are revisited at the end in the conclusions and key findings part. The following Section A consists of a presentation of Irish and German RN4CAST data relevant to this study.

Section A

6.2 Irish and German RN4CAST findings

In this section the Irish and German RN4CAST findings relevant to this study are compared. As previously stated (please refer to page 117 for details), 30 hospitals with 1,406 nurses and 285 patients took part in the Irish arm of the RN4CAST study. The German arm of RN4CAST consists of data relating to 51 hospitals, 1,492 nurses and 262 patients. In terms of samples and sizes these two data sets are comparable. Their structures, processes and outcomes vary, however, as will be shown next.

6.3 RN4CAST findings relating to structure

The first domain of Donabedian's (2005) model is structure: any factors that support and direct the provision of care. Data relating to nurse education, age, nursing experience, international work experience, working conditions and PES-NWI are outlined. Also management support for nurse education and continuous professional development are outlined.

6.4 Nurse education and demographic data

Nurse education, in this section, relates to the RN4CAST nurse survey question D6: 'Do you have a baccalaureate degree in nursing?' In terms of nursing experience, nurses were asked to answer the following question: D9 'How many years have you worked as a registered nurses (a) in your career and (b) in this hospital'.

Nurses, participating in the RN4CAST study, were also asked to report on their international work experience. Nurses provided their reports by answering question D4 in the nurse survey: ‘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’.

Nurse education levels varied between Irish and German RN4CAST data. Fifty eight percent (n=809) of nurses participating in the Irish arm of the study reported degree level education. Most, (99.9% n= 1481) of nurses from German RN4CAST data indicated that they were apprenticeship trained.

Most of the participating nurses in the Irish (92%) and German (88%) arm of RN4CAST were female. Nurses participating in the Irish arm of the study reported, on average, 11 (SD 8) years of experience ‘as qualified nurse’ (years of experience in your career). This is compared to the nurses participating in the German arm of the RN4CAST study, who reported on average 16 (SD 10) years of experience ‘as qualified nurse’. Nurses from the German arm of the RN4CAST study reported on average 13 (SD 9) years of experience ‘in this hospital’ compared to Irish nurses who reported on average 7 (SD 6) years of experience ‘in this hospital’. The average ages of nurses were similar in both countries at 34 (SD 9) and 39 (SD 11) years.

Forty percent (n=562) of Irish nurses reported international work experience, compared to 2.6% (n=39) of German nurses. International work experience ranged from 4-10 years for Irish, and 0-5 years in German nurses participating in this study. The countries where international work experience was gained were the UK, Australia, India, the Philippines, Saudi Arabia and the USA for nurses in the Irish arm of the study. For nurses in the German

arm of the study, international work experience related to Austria, Switzerland, Poland and Romania. The following Table 12 summarises the data for nurse education levels and demographic RN4CAST findings.

Table 13: Irish and German RN4CAST findings - Nurse education levels and demographic data

Nurse survey item	IRISH Findings (n=1,406)	GERMAN Findings (n=1,492)
Nurse education levels* <ul style="list-style-type: none"> • Degree • Apprenticeship training 	58% (n=809) 42% (n=597)	0.1 (n=2) 99.9% (n= 1,481)
Gender* <ul style="list-style-type: none"> • Female • Male 	92% (n=1,297) 6% (n=87)	88% (n=1,330) 11% (n=159)
Average age in years* (SD)	34 (SD 9)	39 (SD 11)
Nursing experience in years (SD)* <ul style="list-style-type: none"> • As a registered nurse • In this hospital 	11 years (SD 8) 7 years (SD 6)	16 years (SD 10) 13 years (SD 9)
International work experience*	40% (n=554)	2.6% (n=39)
Range	4-10 years	0-5 years
Countries*	UK Australia India Philippines Saudi Arabia USA	Austria Switzerland Poland Romania

*some missing values

6.5 Working conditions

Nurses were asked to indicate their working conditions by reporting the number of hours worked during the most recent shift, and to indicate if they had worked unpaid overtime. Nurses were also asked to report on the number of patients that they were directly responsible for in their most recent shift. For this part, the most recent shift could relate to the day or the night shift. The nurse-to-patient ratio was calculated based on the average number of patients

that nurses reported they were directly responsible for during the most recent shift and the total number of patients on the ward in the most recent shift.

Nurses were also asked about the skill mix on the most recent shift. Data related to the number of qualified nurses in the most recent shift and the number of any other care staff providing direct patient care on the ward in the most recent shift. In Ireland ‘other care staff’ most likely related to Health Care Assistants (HCAs), whereas in Germany ‘other care staff’ could relate to KrankenpflegehelferInnen (KPH). Both roles are similar in that they assist qualified nurses in their work practice (An Foras Áiseanna Saothair 2009, Bundesagentur für Arbeit 2014b). Health Care Assistants in Ireland complete a 36 weeks apprenticeship training (An Foras Áiseanna Saothair 2013). Similarly, KrankenpflegehelferInnen complete a 1 to 2 year apprenticeship training programme in Germany (Bundesagentur für Arbeit 2014b).

Nurses participating in the Irish arm of the RN4CAST study indicated that they worked in a 2-shift system of approximately 12 hours per shift. Nurses participating in the German arm of the RN4CAST study indicated working in a 3-shift system of approximately 8 hours per shift. Forty-five percent (n=611) of nurses participating in the Irish RN4CAST study reported working unpaid overtime in their most recent shift. This is compared to 36% (n=547) of German nurses who reported that they had worked unpaid overtime in their most recent shift.

Irish RN4CAST nurses reported being directly responsible for, on average, 11 patients (SD 6), while German RN4CAST nurses reported being directly responsible for 17 (SD9) patients on average. Nurses may have included the patients that they looked after during break cover, as Standard Deviations (SD) are generally high (6 for Irish data and 9 for German data). The Standard Deviation describes how much a value differs from the average value for that group

(Polit and Beck 2009). NPR for Irish RN4CAST data, based on the average number of patients that nurses reported they were directly responsible for in the most recent shift and the total number of patients on the ward in the most recent shift, was 1:6. This means that one nurse cared for 6 patients. In Germany NPR was 1:11, one nurse per eleven patients. Irish nurses participating in RN4CAST reported a skill mix of 4.5 qualified nurses and 2 HCAs for 28 patients, whilst German nurses reported a skill mix of 2.5 qualified nurses and 1 KPH for the same number of patients.

In regards to non-nursing duties, 88% of nurses (n=1,237) participating in the Irish arm of the RN4CAST study reported that ‘answering phones, and performing clerical duties’ was carried out ‘often’ in the most recent shift. This was similar to nurses from the German arm of the study where 78% (n=1,169) of nurses reported that ‘answering phones, and performing clerical duties’ was carried out ‘often’ in the most recent shift. ‘Delivering and retrieving food trays’ was reported by 9% (n=127) of Irish RN4CAST nurses, compared to 52% (n=779) of German RN4CAST nurses. ‘Cleaning patient rooms and equipment’ was reported by 35% (n=492) of nurses participating in the Irish arm of the RN4CAST study, compared to 14% (n=205) of nurses participating in the German arm of the study.

6.6 Hospital bed occupancy

Hospital bed occupancy levels were established from hospital organisational survey data. From those who responded to this question, 13 out of 19 Irish hospitals reported bed occupancy levels above 85%. This is compared to 2 out of 29 German RN4CAST hospitals, who responded to this question, with bed occupancy levels above 85%. The cut-off point for

efficient care of 85% bed occupancy level was chosen according to the Irish Health Boards Executive (2003) Admission and Discharge Guidelines and the UK (2012) Hospital Guide.

6.7 Management support for nurse education and continuous professional development

Twenty-four out of the 30 Irish hospitals and 39 out of the 51 participating German hospitals in RN4CAST reported that they support their nurses financially, and with study leave (27 Irish and 39 German hospitals) in regards to educational and professional development courses. The number of hospitals that reported having a specific budget for nurse education and continuous professional development was 9/30 for Irish RN4CAST hospitals and 13/50 for German RN4CAST hospitals. Table 13, on the following page, depicts the data for working conditions.

Table 14: Irish and German RN4CAST findings – Structures - working conditions

Nurse survey items*	IRISH Findings (n=1,406)	GERMAN Findings (n=1,492)
Average shift length	12 hours (SD 1)	8 hours (SD 1)
Unpaid overtime	Yes 45% (n=611) No 55% (n=763)	Yes 36% (n=547) No 64% (n=959)
Average number of patients directly responsible for during most recent shift	11 (SD 6)	17 (SD 9)
NPR	1:6	1:11
Average skill mix, in numbers (SD)		
• Qualified nurses	4.5 (SD 2)	2.5 (SD 1)
• Other care staff	2 (SD 2)	1 (SD 1)
• Patients	28 (SD 7)	28 (SD 9)
Hospital bed occupancy level*	13 of 19 who responded had bed occupancy levels above 85%	2 of 29 who responded had bed occupancy levels above 85%
Support for nurse education and continuous professional development*	Number/total (n=30)	Number/total (n=30)
Specific budget for nurses available	9/30 hospitals	13/50 hospitals
Provision of study leave	27/30 hospitals	39/50 hospitals
Provision of finance	24/30 hospitals	39/50 hospitals
Non-nursing duties performed ‘often’	Percentage (number)	Percentage (number)
Answering phones, clerical duties	88% (n=1,237)	78% (n=1,169)
Arranging discharge referrals and transportation	47% (n=660)	37% (n=547)
Cleaning patient rooms and equipment	35% (n=492)	14% (n=205)
Obtaining supplies or equipment	31% (n=435)	27% (n=403)
Filling in for non-nursing services not available on off-hours	27% (n=380)	20% (n=304)
Transporting patients within the hospital	20% (n=281)	27% (n=398)
Delivering and retrieving food trays	9% (n=127)	52% (n=779)
Routine phlebotomy / blood draw for tests	9% (n=127)	21% (n=311)

*some missing values

6.8 Nurses’ perceptions of their work environment

For this part of the study, nurses participating in RN4CAST were asked to rate their practice environment on PES-NWI (please refer to page 131 for details). The mean score of each sub-scale and the total score for the scale have a potential to range from 1-4, low to high, negative

to positive. Previous research indicates that a score of 2.5 or higher can be interpreted as a positive finding for the Practice Environment Scale (Aiken et al. 2008).

The total score for the PES-NWI was 2.5 for the Irish and 2.6 for the German RN4CAST study, indicating supportive work environments in terms of the management structure (Lake 2002). Nurses from the Irish and the German arms of the RN4CAST study, rated the sub-scale ‘staffing and resource adequacy’ lowest at 2.0. Nurses from the Irish arm of the RN4CAST study rated ‘nursing foundations of quality of care’ at 2.9, indicating a supportive nurse education environment. Please refer to the following Table 14 for a comparison of Irish and German PES-NWI data. The sub-scale ‘nursing foundations of quality of care’ is highlighted in bold fonts, as it is the factor judged most relevant to study in relation to its association with nurse education (please refer to page 133 for details).

Table 15: Irish and German RN4CAST findings - PES-NWI

PES-NWI*	IRISH Findings (n=1,406)	GERMAN Findings (n=1,492)
Average total score (SD)	2.5 (0.6)	2.6 (0.8)
Average sub-scale scores (SD):		
Staffing and resource adequacy	2.0 (0.7)	2.0 (0.8)
Nursing foundations of quality of care	2.9 (0.5)	2.9 (0.5)
Nurse participation in hospital affairs	2.3 (0.6)	2.6 (0.8)
Nurse manager ability, leadership and support for nurses	2.7 (0.7)	2.6 (0.9)
Collegial nurse-physician relationships	2.7 (0.6)	2.7 (0.8)

*some missing values

The following text relates to RN4CAST process findings.

6.9 RN4CAST findings relating to process

The following section presents process factors, which in this study are the nursing outputs. Findings relate to two parts of the nurse survey, namely emotional exhaustion and tasks necessary but left undone due to lack of time.

6.10 Emotional exhaustion

Emotional exhaustion, as outlined previously (please refer to page 135 for details), is one of the sub-scales of MBI. The higher the scores on the sub-scale, the higher the level of work-related emotional exhaustion. A score of 0-16 indicates ‘low emotional exhaustion’, a score of 17-26 indicates ‘medium levels of emotional exhaustion’ and a score of over 27 implies ‘high emotional exhaustion’. According to this categorisation Irish nurses reported medium levels of EE (24). This is compared to participating German nurses, who reported high levels of EE (30). Process in this study was also measured as the ‘tasks necessary, but left undone due to lack of time’.

6.11 Tasks necessary, but left undone due to lack of time

The tasks undone were measured with question is C12: ‘On your most recent shift, which of the following activities were necessary but left undone because you lacked the time to complete them?’ Nurses were asked to mark, on a list of thirteen activities, the tasks that were necessary, but which were left undone due to lack of time during the most recent shift. Nurses could tick multiple answers (tick as many as apply). For the analysis in this case study, the list of activities was reduced to include the six ‘process’ factors that were relevant to the study as per analytical framework used (please refer to page 108 for details).

Comfort/talk with patients was the task most often left undone due to lack of time (69%) by nurses participating in the Irish arm of RN4CAST. Nurses participating in the German arm of RN4CAST reported that pain management was most often left undone due to lack of time (81%). Process findings are depicted in the following Table 15.

Table 16: Irish and German RN4CAST findings – Process factors

Nurse survey items	IRISH Findings (n=1,406)	GERMAN Findings (n=1,492)
Emotional Exhaustion (MBI score)	24	30
Tasks necessary, but left undone due to lack of time		
Adequate patient surveillance	31% (n=430)	63% (n=939)
Frequent changing of patient position	19% (n=264)	78% (n=1,166)
Administer medications on time	18% (n=247)	79% (n=1,187)
Comfort/talk with patients	69% (n=950)	18% (n=275)
Pain management	5% (n=62)	81% (n=1,205)
Educating patient and family	58% (n=798)	46% (n=692)

6.12 RN4CAST findings for outcomes

Patient outcomes included in this domain need to be relevant to the care provided (Donabedian 2005). In this study patient outcomes and patient satisfaction with nursing care items match the tasks left undone (please refer to page 107 for details).

6.13 Nurse-reported patient outcomes

Nurses reported on the frequency of adverse patient outcomes in their most recent shift involving their patients on a 7 point Likert scale from ‘never’ to ‘every day’. As data was spread considerably across the points on the scale (Scott et al. 2013) responses were condensed for the purpose of this analysis. All adverse patient outcomes are reported together as ‘adverse patient outcomes occurring’.

Findings suggest that all measured adverse patient outcomes occurred at some stage, even if it might have been anything from ‘every day’ ‘a few times a week’, ‘once a week’ ‘a few times a months’, ‘once a months’ or ‘a few times per year’. All of these six points on the Likert scale were considered for this part of the analysis.

On the whole, findings suggest that having more nurses with degree level education is associated with reporting of improved patient outcomes. Two outcomes including ‘pressure ulcers developed after admission’ and ‘patient received wrong medication, time or dose’ were reported to occur less often in the Irish sample of the RN4CAST study. The occurrence of both of these adverse patient outcomes were reported by 72% of nurses. This was compared to 96% of nurses in the German sample, who reported that pressure ulcers were occurring on their ward and 93% who reported that patient received wrong medication time or dose. The following Table 16 depicts the findings relating to nurse-reported patient outcomes.

Table 17: Irish and German RN4CAST findings - Nurse-reported patient outcomes

Patient outcomes occurring	IRISH Findings (n=1,406)	GERMAN Findings (n=1,492)
	Percentage (number)	Percentage (number)
Falls with injury	90% (n=1,265)	98% (n=1,462)
Pressure ulcers developed after admission to the ward	72% (n=1,021)	96% (n=1,425)
Patients receiving wrong medication, time or dose	72% (n=1,026)	93% (n=1,390)

6.14 Patient satisfaction with nursing care

Patient satisfaction with nursing care was measured in RN4CAST in the patient satisfaction survey. Patients rated each item from 1. Never 2. Sometimes 3. Usually to 4. Always satisfied. For the purpose of analysis, patient satisfaction responses relating to ‘usually’ and ‘always’ are presented as ‘satisfied’.

In both samples, participating patients were most satisfied with nurse communication. Sixty eight percent of Irish patients indicated their satisfaction in regards to nurse communication, compared to 58% of patient participating in the German arm of the study.

Table 18: Irish and German RN4CAST findings - patient satisfaction with nursing care

Patient satisfaction with nursing care	IRISH satisfied patients (n=285)	GERMAN satisfied patients (n=262)
	Percentage (number)	Percentage (number)
Nurse communication	68% (n=194)	58% (n=166)
Pain control	65% (n=186)	53% (n=151)
Discharge information provided	30% (n=86)	52% (n=132)

6.15 Conclusion regarding RN4CAST findings

The findings in this section, relating to Irish and German RN4CAST data, show similarities and differences in nursing and nurse education. Nurse education varies in that degrees (58%) and apprenticeship education (42%) levels were reported by participating Irish nurses. This is compared to almost all (99.9%) of participating German nurses who indicated education at apprenticeship level. Nurses participating in the Irish arm of the study reported, on average, 11 years of experience as qualified nurse, compared to nurses participating in the German arm of RN4CAST who reported on average 16 years of experience as a qualified nurse. Forty percent (n=562) of Irish nurses reported international work experience, compared to 2.5% (n=37) of German nurses.

Nurses' working conditions in RN4CAST were dissimilar in regards to shift patterns and nurse-to-patient ratios. Based on the reports of participating nurses the NPR in Germany is 1:11, one nurse per eleven patients. This is compared to a NPR of 1:6 in the Irish RN4CAST data. The total score for the PES-NWI was 2.5 for the Irish and 2.6 for the German RN4CAST study, indicating supportive work environments in terms of the management structure. Both, nurses from the Irish and the German arms of the RN4CAST study, rated the PES-NWI sub-scale 'staffing and resource adequacy' lowest at 2.0 and the sub-scale 'nursing foundations of quality of care' highest at 2.9.

Emotional exhaustion levels appeared less prominent in Irish RN4CAST data. The scores relating to EE were reportedly lower in Irish nurses (24) compared to German nurses (30). Comfort/talk with patients was the task most often left undone due to lack of time (69%) by nurses participating in the Irish arm of RN4CAST. Nurses participating in the German arm of

RN4CAST reported that pain management was most often left undone due to lack of time (81%).

Improved patient outcomes were reported more often in the Irish RN4CAST study. The occurrence of 'pressure ulcers developed after admission' and 'patient received wrong medication, time or dose' were reported less often in the Irish sample of the RN4CAST study. Both of those adverse patient outcomes were reported by 72% of nurses. This was compared to 96% of nurses in the German sample, who reported that pressure ulcers were occurring on their ward and 93% who reported that patient received wrong medication time or dose. In both samples, participating patients were most satisfied with nurse communication. Sixty eight percent (n=285) of Irish patients indicated their satisfaction in regards to nurse communication, compared to 58% (n=262) of patient participating in the German arm of the study. This concludes the comparison of Irish and German RN4CAST findings. The following section presents the case study findings.

Section B

6.16 Case study findings

This section presents the case study findings. Case study findings relate to the three hospitals and the embedded nursing teams within those hospitals selected for this study (please refer to page 155 for details). The section begins with a comparison of hospital profiles in order to create the contextual background for the three cases and embedded cases of this study. This is followed by a comparison of the nurse demographic profile data, structural factors, nursing processes and patient outcomes. Finally, each embedded case is explored for similarities and differences in patient outcomes according to type of nurse education level. The main purpose of this section, as outlined in the methodology chapter (please refer to page 121 for details) is to compare data.

6.17 Contextual background

The first set of data analysed relates to hospital profiles, which provides the contextual background for the embedded cases explored in this study. Hospital bed occupancy within the profiles relates to the total number of beds in each hospital. This is followed in the profiles by the number of medical beds and total number of patient admissions. This data is intended to provide an indication as to the capacity and activity level of each of the participating hospitals. Bed occupancy, patient admission and hospital staffing data were reported for the years ending December 2008 (Germany) and 2009 (Ireland), around the time of the start of the RN4CAST project. While hospital profile data is up to 7 years old at the time of writing this chapter, and may have changed in some of the categories measured, it is concurrent with the other data reported in this thesis.

Figures for nurse staffing are divided into the total number of nurses, which includes nurse managers and specialist nurses, and staff nurses. The term ‘staff nurses’, in this study, refers to their position in hospital (as in not a ward manager or specialist nurse). Data is continued with information in regards to management support for nurse education and continuous professional development. Any factors that might help with understanding hospital structures were collected for the final part of the hospital profiles.

6.18 Hospital profiles

Data from hospital profiles show that two of the participating hospitals were located in Ireland and one was located in Germany. For the purpose of this study, the first two hospital cases from Ireland were coded Hospital 1 and Hospital 2. The third case from Germany was named Hospital 3. The head counts of staff received from participating hospitals were inconsistent, making a comparison difficult. WTEs were recorded by all participating hospitals. The following Table 18 summarises hospital profile data.

Table 19: Contextual background - Hospital profiles

Hospital organisational survey items	Hospital 1	Hospital 2	Hospital 3
Location	Ireland	Ireland	Germany
Bed occupancy rate	93%	85%	77%
Number of medical beds / total number of beds	131 / 474	71 / 324	170 / 447
Total in-patient admissions per year**	23,156	14,065	18,231
Hospital staffing**:			
Total employees	1,792 WTE	996 WTE	900 WTE
Medical staff	242 WTE	102 WTE	141 WTE
Total nurses (incl. nurse managers and specialist nurses)	688 WTE	462 WTE	316 WTE
Staff nurses	547 WTE	383 WTE	277 WTE
Other care staff	79 WTE	26 WTE	69 WTE
Staff Nurse Vacancies*	31 WTE	20 WTE	Not reported
Management support for nurse education*	No specific budget for nurse education. Provision of leave during study period. Financial support for courses. No regular nurse performance review.	No specific budget for nurse education Provision of leave during study period. Financial support for courses. No regular nurse performance review.	none reported
Any factors that help with understanding findings	Opening of major new facility, medical admission unit and a new building. Moving and merging of wards within hospital.	Moving of wards within the hospital. Reconfiguration of services – not further explained.	none reported

*some missing values / **data relates to the years ending December 2008 (Germany) and 2009 (Ireland)

Hospital bed occupancy varied across hospitals, with the highest bed occupancy reported in Hospital 1 (93%), one of the Irish cases. The total number of in-patient admissions was also highest in Hospital 1 with 23,156 admissions recorded. This is compared to Hospital 2 where

the lowest number of in-patient admissions (14,065) was reported. The number of medical beds varied per hospitals from 71 (Hospital 2), over 131 (Hospital 1) to 170 (Hospital 3). Nurse staffing was lowest in Hospital 3 (Germany) with 277 Whole Time Equivalents (WTE). Staff Nurse Vacancies were reported to be the highest in Hospital 1 (Ireland), whilst no reports were made by the German hospital (Hospital C). The lowest number for other care staff were reported in Hospital 2 (26 WTE).

The two Irish hospitals (Hospital 1 and Hospital 2) provided a negative response in regards to regular nurse performance appraisals. They (Hospital 1 and 2) also reported that they provided study leave and financial support for nurse education. The German hospital (3) did not record a response to any of these questions. None of the three hospitals reported that they had a specific budget for nurse education and continuous professional development. The two Irish hospitals reported factors to help understand their structures. These related to the moving of wards (Hospital 1 and 2) and the opening of a major new facility (Hospital 1), a medical admission unit and a new building (Hospital 1).

In the following part of this section, the findings for each of the participating nursing teams (embedded cases) are presented. For ease of reference nursing teams are alphabetically ordered from this point onwards, according to the hospital that they belong to. The team belonging to Hospital 1 from this point onwards is entitled Nursing Team A. The team belonging to Hospital 2 is entitled Nursing Team B and Nursing Team C belongs to Hospital 3.

Data are presented according to Structure-Process-Outcome model (Donabedian 2005), as outlined in the paragraphs on the analytical framework for this study (please refer to page 102

for details). Nursing structure findings including nurse education, demographic profile data, nursing and international experience, working conditions and nurses' perceptions of their working environment are presented first.

6.19 Nursing structures – Nursing Teams A, B and C

In this section the structure factors such as nurse education, nursing and international work experience, working conditions and Practice Environment Scale-Nurse Working Index, for Nursing Teams A, B and C, are compared across the three participating nursing teams. That nurse education levels differ in regards to degree and apprenticeship level was already established during case selection (please refer to page 148 and page 148 for details). The following findings provide more detail about the type of degree held by participants of selected embedded cases.

6.20 Nurse education levels – Nursing Teams A, B and C

Team A had ten degree educated nurses. Nurses of Team A reported pre-registration (n=3), post-registration (n=5) and international degree (n=2). Team B was more even in terms of degree and apprenticeship trained nurses. Six nurses reported having undertaken degree level education and another 6 indicated that they were apprenticeship trained. There were pre-registration (n=2) and post-registration (n=4) degree educated nurses in Team B. Education levels of Team C were consistent in that all (n=8) nurses indicated education at apprenticeship level. Nurse education levels are part of the structures and can be categorised as demographic profile data. For this reason nurse education levels are analysed together with further demographic profile data such as gender, age and experience levels. These are presented in the following paragraph.

6.21 Demographic profiles - Nursing Teams A, B and C

The demographic profile data related to the gender, average ages of nurses, nursing and international work experience, and type of education are shown in following Table 19. Participating nurses' gender was mostly female in all of the nursing teams including Team A (n=11), Team B (n=11) and Team C (n=7). The average ages of participating nurses were similar within selected Irish teams with an average age of 32 (SD 8) years reported in Nursing Team A (Hospital 1) and 33 (SD 9) years reported in Team B (Hospital 2). The average ages reported by nurses in this case study are slightly lower compared to the Irish arm of RN4CAST (34 years SD 9). In contrast the nurses within Team C reported a higher average age of 45 years (SD 11) compared to the findings in the German arm of RN4CAST, where an age of on average 39 (SD 11) years was reported.

Nurses of Team C reported the highest average ages (45 years, SD 11) in this case study. Team C also reported highest levels of nursing experience as a qualified nurse (average of 18 years, SD 14) and in this hospital (average of 18 years, SD 14), compared to the other two teams. Nursing Team B reported highest levels of international work experience (5 years on average, SD 4) of Irish trained nurses. Whilst no international degrees were reported in Team B, international work experience related to Irish trained nurses. Nurses of Team A reported the only international degrees (n=2) in this study. The countries where international work experience was obtained were the UK, Australia and India (Teams A and B). Nurses of Team C did not report any international work experience, nor did they report any degree level education. Findings are presented in Table 19, which is next.

Table 20: Nurse education levels and demographic profiles - Teams A, B and C

Nurse survey items	Team A (n=11)	Team B (n=12)	Team C (n=8)
Nurse education levels (number of nurses in the team)			
Degree	10	6	0
• Pre-registration degree	3	2	0
• Post-registration degree	5	4	0
• International degree	2	0	0
Apprenticeship training	1	6	8
Gender* (number of nurses in the team)			
• Female	11	11	7
• Male	0	1	0
Average age in years (SD)*	32 (8)	33 (9)	45 (11)
Nursing experience in years (SD)*			
• As a qualified nurse	10 (8)	11 (9)	18 (14)
• In this hospital	6 (5)	9 (9)	18 (14)
International nursing experience in years (SD)*	4 (3)	5 (4)	0 (0)
Country*	UK Australia India	UK Australia	N/A

*some missing values

6.21.1 Experience levels according to nurse education level

Experience levels such as years of experience ‘as a qualified nurses’ and ‘in this hospital’ were also analysed according to nurse education levels. Table 20 shows the breakdown.

Table 21: Nursing experience according to type of nurse education - Teams A, B and C

Average years of experience according to nurse education level			
	Team A (n=11)	Team B (n=12)	Team C (n=8)
As a qualified nurse (SD)*	10 (8)	11 (9)	18 (14)
Pre-registration degree nurses	2 (1)	2 (0)	--
Post-registration degree nurses	11 (8)	9 (2)	--
International degree nurses	10 (5)	--	--
Apprenticeship trained nurse	28 (0)	14 (11)	18 (14)
In this hospital (SD)*	6 (5)	9 (9)	18 (14)
Pre-registration degree	2 (1)	2 (1)	--
Post-registration degree	11 (8)	9 (0)	--
International degree	3 (0)	--	--
Apprenticeship trained nurses	2 (0)	12 (11)	18 (14)

*some missing values

Nurses holding pre-registration degree reported on average 2 (SD 1) years of experience ‘as a qualified nurse’ as well as on average 2 (SD 1) years of experience ‘in this hospital’ (Team A and B). This compared to nurses with post-registration degree, who reported up to on average 11 (SD 8) years of experience ‘as a qualified nurse’ and ‘in this hospital’ (Team A). Similar to the team-based findings Team C, with exclusively apprenticeship trained nurses, reported 18 (SD 14) years of experience ‘as a qualified nurse’ and ‘in this hospital’. Apprenticeship trained nurses of the other two teams reported up to 28 (SD 0) years (Team A) ‘as a qualified nurses’, and 12 (SD11) years (Team B) ‘in this hospital’.

6.22 Working conditions of Teams A, B, and C

The following analysis compares nurses’ working conditions (Teams A, B and C). Factors relating to average shift length, unpaid overtime, NPR, skill mix and non-nursing duties are presented in the following paragraphs. Nurses recorded the hours worked during their most recent shift in the space provided on the nurse survey. Nurses were then asked if they had worked unpaid overtime in the most recent shift, which they could answer with ‘yes’ or ‘no’.

The most frequently provided response (mode) about the occurrence of unpaid overtime is presented, together with the number of nurses who reported unpaid overtime in brackets.

Nurses also recorded the number of patients for which they were directly responsible on their most recent shift, the number of qualified nurses in the most recent shift, care staff and patients on the most recent shift. Average numbers for these responses are presented with the Standard Deviations (SD) in brackets behind each number. ‘Non-nursing’ duties performed were based on a list of activities provided in the nurse survey. As explained before, such duties related to tasks, which could be interpreted as ‘non-nursing’. Nurses were asked to tick as many tasks as applied. Data are presented for each team rather than separately for each participating nurse. The total number of non-nursing duties and the number for individual items performed ‘often’ in the most recent shift in the team are presented in Table 21 below.

Table 22: Structures - Working conditions - Teams A, B and C

Nurse survey items	Team A (n=11)	Team B (n=12)	Team C (n=8)
Average shift length in hours (SD)	12 (SD 1)	12 (SD 1)	8 (SD 1)
Unpaid overtime (number of nurses)	Yes (7)	No (3)	Yes (4)
Average number of patients directly responsible for during most recent shift (SD)	12 (1)	14 (6)	13 (2)
NPR	1:6	1:6	1:11
Skill mix (SD)			
• Average number of qualified nurses	5 (1)	5 (2)	3 (1)
• Average number of other care staff	2 (2)	2 (2)	0 (0)
• Average number of patients	31 (3)	30 (2)	33 (3)
Non-nursing duties performed ‘often’ (total)	53	22	18
Answering phones, clerical duties	10	9	5
Arranging discharge referrals and transportation	9	4	1
Cleaning patient rooms and equipment	9	2	1
Obtaining supplies or equipment	6	2	1
Filling in for non-nursing services not available on off-hours	8	2	1
Transporting patients within the hospital	7	0	2
Delivering and retrieving food trays	3	2	7
Routine phlebotomy / blood draw for tests	1	1	0

Nurses of Team A (Hospital 1 – Ireland) reported that they worked on average 12 hours in a shift (SD (1), which is in line with Irish RN4CAST findings (12 hours SD 1). Seven out of eleven (7/11) nurses within Team A reported that they worked unpaid overtime in the most recent shift. In comparison, the proportion of nurses within Team A reporting unpaid overtime was higher than in the Irish arm of RN4CAST (45%). Within the German data, nurses reported lower rates of unpaid overtime in the case study (4/8 in Team C) compared to RN4CAST findings (36%).

Nurses of Teams A and B reported a NPR of 1:6, compared to a NPR of 1:11 reported by nurses of Team C. This finding is comparable with the overall findings in RN4CAST (please refer to page 163 for details), which suggests that nurse staffing is a country-specific factor. Nurses of Team C reported no other care staff (0) being available in the most recent shift, indicating the least favourable skill mix in this study. Team A and Team B had support from 2 care staff each during their most recent shift.

Team A responded with 53 responses in total to the list on non-nursing duties performed ‘often’ in their most recent shift, compared to 22 in Team B and 18 in Team C. ‘Answering phone calls, clerical duties’ was ticked most frequently by nurses of Teams A (n=10) and B (n=9), which is comparable to Irish RN4CAST findings. In contrast ‘delivering and retrieving food trays’ was frequently selected as non-nursing duty in Team C (n=7). The following is a presentation of the findings relating to participating nurses’ perceptions of their work environment.

6.23 Nurses' perception of their work environment – Teams A, B and C

As outlined in the methodology chapter (please refer to page 87 for details), nurses rated their work environment through the 32-item Practice Environment Scale-Nurse Working Index (PES-NWI). Nurses rated the PES-NWI total scale and five sub-scales from 4-0, high to low, good to poor. The scores for each team are presented in the following Table 22. The score of 2.5 indicates a good work environment (Lake 2002).

Team A rated their work environment lowest with a PES-NWI total score of 2.0. This score is also below the Irish RN4CAST finding (2.5). The sub-scale 'staffing and resource adequacy' was rated lowest (1.3) out of the results reported for Team A. Team A's highest score related to 'collegial nurse-physician relationships'. Team B's highest PES-NWI score within its own team related to 'nursing foundations of quality care', the sub-scale most relevant to nurse education. Team C reported the highest score within the three participating teams for the sub-scale 'nursing foundations of quality care' (3.4), indicating the most supportive nurse education environment. They (Team C) also reported the highest total score (2.7), indicating participating nurses' satisfaction in regards to the managerial context within their work place. The finding for team C is slightly higher than the total PES-NWI score reported in the German arm of RN4CAST. Findings are summarised in Table 22 below. As before, the sub-scale 'nursing foundations of quality of care' is highlighted in bold fonts as it is the factor most relevant to nurse education (please refer to page 133 for details).

Table 23: PES-NWI - Teams A, B and C

PES-NWI	Team A (n=11)	Team B (n=12)	Team C (n=8)
Average total score (SD)	2.0 (0.7)	2.3 (0.8)	2.7 (0.6)
Average sub-scale scores (SD):			
Staffing and resource adequacy	1.3 (0.5)	2.0 (0.7)	2.1 (0.6)
Nursing foundations of quality of care	2.3 (0.7)	2.6 (0.8)	3.4 (0.6)
Nurse participation in hospital affairs	1.6 (0.7)	2.0 (0.9)	2.9 (0.6)
Nurse manager ability, leadership and support for nurses	2.2 (0.9)	2.5 (1.1)	2.8 (0.5)
Collegial nurse-physician relationships	2.6 (0.6)	2.4 (0.8)	2.7 (0.7)

This concludes the comparison of structural factors for Nursing Teams A, B and C. The following depicts the findings for process.

6.24 Nursing processes - Teams A, B and C

In this section, the nursing process findings relating to Nursing Teams A, B and C are presented. The first part of the nursing process data in this study relates to ‘emotional exhaustion’.

6.25 Emotional Exhaustion

Findings were calculated for each item within the sub-scale of emotional exhaustion (EE) of the Maslach Burnout Inventory (MBI) in the RN4CAST nurse survey (please refer to page 135 for details). The following Table 23 shows the number of nurses within each selected team, who responded positively to the items in the sub-scale EE.

Half of the nurses (6/12) in Team A reported that they felt emotionally drained. Nurses of Team A also reported that they felt used up at the end of a work day (n=6) and felt frustrated by their job (n=6) ‘every day’. This is compared to nurses of Team B and Team C where only

one nurse of each team reported that he/she felt frustrated with her job ‘every day’ (n=1). In comparison to national data the findings reported by the nurses within Team A are high, as nurses participating in the Irish arm of RN4CAST reported lower EE scores (24) than the nurses participating in the German arm of RN4CAST (30). None of the participating nurses in this case study reported ‘working directly with people puts too much stress on me’ as an item that affected them. The findings for sub-scale EE of MBI are summarised next.

Table 24: Process factors - EE - Teams A, B and C

Emotional Exhaustion ‘every day’	Team A (n=11)	Team B (n=12)	Team C (n=8)
	Number of nurses	Number of nurses	Number of nurses
I feel emotionally drained from my work	6	3	1
I feel used up at the end of the workday.	6	3	4
I feel fatigued when I get up in the morning and have to face another day on the job.	5	2	1
Working with people all day is really a strain for me.	1	0	0
I feel burned-out from my work.	3	1	1
I feel frustrated by my job.	6	1	1
I feel I’m working too hard on my job.	4	3	3
Working directly with people puts too much stress on me.	0	0	0
I feel like I’m at the end of my rope.	2	1	1

6.26 Tasks necessary, but left undone - Nursing Teams A, B and C

The second part of the nursing process findings in this study relate to the ‘tasks necessary, but left undone due to lack of time’. The numbers of nurses within each selected team, who reported the tasks listed in the nurse survey are depicted in the following Table 24.

Table 25: Process factors - Teams A, B and C

Tasks necessary, but left undone due to lack of time	Team A (n=11)	Team B (n=12)	Team C (n=8*)
Adequate patient surveillance	9	3	6
Frequent changing of patient position	5	1	7
Administer medications on time	6	1	7
Comfort/talk with patients	9	8	1
Pain management	1	1	7
Educating patient and family	11	6	1
Total number of reports	41	20	29

*some data missing (i.e. one nurse of Team C did not provide responses to this question)

Responses for one nurse in Team C (1/8) are missing for this question. The remaining nurses of Team C reported that tasks such as ‘frequent changing of patient position’ (n=7), ‘administer medications on time’ (n=7) and pain management (n=7) were most often left undone due to lack of time in the most recent shift. These were also the top three tasks reported by nurses participating in the German arm of RN4CAST. Nurses of Team B reported that ‘comfort/talk with patient’ (n=8) and ‘educating patient and family’ (n=6) were most frequently left undone, similar to Irish RN4CAST findings. Team A reported that the tasks ‘educating patient and family’ (n=11), ‘comfort/talk with patient’ (n=9) and ‘adequate patient surveillance’ (n=9) were most frequently left undone. Overall, the number of tasks reported as left undone was lowest (total responses 20) in Team B. This is compared to 29 responses for ‘tasks necessary, but left undone due to lack of time’ in Team C and 41 total responses to this question reported by nurses of Team A. As before the findings reported by nurses within Team A are high in comparison to Irish RN4CAST data in that tasks were more often reported as left undone due to lack of time.

6.27 Tasks necessary but left undone, according to nurse education level

The ‘tasks necessary, but left undone due to lack of time’ were also analysed according to nurse education level. Findings relate to Nursing Teams A and B, as they were the only teams with a variation in regards to the types of nurse education levels. To avoid repetition, findings for Team C are not included in the following text.

The apprenticeship trained nurse (n=1) in Team A reported that all tasks were left undone due to lack of time. This finding relates to one single nurse and needs to be interpreted bearing this in mind. Pre-registration and international degree nurses reported similar results in that all (n=3 pre-registration and n=2 international degree) reported that ‘adequate patient surveillance’ and ‘administering medication on time’ were tasks left undone due to lack of time in the most recent shift. ‘Educating patient and family’ was reported as left undone by all participating nurses in Team A, regardless of the type of education. ‘Pain management’ was not reported as a task left undone by any of the three types of degree level educated nurses. Findings for Team A are shown in the following Table 25. The table does not depict the total numbers for each task, as great variations exist between the nurses in each education level. Findings are presented in bold fonts, if all nurses from the given type of education provided a positive response.

Table 26: Process factors according to nurse education level - Team A

Tasks necessary, but left undone due to lack of time (Team A, n=11)	Pre-registration degree (n=3)	Post-registration degree (n=5)	International degree (n=2)	Apprenticeship training (n=1)
Adequate patient surveillance	3	3	2	1
Frequent changing of patient position	2	1	1	1
Administer medications on time	3	0	2	1
Comfort/talk with patients	3	3	2	1
Pain management	0	0	0	1
Educating patient and family	3	5	2	1

In the following text, the ‘tasks necessary, but left undone due to lack of time’ reported by participating nurses of Team B are presented.

6.28 Tasks necessary, but left undone in Team B

Post-registration nurses (n=4) reported that the least number of tasks were left undone in the most recent shift. The task ‘administer medications on time’ was only reported as undone in the group of pre-registration degree nurses (n=1). ‘Pain management’ and ‘frequent changing of patient position’ were reported as not left undone by any of the degree nurses of Team B. ‘Comfort / talk with patient’ was reported as left undone by most of the apprenticeship trained nurses (n=5), some (n=3) of the post-registration degree and one (n=1) of the pre-registration degree nurses in Team B. Findings are depicted in the following Table 26. As in the previous table, the number appears in bold fonts if all of the nurses within a given type of nurse education level reported the task.

Table 27: Process factors according to nurse education level - Team B

Tasks necessary, but left undone due to lack of time (Team B, n=12)	Pre-registration degree (n=2)	Post-registration degree (n=4)	Apprenticeship training (n=6)
Adequate patient surveillance	2	0	1
Frequent changing of patient position	0	0	1
Administer medications on time	1	0	0
Comfort/talk with patients	1	3	4
Pain management	0	0	1
Educating patient and family	0	1	5

This concludes the part relating to process factors. Findings relating to the processes of care measured through emotional exhaustion and tasks left undone in the most recent shift were presented. The findings suggest similarities and differences in the care provided by a small number of selected nursing teams, rather than proving a relationship between measured factors. The next part will explore patient-related outcomes such as the nurse-reported patient outcomes, which match the process factors analysed in this section (please refer to page 107 for details).

6.29 Patient-related outcomes

This part of the findings chapter relates to the patient-related outcomes measured in this study, including nurse-reported patient outcomes and patient satisfaction with nursing care. Nurse-reported patient outcomes are presented first. Three outcomes were measured by ways of nurses' reports including 'falls with injury', 'pressure areas developed after admission' and 'patient received wrong medication time of dose'. Nurses rated how often these patient outcomes occurred involving themselves or their patients. Findings are presented for each team first, before they are presented according to nurse education levels.

As a wide spread of responses was found again in nurses' responses to the 7 point Likert-scale measuring nurse-reported patient outcomes, findings were categorised. For ease of reference the responses 'never' and 'a few times a year or less' were categorised into occurring 'rarely'. The responses 'once a month or less' and 'a few times a month', from the Likert-scale, were categorised into occurring 'sometimes'. The responses 'once a week', 'a few times a week' and 'every day' were categorised into occurring 'frequently'.

6.30 Nurse-reported patient outcomes - Nursing Teams A, B and C

Nurses of Team B reported the best patient outcomes i.e. the total number of responses (n=34) provided suggest that adverse patient outcomes occurred 'rarely' i.e. 'never' or 'a few times a year or less'. Patient falls with injury were not reported by any of the participating nurses within Team B. This is compared to Team A where nurses reported that patient falls with injury occurred 'sometimes' (n=6) and 'frequently' (n=2). Nurses of Team C also reported that patient falls with injury occurred 'sometimes' (n=7) i.e. 'once a month' and 'a few times a month' involving themselves or their patients.

Overall, the reports of nurses in Team C tended more towards the category 'sometimes'. Seven nurses reported that 'patient falls with injury' occurred 'sometimes'; four nurses reported that 'pressure ulcers after admission' occurred 'sometimes' and a further four nurses reported that 'patient received wrong medication, time or dose' occurred 'sometimes'. On the whole Team C provided 15 'sometimes' responses, compared to 7 responses in Team A and 2 responses in Team B in this category.

Some of the data relating to this question was missing. Two missing values were observed in Team A. One nurse within Team A did not respond to 'patient falls with injury', while also

one nurse did not record an answer for ‘pressure ulcer developed after admission’. One nurse within Team C opted to not provide an answer in relation to the patient outcome ‘patient received wrong medication, time of dose’. In Table 27 the nurse-reported patient outcomes are presented, based on the categories for each team.

Table 28: Nurse-reported patient outcomes occurring - Teams A, B and C

Patient outcomes	Team A (n=11)	Team B (n=12)	Team C (n=8)
Falls with injury*			
• rarely	2	12	1
• sometimes	6	0	7
• frequently	2	0	0
Pressure ulcers developed after admission*			
• rarely	10	11	4
• sometimes	0	1	4
• frequently	0	0	0
Patient received wrong medication, time or dose*			
• rarely	9	11	3
• sometimes	1	1	4
• frequently	1	0	0
Total*			
• rarely	21	34	8
• sometimes	7	2	15
• frequently	3	0	0

*some missing values

6.31 Nurse-reported patient outcomes according to nurse education levels – Team A

Nurse-reported patient outcomes were also analysed according to nurse education levels. The same categories from the paragraph before (Nurse reported patient outcomes – Teams A, B and C) apply.

Overall, pre-registration degree nurses reported the best patient outcomes i.e. none of the patient outcomes measured were reported as occurring 'frequently'. The outcome 'patient falls with injury' was reported by pre-registration (n=3) and post-registration (n=3) degree nurses as occurring 'sometimes'. The outcome 'patient received wrong medication, time or dose' was reported as occurring 'frequently' by international degree nurses. 'Pressure ulcers developed after admission' were least often reported (occurred 'rarely'), regardless of type of education level.

Missing values were observed in the group of international degree nurses for the patient outcome 'falls with injury (n=1), and in the group of post-registration degree nurses for the patient outcome 'pressure ulcers developed after admission' (n=1). Comparisons of findings for Nursing Team A according to nurse education levels are presented in the following Table 28.

Table 29: Nurse-reported patient outcomes according to nurse education levels-Team A

Patient outcomes occurring (Team A, n=11)	Pre- registration degree (n=3)	Post- registration degree (n=5)	International degree (n=2)	Apprenticeship training (n=1)
Falls with injury*				
• rarely	0	1	1	0
• sometimes	3	3	0	0
• frequently	0	1	0	1
Pressure ulcers developed after admission*				
• rarely	3	4	2	1
• sometimes	0	0	0	0
• frequently	0	0	0	0
Patient received wrong medication, time or dose				
• rarely	3	4	1	1
• sometimes	0	1	0	0
• frequently	0	0	1	0
Total				
• rarely	6	9	4	2
• sometimes	3	4	0	0
• frequently	0	1	1	1

*some missing values

6.32 Nurse-reported patient outcomes according to nurse education levels – Team B

As stated in the previous paragraph (please refer to the section above), this team (Team B) reported the best patient outcomes. The breakdown into education levels shows that all responses from pre-registration (n=6) degree nurses and all responses from post-registration (n=12) degree nurses were positive i.e. the measured patient outcomes were reported as occurring ‘rarely’. The group of apprenticeship trained nurses within Team B reported that ‘pressure ulcers developed after admission’ (n=1) and ‘patient received wrong medication, time or dose’ (n=1) occurred ‘sometimes’. There were no missing values observed for data relating to Team B. Nurse-reported patient outcomes are summarised in Table 29.

Table 30: Nurse-reported patient outcomes according to nurse education levels-Team B

Patient outcomes occurring (Team B, n=12)	Pre-registration degree (n=2)	Post-registration degree (n=4)	Apprenticeship training (n=6)
Falls with injury			
• rarely	2	4	6
• sometimes	0	0	0
• frequently	0	0	0
Pressure ulcers developed after admission			
• rarely	2	4	5
• sometimes	0	0	1
• frequently	0	0	0
Patient received wrong medication, time or dose			
• rarely	2	4	5
• sometimes	0	0	1
• frequently	0	0	0
Total			
• rarely	6	12	16
• sometimes	0	0	2
• frequently	0	0	0

This concludes the nurse-reported patient outcomes findings. The following presents the findings for patient satisfaction with nursing care.

6.33 Patient satisfaction with nursing care – Teams A, B and C

Patient satisfaction, in this section, relates to survey ratings of up to six patients per team for Nursing Teams A and B. Patients rated the care received on their ward, which included the care from the nurses who participated in this nurse survey of this study, but was not directly attributable to only those nurses. Their ratings also referred to the care received from nurses who chose not to participate in this study. The nurses who participated in this study did form a part of the experience for patients. This is the reason why the phrase ‘patients cared for by nurses of team...’ is used at times in the following text.

Satisfaction ratings for Nursing Team C relate to the entire hospital (Hospital 3), a total of 27 patients surveyed. Nurses of Team C may have formed part of the experience for patients as the same wards were approached for satisfaction surveys as for nurse surveys, but these were then aggregated to hospital level (Sermeus et al. 2011). Hence they are less directly linked to the selected Nursing Team C.

Data are presented based on the responses provided in the patient surveys. The relevant response i.e. ‘Always’ is presented in the following Table 30 to show patients’ satisfaction levels according to each of the measured items. Findings relating to discharge information are presented using a different approach, as there were only two response option ‘yes’ or ‘no’. The most positive ratings, i.e. all patients rated care as always satisfying, are highlighted in bold fonts in the table.

Table 31: Patient satisfaction with nursing care - Teams A, B and C

Patient satisfaction with nursing care	Team A	Team B	Team C (at hospital level)
Nurse communication	(n=6)	(n=6)	(n=27)
<ul style="list-style-type: none"> During this hospital stay, how often did nurses treat you with <u>courtesy and respect</u>?* 	Always (5) Usually (1)	Always (6)	Always (19) Usually (6)
<ul style="list-style-type: none"> During this hospital stay, how often did nurses <u>listen carefully</u> to you? 	Always (6)	Always (6)	Always (9) Usually (13)
<ul style="list-style-type: none"> During this hospital stay, how often did nurses <u>explain</u> things in a way you could understand? 	Always (4) Usually (2)	Always (3) Usually (3)	Always (14) Usually (8) Sometimes (4)
Pain control	(n=5)	(n=3)	(n=14)
<ul style="list-style-type: none"> During this hospital stay, how often was your pain well controlled?* 	Always (3) Usually (2)	Always (2) Sometimes (1)	Always (8) Usually (5) Sometimes (1)
<ul style="list-style-type: none"> During this hospital stay, how often did the hospital staff do everything they could to help you with your pain?* 	Always (3) Usually (2)	Always (2) Sometimes (1)	Always (11) Usually (2) Sometimes (1)
Discharge information	(n=6)	(n=6)	(n=27)
<ul style="list-style-type: none"> During this hospital stay, have doctors, nurses or other hospital staff talked with you about your care after you leave the hospital? 	Yes (1) No (5)	Yes (2) No (4)	Yes (18) No (9)

*some data missing

Patients cared for by nurses of Teams A and B reported overall the highest levels of satisfaction in regards to nurse communication. This findings is in line with RN4CAST data where more (68%) of patients participating in the Irish arm of RN4CAST reported their satisfaction compared to patients participating in the German arm of RN4CAST (58%). Patients cared for by nurses of Team B reported that they were ‘Always’ satisfied with the level of courtesy and respect (n=6) and that nurses ‘Always’ (n=6) listened carefully to them. Patients cared for by nurses of Team C reported overall more diverse responses i.e. in regards to how often pain was well controlled (Always = 8, Usually =5, Sometimes=1). The numbers

of patient ratings relating to pain control were overall smaller (n=5 Team A, n=3 Team B and n=14 Team C), as not all patients required pain control during the time in which data were collected.

Patients cared for by nurses of Team C reported that discharge information was more often provided (n=18), compared to patients cared for by nurses of Team A (n=1) and Team B (n=2). This finding is in line with the RN4CAST findings generated in section 1 of this chapter (please refer to page 157 for details), where 52% of patients in the German arm of RN4CAST reported that they had received discharge information compared to 30% in the Irish arm of RN4CAST.

This concludes the findings on patient satisfaction and the findings section overall. Patient satisfaction ratings according to nurse education levels were not calculated, as survey data related to entire teams (Teams A and B) and the hospital (Team C). The following text presents a re-visit of the study's theoretical propositions.

6.34 Re-visiting the study's theoretical propositions

The completion of the analysis of findings marks an opportunity for re-visiting the study's theoretical propositions, as posed in the methodology in one of the previous chapters (please refer to page 101 for details). In this findings chapter the nursing education levels, care processes and patient outcomes within and across selected nursing teams working in three hospitals in Ireland and Germany were explored and compared. Degree level educated nurses participating in this study reported on the whole better patient outcomes compared to participating apprenticeship trained nurses. For instance, the team with apprenticeship trained nurses (Team C) provided a total of 8 responses for adverse patient outcomes occurring

'rarely'. More adverse patient outcomes occurring 'rarely' were reported in teams with degree educated nurses i.e. Team A provided a total of 21 and Team B provided a total of 34 responses for this category.

Patients cared for by teams with degree nurses also reported higher levels of satisfaction in regards to nurse communication. As such, the findings support the first theoretical proposition of this study that degree education contributes to improved patient outcomes. The findings of this study also show that there are structures and processes, which influence the care provided by nurses with different educational backgrounds. This is in line with the other theoretical proposition of this study, that patient outcomes are influenced by what precedes them (Donabedian 2005). Based on the review of theoretical propositions the following analytical generalisations emerge, which are presented as the key findings in the section below.

6.35 Key findings

As already stated in the above paragraph, the first key finding of this study suggests that:

1. Degree level education plays a role in improving patient outcomes. Findings also suggest that nurses with different types of degrees contribute in various ways to patient outcomes.

- Pre-registration degree nurses in Team A were the only group reporting that none of the measured patient outcomes occurred frequently. They achieved these results despite being the youngest group of nurses within the team, and although they reported more tasks left undone. Both pre-registration and post-registration degree nurses reported that falls with injuries occurred sometimes, indicating a slight weakness with regards to this area of care. Nurses with international degrees reported the second best outcomes, with a slight weakness reported in the area of medication management. Within Team B pre- and post-registration degree nurses reported comparatively good results, suggesting that they were well prepared for all of the patient outcomes measured in this study. The finding also suggests that Team B were better supported, compared to the nurses of Team A. The finding is that:

2. There are complex and unexpected associations between degree and apprenticeship level nurse staffing, poorer working conditions and patient-related outcomes.

- This was found for the team with mostly degree educated nurses (Team A), whose members reported the most demanding working conditions including highest rates of unpaid overtime and the highest rates of non-nursing duties performed ‘often’ out of the three cases explored in this study. Accordingly, more nurses within Team A reported fatigue and emotional exhaustion, and provided more responses in regards to adverse patient outcomes occurring ‘frequently’, compared to the other team with degree nurses.

- The other team with degree nurses (Team B) depicted the most supportive working conditions in terms of the least amount of unpaid overtime reported, the highest average years of international work experience, and in regards to a more supportive nurse education environment. Subsequently, they reported less fatigue, the least number of tasks necessary but left undone and the best patient outcomes. Patient falls with injury, for example, were not reported by any of the participating nurses of Team B as occurring ‘sometimes’ or ‘frequently’.
- The association of factors within Team C, the team with all apprenticeship trained nurses, also showed complexities. Although they reported highest average years of nursing experience, least levels of fatigue and although they rated their practice working environment positively, nurses reported on the whole poorer patient outcomes compared to the teams with degree nurses.
- The findings also showed associations between care processes (measured as tasks necessary, but left undone due to lack of time) and patient-related outcomes. The total number of ‘tasks necessary, but left undone due to lack of time’ correlated with the outcomes reported. Findings for the task ‘educating patient and family’ correlated with the patient ratings for ‘discharge information’ in Team A. Similarly, the task ‘pain management’ correlated with the patient satisfaction ratings for ‘pain control’ in Team C. Apart from working conditions and care processes, national and hospital-based contexts played a role, as is outlined below.

3. National and hospital-based contexts influence the care provided by nurses with different educational backgrounds.

- This is shown in the findings of Team C, where the nurse-to-patient ratio was reportedly lower (1:11) than in Teams A and B (both 1:6). The findings for NPR were identical in team-based and national RN4CAST data, which suggest that this factor reflects the

country-specific context more so than a local situation. Other factors, which were found to be reflective of the national context included shift patterns, skill mix and hospital bed occupancy.

- Hospital bed occupancy levels were reportedly higher within Irish hospitals, compared to German hospital. Highest bed occupancy levels were reported for the hospital where the team with mostly degree educated nurses was investigated. A combination of a high hospital bed occupancy level and a more demanding work environment adversely influenced the patient-related outcomes reported by the team with mostly degree educated nurses. Figure 8 depicts the case and embedded case summaries. Findings are presented in a comparative style, based on the main findings and according to the design of this study.

Figure 8 Case and embedded case summaries

Hospital 1 (Ireland)	Hospital 2 (Ireland)	Hospital 3 (Germany)
<ul style="list-style-type: none"> • Highest hospital bed occupancy level reported • High number of in-patient admissions reported • Opening of a major new facility, medical admission unit and a new building. 	<ul style="list-style-type: none"> • Moderate hospital bed occupancy level reported • Lowest number of in-patient admissions reported. 	<ul style="list-style-type: none"> • Lowest hospital bed occupancy level reported • Medium number of in-patient admissions reported.
<p>Team of mostly degree educated nurses</p> <ul style="list-style-type: none"> • Lowest average age and nurse experience levels reported • Shift length 12 hrs • Increased levels of unpaid overtime reported • NPR 1:6 • Highest levels of non-nursing duties performed ‘often’ reported • Lowest score for total PES-NWI and for the sub-scale ‘nursing foundations of quality of care’ provided • Highest number of nurses recorded, who reported fatigue • Highest number of ‘tasks necessary, but left undone due to lack of time’ reported • Modest rates of improved patient outcomes and patient satisfaction with nursing care reported. • Discharge information less often provided to patients. 	<p>Team of both degree and apprenticeship trained nurses</p> <ul style="list-style-type: none"> • Highest average years of international work experience reported • Shift length 12 hrs • Lowest levels of unpaid overtime reported • NPR 1:6 • Medium levels of non-nursing duties performed ‘often’ reported • Medium PES-NWI sub-scale score for ‘nursing foundations of quality of care’ provided • Less frustration and fatigue reported • Lowest number of ‘tasks necessary, but left undone due to lack of time’ reported • Best patient outcomes and patient satisfaction with nursing communication reported. • Discharge information less often provided to patients. 	<p>Team of all apprenticeship trained nurses</p> <ul style="list-style-type: none"> • Highest average years of experience ‘as a qualified nurse’ and ‘in this hospital’ reported • Shift length 8hrs • Medium levels of unpaid overtime reported • NPR 1:11 • Lowest levels of non-nursing duties performed ‘often’ reported • Highest total PES-NWI score, and highest sub-scale score for ‘nursing foundations of quality of care’ provided • Moderate levels of fatigue reported • Medium number of ‘tasks necessary, but left undone due to lack of time’ reported • Less improved patient outcomes and patient satisfaction reported overall • Discharge information more often provided to patients.

The key findings outlined in the preceding text and in the case summaries influenced the revision of the analytical framework utilised in this study, which is presented in the following text.

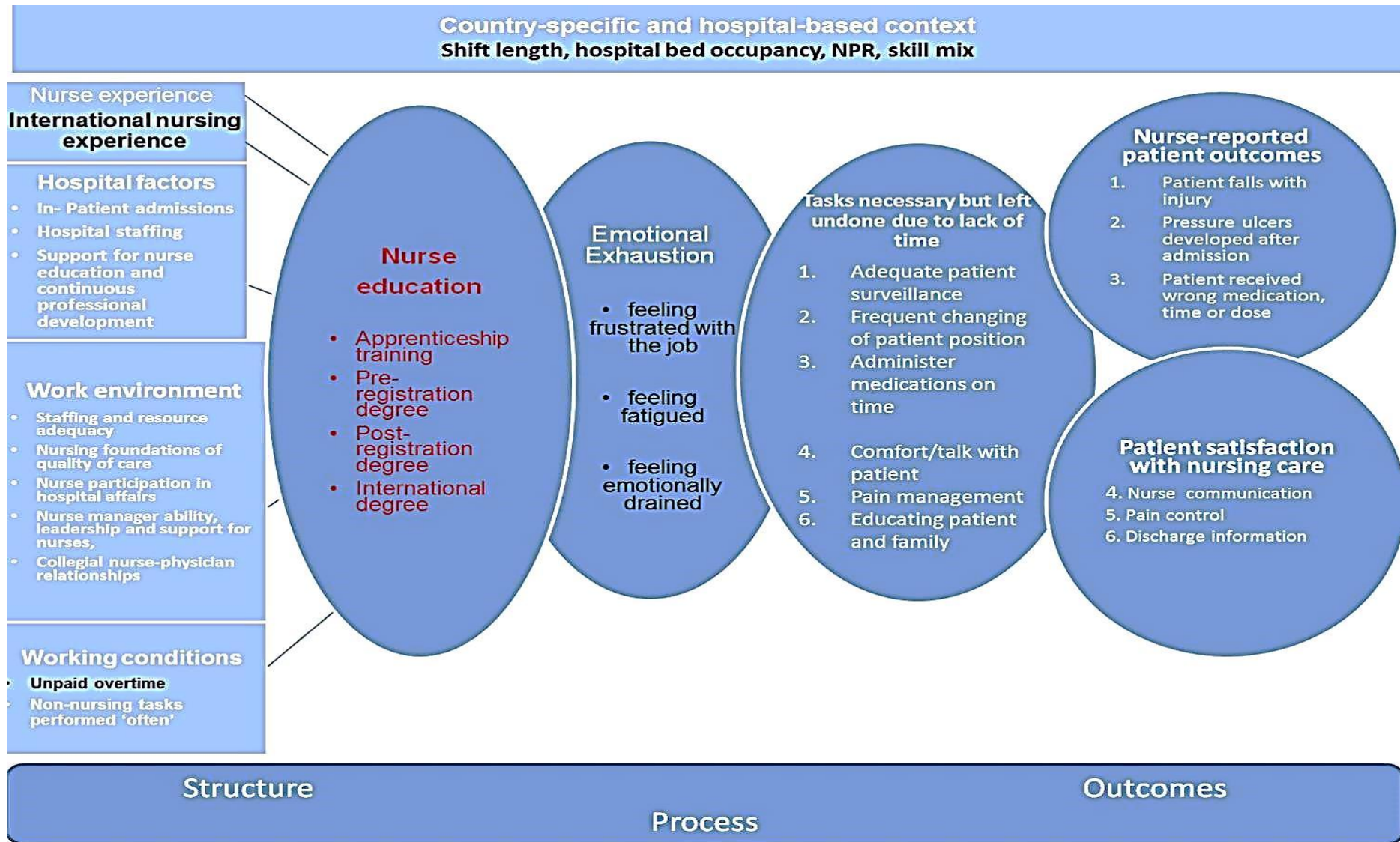
6.36 Revised analytical framework

Various factors relating to nurse education and care contexts were included under each domain of the Structure-Process-Outcome model used in this study, based on the literature reviewed and based on the content available the RN4CAST survey tools. Following the analysis of data a revision of the factors in the SPO analytical framework of this study is suggested. In the revised analytical framework relevant factors are re-arranged according to the findings of the study. For example, more details in regards to the nurse education levels can be included such as the types of degrees (pre-registration, post-registration and international degree). The factors shift length, hospital bed occupancy and NPR are re-allocated, in the revised framework, to country-specific and hospital-based context factors based on the findings of this study.

The framework is also revised in terms of some new factors, which were identified from the analysis. The items 'feeling frustrated with the job', 'feeling fatigued' and 'feeling emotionally drained' are included under Emotional Exhaustion, as they have been shown to influence nurses in this study. The item 'international nursing experience' is highlighted in the revised framework, as it has received limited attention in previous studies and as it was one of the factors which was found to be present in the team with the best patient outcomes in this study. The item overtime is revised to 'unpaid' overtime, as nurses in this study specifically reported on this factor.

Nurse education levels are depicted in a slight dark colour in the following framework, as they are the focus of the analysis and the framework in this study. Re-allocated and new factors are highlighted in black colour. The revised framework is presented in Figure 9 on the following page.

Figure 9: Revised analytical framework - based on Donabedian (2005)



6.37 Conclusion

This findings chapter explored the role of nurse education in improving patient-related outcomes. National, hospital-based and nursing team data were explored and compared. On the whole the theoretical propositions posed in the methodology chapter (please refer to page 101 for details) are affirmed. Findings suggest that degree level education plays a notable role in the reporting of improved patient outcomes. The type of degree held by participating nurses in this study contributed in various ways towards effective care. Complex and unexpected associations between working conditions, care processes and patient-related outcomes were found at a team level. National and hospital-based contexts such as hospital bed occupancy levels, nurse-to-patient ratios and skill mix further affected the care provided by the nursing teams participating in this study. The following chapter discusses the findings of this study.

CHAPTER 7: DISCUSSION

7.1 Introduction

This study provides situated insights into cases which, when compared, assist in the discovery of factors that interact with nurse education on a local and country-specific level. As such the study suggests nuanced links between these factors, which otherwise could have been lost. Based on the key findings of this study, the discussion is presented under the following three sub-headings:

- **The role of nurse education in improving patient-related outcomes**
- **The mediating effects of factors other than nurse education**
- **Country-specific and hospital-based factors interacting with nurse education.**

7.2 The role of nurse education in improving patient-related outcomes

In order to examine the role of nurse education in improving patient-related outcomes, it was first necessary to establish the situation i.e. the composition of nurse education within nursing teams, and the implications on care and outcomes. As a result of this case study, a picture has emerged of the existing situation in regards to nurse education within selected nursing teams and the role of nurse education in improving patient-related outcomes. Using an exploratory case study design, this study provides insights into nurse demographic profiles, hospital and national contexts and patient outcomes. The following is a discussion of the findings relating to the role of nurse education in improving patient outcomes and patient satisfaction with nursing care.

In this study, the team consisting of half of degree educated nurses reported the best patient outcomes. The team with most degree educated nurses reported modest levels of improved patient outcomes, and the team with all apprenticeship trained nurses reported poorer patient outcomes compared to the other teams explored in this study. This finding, that different compositions of nurse education within teams contributes to different patient outcomes, affirms the knowledge gained from previous research (please refer to literature review starting on page 38 for details), which demonstrated that improved patient outcomes can be achieved through degree nurse education. Degree programmes are claimed to prepare nurses to apply critical thinking to clinical decision making practice (Botti and Reeve 2003), and this may help explain these better outcomes for this study. As outlined previously (please refer to page 2 for details), degree programmes purport to better prepare nurses to work together with other health care professionals. Apprenticeship training purports to prepare nurses to assist other health care professionals. This distinction could help explain how nurses with degree education contribute to preventing adverse patient outcomes in the hospitals examined in this study. However, the strength of this study is that it enables more nuanced accounts of such degree level education such as the role of types of degrees, although with small samples in this study. The role of types of degrees to improved patient outcomes is discussed later in this chapter (please refer to page 209 for details).

The finding, that the team with both degree and apprenticeship trained nurses reported the best patient-related outcomes, also suggests that a balance of education levels within a given team can work to the patients' advantage. Degree and apprenticeship trained nurses in this study complemented each other in that they reported different care processes. While there is limited

research on the different care processes of degree and apprenticeship trained nurses, it has been claimed that degree educated nurses perform a wider range of competencies in practice, based on the more extensive skills set developed through the degree programme (Bartlett et al. 2000).

The outcomes measured in this study relate primarily to those of direct nursing care. As such it could be argued that any staff nurse, regardless of their educational background, is prepared to provide the necessary care required by patients. One could take the view that apprenticeship trained nurses in this study were simply more honest when they reported higher levels of adverse patient outcomes. In this study most of the missing values were observed for the team with mostly degree educated nurses. It seems unlikely that degree educated nurses did not understand nor is it likely that they were unable to answer the questions in the survey (Cheema 2014), although the latter is a possibility if time was an obstacle. Missing values can be an indication of a reluctance to report an embarrassing occurrence (Tourangeau and Yan 2007). In this study, degree nurses may have under-reported to a greater extent out of a fear of blame, although this is also the culture in which apprenticeship trained nurses practise. Under-reporting is an acknowledged issue within health care in Ireland (Department of Health and Children 2008, Kirwan, Matthews and Scott 2013); great efforts are being made to develop a blame-free adverse patient outcome reporting culture (Department of Health Children 2008). In this study, as outlined in the research tools chapter (please refer to page 137 for details), nurses' reports of adverse patient outcomes are not interpreted as formal incidence reports.

It is possible that degree educated nurses in this study may have been influenced by the expectation that goes with their level of education, and may therefore have responded more

positively compared to apprenticeship trained nurses. The notion of socially desirable responding has been discussed previously in the literature review chapter of this study. The patient satisfaction surveys utilised in this study assisted in the triangulation of data, as another set of outcomes findings was collected. The responses in the patient survey followed similar patterns in that best nurse communication outcomes were reported for the team with one half of degree nurses.

Another finding of this study is that apprenticeship trained nurses on the whole reported more 'tasks necessary, but left undone due to lack of time' and overall reported poorer patient outcomes. This finding appears to support the claim that degree educated nurses are better equipped to provide complex patient care (World Health Organisation 2001, World Health Organisation 2009b, International Council of Nurses 2010a), as apprenticeship trained nurses reported less completed tasks compared to participating degree nurses. Degree educated nurses in this study reported overall fewer tasks undone, which suggests that they coped better with the complexity of care. Aiken et al. (2003), in their seminal study, claimed that the higher the proportion of degree educated nurses within a given team, the more positive patient outcomes will be. For this study this would have meant that the team with mostly degree educated nurses should have reported the best patient outcomes. As this was not the case in this study, and as the best patient outcomes were reported by the team of whom half were degree educated nurses, it implies that this simple correlation is not always borne out.

In this study the team with mostly degree educated nurses reported moderate levels of improved patient outcomes. This finding is in line with previous research in this field. The models used to

predict mortality and FTR in previous nurse education studies were calculated assuming proportions of 50% (Aiken et al. 2012), 60% (Aiken et al. 2003) and up to 74% (Kendall-Gallagher et al. 2011) of degree educated nurses.

The team with the most degree educated nurses (10/11) in this study reported higher levels of inexperience compared to the other two teams. The implications of inexperience have been discussed in the literature review chapter, and include decreased ratings of quality of care (Kanai-Pak et al. 2008), similar to the findings of this study. The most inexperienced group in this study was nurses holding pre-registration degrees. Pre-registration degree nurses reported on average 2 years of experience as a nurse, and on the whole they reported less effective care process in relation to adequate patient surveillance and administering medication on time. This supports the view that the type of education (pre-registration degree) combined with the level of inexperience affects quality of care (Pfaff et al. 2014). The following is a discussion of the role of nurses with different types of degrees.

7.2.1 The role of nurses with different types of degrees

The findings of this study suggest that nurses with different types of degrees contribute to patient outcomes in various ways; this has not been previously examined in this research area. Pre-registration degree programmes have frequently been criticised for insufficiently preparing nurses to prioritise care (Litchfield and Chater 2007, Health Service Executive 2009a, 2010a), which may explain some of the findings of this study relating to inadequate patient surveillance and errors in administering medication on time. Pre-registration degree nurses in this study reported more often than other degree nurses that the tasks ‘adequate patient surveillance’ and

‘administering medication on time’ were not completed. As there were also other nurses in this study, who reported ineffective patient surveillance and medication management practices, the findings cannot be fully attributed to pre-registration degrees. Pre-registration degree educated nurses may have been more conscious through their programme of education as to what would be ‘best practice’ (Leufer and Cleary-Holdforth 2007); hence they rated their monitoring and medication management practices more disapprovingly.

This study also shows that the opposite combination of factors (i.e. long years of experience and post-registration degree level education) is associated with improved patient outcomes. It could be argued that a post-registration degree contributes to improved patient outcomes, as it is designed to augment the knowledge, skills and attitudes of registered nurses for the enhancement of nursing practice (An Bord Altranais 2010). In addition, length of experience is viewed as an important indicator in the development of clinical competence (Meretoja, Eriksson and Leino-Kilpi 2002), which arguably affects patient outcomes (Morrison et al. 2001). Years of experience on its own may not be the only factor that influenced post-registration degree nurses in this study. Other traits such as ‘internal motivation’ and a ‘desire to improve own practice’ influence the development of clinical competence (Bobay, Gentile and Hagle (2009). King et al. (2007) added that ‘complex caseload management’ is a factor influencing the development of clinical competence, which seems applicable to the teams explored by the various tasks and non-nursing duties reported in this study. While high levels of clinical experience were reported by post-registration degree nurses, the measurement of personal traits influencing the development of clinical competence in practice was beyond the scope of this study.

Similarly to pre-registration degree nurses, nurses with international degrees reported some less efficient care processes and patient outcomes, compared to other types of nurse education. They also reported inexperience, but mainly in regards to the time worked at the current hospital (on average 3 years). As such, inexperience with working in the current hospital could have been equally related to the reports of less effective care and patient outcomes as the international degree.

It may be suggested that language can be a barrier to effective patient care. In this case study one nurse completed a degree in a country where English is not the mother tongue (India), hence it is not possible to attribute the adverse patient outcome findings to international degree with a sufficient level of certainty. Some research including an integrative research review of twenty-nine studies conducted by Kawi and Xu (2009) and a research study conducted by O'Neill (2011) showed that patient outcomes can be affected by international degree. O'Neill (2011) conducted a study with ten internationally educated nurses from India, China and Nepal who, following English proficiency test (IELTS = International English Language Testing System and OET = Occupational English Test), came to work in Australia. Findings suggest that having a 'safe' level of English (p.1125) does not stop with passing OET or IELTS. Proficiency in English language is a core competency for all nurses working in the Irish health sector (Devitt and Bobek 2015). This includes specific language requirements for registration with the Nursing and Midwifery Board of Ireland (2015a), which may also have prevented some of the adverse patient outcomes measured in this study. According to the findings of Myhre (2011) the benefits of international nursing experience including increased levels of confidence in practice outweighs the potential issue of language challenges. This might explain some of the better

patient outcomes reported by nurses with international nursing experience in the team with half degree and half apprenticeship trained nurses.

Apart from the types of degrees and the level of nurse education within the teams, a number of factors relating to working conditions evidently contributed to patient-related outcomes in this study. The mediating effects of factors other than nurse education are discussed in the following section.

7.3 The mediating effects of factors other than nurse education

One of the key findings in this study is that there are complex and unexpected associations between nurse education, poorer working conditions and patient-related outcomes. Reports of improved patient outcomes did not follow a linear relationship according to an increase in the proportion of degree educated nurses, as in previous studies discussed in the literature review chapter (please refer to page 41 for details). The case study design allowed for an exploration of factors within situated contexts, without assuming that all else except nurse education was equal. Each team in this study had a different working environment and factors that influenced their care. The following is a discussion of the mediating effects of the factors other than nurse education, as reported by participating nursing teams in this study.

7.3.1 Reports of unpaid overtime

One of the factors interacting with nurse education, in this study, related to nurses' reports of unpaid overtime in the most recent shift. The findings of this study imply that the wards of two

teams selected for this study (the team with most degree educated nurses and the team with all apprenticeship trained nurses) were so busy that nurses were required to stay beyond their contracted working hours. It could be argued that the unpaid overtime in the most recent shift, reported in this study, made only the tip of the iceberg visible. The teams reporting unpaid overtime could have been constantly under pressure to deliver care in a busy environment. The economic circumstances, such as the cutbacks in nurse staffing during recession in Ireland and the reformation of the hospital sector in Germany were discussed in the nurse education in context chapter (please refer to page 30 for details), and these are bound to have impacted on the reports of unpaid overtime of the nurses part-taking in this study.

The findings of this study showed that the teams reporting overtime reported more patient falls with injury, compared to the team where nurses did not report overtime. This is borne out in this research, though with small samples. This is in line with previous research suggesting that one of the consequences of working overtime was a higher rate of patient falls with injury (Olds and Clarke 2010, Lui et al. 2012). According to Olds and Clarke (2010) the likelihood of patient falls occurring is increased by 19.8%, if nurses work overtime. The fact that only falls with injuries were measured in this study implies that incidents must have been quite severe. Overtime may have not been the only factor contributing to patient falls. Based on this study's findings it could be suggested that nurses' levels of fatigue may also have contributed to patients falling and sustaining injury. Findings relating to fatigue are discussed in the following section.

7.3.2 Fatigue and frustration

Almost half of the team with mostly degree educated nurses in this study reported that they felt fatigued, which implies an association between demanding working conditions, nurses levels of emotional exhaustion and patient outcomes similar to the literature discussed in the review chapter (please refer to page 75 for details).

The finding that the team of nurses that did not report any unpaid overtime also reported some good patient outcomes supports the idea that nurses need some time to unwind emotionally in order to provide safe and effective care (Janssen et al. 2003). The Irish nurses participating in this study in particular could have felt that they were stuck, as they had nowhere to go in Ireland with the recruitment embargo in place during the time of data collection. Being part of a team where unpaid overtime occurs and where adverse events such as falls occur frequently, would probably be a frustrating experience for any nurse. Nurses might have felt that they had little control over their situation on the whole, and this could have increased their levels of frustration. It appears from the findings of this study that nurses, and in particular those working in the team with the mostly degree educated nurses, faced working conditions that put them under emotional strain. They were the least resourceful team in terms of coping with unpaid overtime and with emotional exhaustion. With about half of the team reporting fatigue and emotional exhaustion, there were fewer nurses left, compared to the other teams, who could have offered sympathy or emotional support to affected nurses.

Apart from the emotional strain, the team with the most degree educated nurses also reported the most physically demanding working conditions. One factor measured in this study, which relates

to physically demanding working conditions is non-nursing duties performed 'often'. The findings relating to non-nursing duties are discussed in the following section.

7.3.3 Non-nursing duties performed 'often'

The team with most degree educated nurses reported the largest number of non-nursing duties performed 'often' in this study. This implies that they were regularly distracted from their direct patient care duties, which resulted in poorer patient outcomes in this study. The findings also show that nurses often performed clerical and cleaning duties, rather than expanded clinical roles. This is in line with previous research conducted by Al-Kandari and Thomas (2009) who found that non-nursing duties included clerical/administrative tasks, transporting patients and housekeeping/cleaning tasks; similar to the findings in this case study.

The number of non-nursing duties performed by nurses in Al-Kandari and Thomas's (2009) study showed that nurses holding degree education carried out more non-nursing duties, compared to nurses without a degree. This is also in line with the findings of this study, whereby nurses of the team with mostly degree educated nurses reported performing all of the listed non-nursing duties 'often' during their most recent shift. The finding implies that the care provided by this team was overall more demanding, as they probably tried to attend to direct patient care nursing activities and non-nursing duties at the same time. Performing all non-nursing duties 'often' could have led the nurses holding a degree to being unable to attend at times to direct patient care, which may have resulted in the poorer patient outcomes reported in this study. Clerical and cleaning duties fall under the tasks which are less intellectually challenging as they pose less of a safety threat to patients (Duffield, Gardner and Catling-Paull 2008). Some might

view other duties such as phlebotomy an expanded practice for nurses (Health Service Executive 2009c, 2010b). Dedicated phlebotomy is a reasonably well developed service at this point in time in Ireland, and this might explain why phlebotomy was one of the least performed non-nursing duties in this study. For some of the nurses participating in this study juggling varying demands including clerical, cleaning and expanded duties could have led to more essential care being left undone. This might also explain the findings for the team with mostly degree educated nurses, who reported the largest number of 'tasks necessary, but left undone' out of the three selected teams in this study.

The team with all apprenticeship trained nurses in this study reported the least number of non-nursing duties performed 'often', which indicates that they had more time for direct patient care. This might explain why this team of nurses reported engaging more frequently in the processes involved in provided discharge information to their patients, as they had more time available. On the other hand it is possible that the hospital of the team with all apprenticeship trained nurses had policies in place, which guided the practice around discharge information. The positive effects of policies in guiding nursing practice (Kneafsey, Clifford and Greefield 2015) and discharge planning (Mehta, Nair and Rao 2015) have been described in previous research, and may have influenced nursing care in this study.

From the discussion so far, it appears as if the work of selected nursing teams was supported and inhibited in various ways. This is also shown for the task comfort/talk with patients, where various responses were reported. The task comfort/talk with patient is discussed under the following heading of 'less time to talk'.

7.3.4 Less time to talk

Comfort/talk with patient was a task reported as left undone' due to lack of time in the most recent shift by two out of the three teams in this study. This finding supports the notion that nurses prioritise clinical over psycho-social tasks when limited time is available (Rocheffort and Clarke 2010, Hemsley, Balandin and Worrall 2011, Ball et al. 2014). One of the reasons for nurses' prioritisation of clinical tasks over psycho-social tasks could relate to the quality and safety agenda in Ireland (Health Service Executive 2010c), where safety was outlined as one of the key priorities. The parts relevant to nursing in the Health Service Executive (2010c) document mainly related to medication management and hygiene control. Comforting and talking with patients were not mentioned as a key priority. This might have sent the message to nurses that as long as clinical tasks were performed to a high standard, that this was sufficient. The Integrated Risk Management Policy published in Ireland (Health Service Executive 2009d) re-enforced the importance of patient-centred care. This could have influenced the smaller proportion of participating nurses, who did not report comfort/talk as left undone in this study.

Clinical effectiveness is also one of the key factors that drove the reformation in the German hospital sector through the introduction of Diagnostic Related Groups (DRGs) (Zander, Dobler and Busse 2013). For nurses participating in this study, this could have resulted in psycho-social tasks such as comfort/talk being less often prioritised in clinical practice, although this did not show in the findings for the team with all apprenticeship trained nurses (Germany).

The study shows that overall there was more of a focus on comfort / talk with patients evident in the findings for the team with all apprenticeship trained nurses, compared to the other two teams.

This is in line with the elements of nurses education programmes outlined in one of the previous chapters (please refer to page 25 for details). The elements of nurse education programmes in German apprenticeship training include implementing rehabilitation which in medical patients, such as for example for patients after heart attack or stroke, includes the provision of social and emotional support (Kalra et al. 2004, Årestedt et al. 2012). The provision of care including comfort/talk with patients may have been a shared effort between nurses and other hospital staff. Specific services in Germany focus on psych-social tasks such as the ‘Grünen Damen’, who view their role as the provision of social and interpersonal support to hospitalised patients (Borgetto 2003). There is a slight possibility that participating nurses confused the meaning in regards to this question. Nurses may have rated the activity comfort/talk with patient on the whole, including the parts which were delegated to other staff, rather than the activities relating to comfort/talk with patient completed solely by them. In the RN4CAST survey, nurses were asked to rate the tasks necessary, but left undone because *they* lacked the time to complete them. Nurses could have also related their answer to comforting, rather than talking, which implies a focus on clinical care.

The item comfort/talk to patient could have also been misinterpreted in another way in this study. Nurses may have related their answer to the conduct of ‘formal’ conversations intended to alleviate specific individual issues. What could be meant also by comfort/talk with patient is ‘informal’ conversation. Informal conversation has been described as a contributing factor in the development of a positive nurse-patient relationship (McCabe 2004, Elliott 2010, Chan et al. 2011). Nurses humanise patients’ experiences of hospitalisation by *chatting* informally with them. This could be achieved through an informal chat about, for example, a recent family event

or by having a conversation unrelated to the patient's illness (Chan et al. 2011). Arguably any nursing activity carried out in direct patient contact requires informal conversation. It could be argued, from the findings of this study that all participating teams engaged in direct patient care. Hence they are likely to have engaged in comfort/talk with patient by means of informal conversation. A lack of informal conversation could have left patients feeling depersonalised (Moran 2008). With the overall positive satisfaction ratings of nurse communication reported by participating patients in this study, it does not appear as if patients felt that the care they received was depersonalised.

The finding in this study, that some nurses reported comfort/talk with patient as left undone, may imply that communication can be particularly challenging on medical wards. Medical nursing was the specialty selected for this case study (please refer to page 153 for details). Comfort/talk with patient may take prolonged lengths of time in medical specialty, particularly if patients are cognitively impaired (Nordehn, Meredith and Bye 2006) or if, for example, patients developed aphasia following stroke (Horton, Lane and Shiggins 2015). Comfort/talk with patients could have required more time than the time that participating nurses had available. It could have also been a task which may have gone beyond some of the participating nurses' level of skill, particularly if they did not have the relevant tools or training to talk with patients with impaired speech (Luxford et al. 2015, Horton, Lane and Shiggins 2015). Nurses, particularly those who already engaged in overtime, were probably not in a position to spend prolonged periods of time to comfort/talk with their patients. If they were to do so, they could run the risk of not completing other activities. Nurses are frequently faced with a decision about prioritising care activities. This approach is described in the literature as implicit rationing (Schubert et al. 2008).

Nurses participating in this study prioritised their care differently, dependent on many factors including educational background and working conditions. Some of the care reported in this study was also influenced by country-specific factors. The country-specific factors interacting with nurse education in this study are discussed below.

7.4 Country-specific factors interacting with nurse education

Through the analysis of the findings on a case-by-case basis, and through the comparison of data across cases and national findings, this study reveals some country-specific contexts. An awareness of these contexts assists in understanding the role of nurse education within the two countries investigated in this study, namely Ireland and Germany. The following is a discussion on the country-specific hospital-based and national findings. One noticeable country-specific finding in this case study is that of nurse-to-patient ratio, which is discussed first.

7.4.1 Nurse-to-patient ratio

The team with apprenticeship trained nurses (Germany) in this study reported a lower NPR (1:11), compared to the two teams with degree educated nurses (Ireland 1:6). The findings for NPR were consistent in team-based and national RN4CAST findings where German nurses reported lower NPR compared to Irish nurses. This indicates that NPR is a country-specific factor interacting with nurse education. That NPRs are lower in Germany than in most other European countries (including Ireland) has been shown in a number of previous investigations, including a recent large-scale analysis of RN4CAST data (Aiken et al. 2013) and the statistics published by the Organisation for Economic Co-operation and Development (OECD) (2012).

The consequences of a low NPR have been discussed in the literature review and include reduced quality of care (please refer to page 78 for details). As the German hospital reported the lowest number of staff nurses, compared to selected Irish hospitals, nurse-to-patient ratios may have played a part in the development of adverse patient outcomes reported in this study. Low nurse-to-patient ratios may have also contributed towards dissatisfaction with nursing care (You et al. 2013), as is shown in this study through the slightly less satisfied reports of patients cared for by nurses in the German hospital.

Participating German nurses in this study rated the sub-scale ‘staffing and resource adequacy’ higher than the other two teams in this study. This indicates that they did not perceive the reported nurse-to-patient ratios as unusual, and that they had adapted to post health sector reformation staffing levels. Staffing and resource adequacy may have been perceived more negatively in the Irish teams, where the cutbacks in nursing were very recent during the time of data collection. The finding also suggests that participating Irish nurses perceived a lack of resources, such as limited amounts of time for the work required to provide effective patient care. Aiken et al. (2012) reported in their paper based on RN4CAST data from 12 European countries (including Germany and Ireland) that the nurses’ working environment (based on the Practice Environment Scale-Nurse Working Index) can act as mediating factor to low nurse-to-patient ratios, which may explain some of the more positive reports in regards to patient-related outcomes in the German case.

Participating German nurses rated their practice working environment including the foundations for quality care and total PES-NWI overall positively. Hence the finding points towards another

country-specific difference between Irish and German nursing. The finding differs from previous research such as Aiken et al. (2012). A 'good' working environment, in this case study, did not mediate the negative effects of staffing, nor did it mediate the negative effects of lack of degree education.

A further country-specific finding in this case study relates to skill mix, which was characterised by fewer 'other care staff' in the German team, compared to the Irish teams. Similar to the nurse-to-patient ratios, findings relating to skill mix were similar in team-based and national RN4CAST data. Nursing care in German hospitals is apparently supported by semi-skilled workers with qualifications below KPH (Maier and Afentakis 2013), which were not accounted for in the RN4CAST project or this study's data. The impact of semi-skilled workers in nursing teams on patient outcomes has been explored in a number of previous studies, and show mainly positive results on patient outcomes (Giles et al. 2006, Tzeng and Yin 2007, Damianakis et al. 2007). The use of semi-skilled workers has also shown to impact negatively on nursing teams, especially if they require regular supervision from nurses (Giles et al. 2006), hence take from the time that nurses have to spend in direct patient care. On the whole, the lower number of nurses and other care staff in the team of all apprenticeship trained nurses played a role in this study. The team with the less favourable skill mix also reported less favourable patient outcomes.

On a positive note, the team of German nurses reported shorter shift lengths, which should have contributed positively towards patient care. The effects of long shifts including increased development of pressure ulcers, lack of nurse communication and increased mortality rates have been discussed in the literature review (please refer to section on 'factors other than nurse

education' starting on page 75). Between the Irish teams with degree educated nurses, shift patterns were one of the less prominent factors. Both teams reported the same long shift patterns with dissimilar patient-related outcomes. Another factor, which was more country-specific than team-based, was hospital bed occupancy. The following discusses the findings relating to hospital bed occupancy levels.

7.4.2 Hospital bed occupancy levels

Hospital bed occupancy levels were different between the two countries in this study. The German hospital reported the lowest hospital bed occupancy level (77%). This is compared to higher hospital bed occupancy levels reported in the two Irish hospitals (85% and 93%). A hospital bed occupancy level, according to the Department of Health in Ireland (2011), refers to the ratio of bed days used to available hospital bed days per year. The Health Boards Executive (2003) recommended in their *Admission and Discharge Guidelines* an 85% bed occupancy level for Irish hospitals, as it allows for flexibility in dealing with the natural ebb and flow of illness within the community.

Hospital bed occupancy at 85% or below was also recommended in the UK hospital guide (Foster 2012), as it assists hospitals in the consistent delivery of good patient outcomes. In this study, the team working in the hospital with hospital bed occupancy over the recommended level reported some poor patient outcomes, which is in line with the suggestions made in the UK (Foster 2012) hospital guide.

According to Huczynski and Buchanan (2013) management influences the structures within the organisation, which could be the use of bed capacity. It could be argued that management are the group of people who direct bed usage and hospital activities. Findings for one of the Irish hospitals (Hospital 1) demonstrate that bed occupancy rose above the recommended (85%) national level. This suggests that management of Hospital 1 was perhaps less resistant to external influences or had less control over their resources, compared to management of the other Irish hospital (Hospital 2) and the German hospital (Hospital 3), where bed occupancy was at or below the recommended level.

Davies, Nutley and Mannion (2000) described how hospital management can be manipulated by external influences such as the economy. At the time of data collection both Irish hospitals had to react to strong external influences such as, for instance, the Austerity Plan introduced during economic recession. The Austerity Plan (2010) aimed at reducing the number of nursing staff (please refer to page 30 for details). In parallel, patient numbers in medical specialties, such as the ones cared for by participating nursing teams in this study, increased by a mean of 6.4% annually between 2006-2010 (Economic and Social Research Institute 2010). One way to compensate for reduced nursing staff numbers at a time where more patients require care is to use available patient bed capacity more extensively. By taking this approach, management of Hospital 1 may seem to have reacted to external influences by focusing on 'quantity' i.e. treating as many patients as possible with limited resources.

In 2006, Hospital 1 reported 92 medical beds (Health Service Executive 2008b), while in this case study they reported 131 medical beds for the year ending 2009. This suggests an increase in

medical activity and may simply reflect the social and demographic characteristics of the patients (and populations) for whom the hospital provided care at the given point in time. Management, however, plays a major role in the deployment of overall bed provision within a hospital and their work can influence the quality of patient care (Parand et al. 2014).

The opening of a new medical admission unit in Hospital 1 during economic recession may have led to more patients accessing the hospital at a time when limited nursing staff was available (due to impact of the Austerity Plan on the reduction on nursing staff numbers), hence affecting the care and outcomes of the team with largely degree educated nurses. The purpose of a medical admission unit is to alleviate some of the pressures from medical wards (Department of Health and Children 2010), but it may also put pressure on nursing resources. As shown in the *Report of the Expert Group on Resource Allocation and Financing in the Health Sector* published by the DoH management of Hospital 1 used an ‘internal transfer of staffing resources’ system to enable the opening of the medical admission unit (Department of Health and Children 2010). Other ways in which management could have positively influenced how bed capacity was used includes finding different ways of progressing patients between areas of the hospital and ensuring effective integration of bed use with other aspects of hospital care such as the use of investigative facilities. According to Huczynski and Buchanan (2013) an organisation that focuses on quantity directs their resources towards measurable goals. Little value is attached to the way in which goals are achieved.

Hospital 1, based on the findings of this study, directed their resources towards producing measureable outcomes for government such as the opening of new facilities, though in the

complexity of health policy and management this is difficult to evaluate. The Public Service Agreement (2010) stipulated that hospitals should focus on a more productive match between staffing and service activity. Regular investigations were undertaken to assess hospitals' progress made under the Public Service Agreement (Department of Health 2011b).

The findings in regards to nurse education in this study need to be understood as an estimate of the number of degree educated nurses in each team. It is possible that they are an overestimation, if more nurses with degrees were more inclined to take part in this study. As such the team relating to Hospital 1, as much as both of the other teams may be more mixed when the full spectrum of nurse education levels is considered.

In Hospital 2, which was affected by the same economic circumstances and Austerity Plan, the focus seems to have been more on 'balancing' i.e. making do with what was available in terms of resources and bed capacity. Instead of opening new facilities, Hospital 2 engaged in 'reconfiguration of services', as is shown in the case profiles in the previous findings chapter (please refer to page 173 for details). They concentrated on building an integrated hospital network within the region to deliver economical care. For nurses this meant that they had to provide care to the same patients, but probably with more stable nursing resources. Within an integrative hospitals system there is a greater focus on developing community services, which may have contributed to the hospital's ability to keep bed occupancy levels within normal range.

The Acute Summary Hospital Statistics of the DoH in Ireland showed that hospital bed occupancy levels in Hospital 1 (Nursing Team A) substantially increased from 83% in 2007 to

93% in 2009 (Department of Health 2011a). This is compared to consistent hospital bed occupancy levels of 85% in 2007 and 2009 for Hospital 2 (Nursing Team B) (Department of Health 2011a). Nurses working in Team C (Hospital 3 in Germany) reported the lowest (77%) bed occupancy levels. This may be due to less external influences. The economy in Germany, as outlined on page 32, was stable during the time of data collection for this study.

Bed occupancy levels reported by participating hospitals in this study are also in line with the reports of the European Hospital and Healthcare Federation (2011). They reported hospital bed occupancy across Europe at, on average, 75% which is close to the level reported in Hospital 3. Irish hospitals reported one of the highest bed occupancy levels of, on average, 88% (European Hospital and Healthcare Federation 2011) similar to what was found in this case study. The reason for Irish hospitals reporting one of the highest bed occupancy levels in Europe may also be due to limited healthcare services being available in the community, compared to other countries within the union (Department of Health and Children 2001, European Hospital and Healthcare Federation 2011).

The relationships between bed occupancy levels and patient outcomes have not been fully explored in previous research related to nurse education (Aiken et al. 2003, 2011, 2014). This may be due to the fact that most research on this topic has been directed by researchers from the USA, where bed occupancy levels are less of a problem (American Hospital Association 2012). According to the American Hospital Association (AHA) Annual Survey of Hospitals (2012), bed occupancy levels in USA hospitals (400-499 beds) were at 68% in 2010, indicating that they were unlikely to have played a major part in the provision of nursing care. Data related to all

AHA registered hospitals such as short-term general, psychiatric, maternity and rehabilitation institutions. The Organisation for Economic Co-operation and Development (OECD) reported similar levels for American Acute Hospitals (2011). Hospital bed occupancy was reported at 65% for 2009, based on the number of hospital bed-days related to acute care divided by the number of available acute care beds (multiplied by 365). The average for all participating OECD countries for the year 2009 was 76%. Ireland reported one of the highest European hospital bed occupancy levels for 2009 (after Norway) of 89%.

Most variations in bed occupancy levels are due to fluctuations in the number of in-patient admissions and the average length of stay (European Hospital and Healthcare Federation 2011). Both Irish hospitals in this study, Hospital 1 and 2, reported relatively stable numbers for in-patient admissions and average lengths of stay between the years 2007-2010 (Department of Health Acute Hospital Statistics 2011). It should, however, be noted that the length of stay of on average 5.5 to 6 days applied to approximately 23,000 in-patient admissions in Hospital 1, compared to approximately 14,000 in-patient admissions in Hospital 2. The effects of bed occupancy levels on patient outcomes are shown in international research, as is demonstrated in the next section.

7.4.3 The impact of high bed occupancy levels on patient outcomes

The impact of high bed occupancy levels has been researched previously and shows mainly negative effects on patient outcomes. This includes research conducted by Ahyow et al. (2013) who found, in a retrospective longitudinal (over two-year period) cohort study of 1598 cases of hospital acquired clostridium difficile (CD) in the UK, that in hospitals with bed occupancy

levels of 90% and above (up to a maximum bed occupancy level of 100%) the rates of CD were 55% higher compared to the baseline (0-69.9%).

Some other studies established similar links such as Boyle et al. (2014) who found in their study carried out in South Australia that at a hospital occupancy level of 80%, there is a 10% chance of one severe adverse event occurring, increasing to 20% chance at 95% occupancy and to 22% at a bed occupancy level of 100%. This pattern is roughly followed in this case study whereby nurses of the team with both degree and apprenticeship trained nurses reported some adverse events which, together with other factors, may be attributed to the bed occupancy level of 85%. Nurses of the team with most degree educated nurses reported higher levels of adverse events in a hospital with a bed occupancy level at 93%. While this suggests an association between hospital bed occupancy, nurse education and patient outcomes findings from this case are tentative and require further testing. Kaier, Mutters and Frank (2012) associated high bed occupancy levels (>85%) with hospital acquired infections. Schilling et al. (2010) linked elevated bed occupancy levels to an increased risk in patient mortality in a cohort study of 166,920 patients admitted to 39 Michigan hospitals between 2003 and 2006. One study conducted by Volpe, de Miranda Magalhães and Rocha (2013) found that bed occupancy levels had an inverse correlation to in-hospital mortality and presented no significant correlation to nosocomial infection rates in nine hospitals in Brazil.

The implications of high bed occupancy levels on nursing care were apparent from the findings of this case study, as will be discussed below.

7.4.4 Increased levels of activities and demands on nurses

The level of activity and demands on nurses were notably higher in the team with mostly degree educated nurses in Hospital 1 of this case study, where bed occupancy levels were elevated (93%). Nurses of the team with the most degree educated nurses reported that they performed a wide range of duties including more non-nursing duties, compared to the other participating teams in this study. Nurses of the team with the mostly degree educated nurses reported that 'adequate patient surveillance' was one of the tasks necessary but left undone due to a lack of time.

This is compared to Team B (Hospital 2 – bed occupancy level 85%) where nurses reported that 'adequate patient surveillance' was less often left undone. The finding implies that the team with mostly degree educated nurses lacked the time to complete the task of monitoring patients' conditions, one of the core activities in general nursing (Scott et al. 2006a). Nurses are generally well positioned to conduct patient surveillance, as they spend most of their time in direct patient contact (Al-Kandari and Thomas 2009). As such, nurses act as a surveillance system for the early detection of problems (Aiken et al. 2003). The findings of this study relating to increased hospital bed occupancy and nurse-reported lack of adequate patient surveillance suggest that the team with mostly degree educated nurses was affected by their surrounding factors.

Patient surveillance in regards to patient falls is particularly complex. Nurses have to assess risk and monitor mental state, gait, balance and urinary frequency (Lang et al. 2007), as well as monitor for side effects from medications including dizziness, hypotension, visual disturbances and hypoglycaemia (Cranwell-Bruce 2008). In addition, nurses have to monitor environmental

factors such as slippery/wet flooring, poor lighting, the use of bed rails, bed height and ill-fitted footwear (Choi et al. 2011). As nurses of the team with mostly degree educated nurses (Hospital 1) reported less time available to conduct adequate patient surveillance, and as bed occupancy in Hospital 1 was reportedly elevated, they may have been unable to monitor some of the factors outlined above. This could have been associated with a higher risk of patients falling more frequently, as has also been suggested in the findings of this study.

One of the advantages of having bed occupancy levels at the recommended level (85%) is that nurses have some downtime before a new wave of patients comes into the hospital. During downtime nurses can, to some extent, prepare themselves and re-charge their energy. There are, however, various activities that need to be performed during downtime also. Some of those activities can be categorised into post-discharge organisational tasks and preparative tasks for admission such as communication with nursing team members and bed managers, liaison with treating medical teams, allied health professionals and service staff, documentation, filing, data entry, cleaning, re-stocking, and requests for and collection (or clearance) of equipment (Collins et al. 2010). The time required and the complexity involved in performing these activities may increase considerably after hours, when administrative, cleaning and catering staff are unavailable (Collins et al. 2010). In a hospital where bed occupancy levels exceed recommended levels, such as in Hospital 1 in this study, there is less of a chance for nurses to re-charge their energy. Nurses of the team with the most degree educated nurses probably had to work harder and faster to ensure that beds were equipped and that documentation was organised before new patients arrived, as beds were turned around faster than in Hospital 2 (team with both degree and apprenticeship trained nurses) or Hospital 3 (team with all apprenticeship trained nurses).

On the whole, this section shows that country-specific factors such as nurse-to-patient ratios, skill mix, shift patterns and hospital bed occupancy levels influenced the care provided and the patient outcomes achieved by nurses with different educational backgrounds that participated in this study.

7.5 Conclusion

In this case study nurse education played a role in the reporting of improved patient outcomes. The team with both degree and apprenticeship trained nurses worked in a more relaxed working environment, which evidently influenced the care provided. The type of degree in this study was linked to certain demographic characteristics such as years of experience, which together influenced the care provided and the outcomes achieved.

Nurses in this study conducted and prioritised care differently, which was influenced by many factors including working conditions and cultures of care. The German team prioritised psychosocial care, whereas the Irish team prioritised clinical tasks. Other country-specific factors which interacted with nurse education included nurse-to-patient ratio and skill mix. High levels of hospital bed occupancy and increased levels of activities led to care tasks being performed less effectively. Patient outcomes were reportedly better when hospital bed occupancy was within recommended levels, which suggests that nurses need downtime in between care episodes. The following section summarises the contribution to knowledge gained from this study.

7.5.1. Contribution to Knowledge

This study, using an exploratory multiple case study design, provided detailed and nuanced insights into nurse education, nurse characteristics, hospital and national contexts and related patient outcomes. While previous research suggested that degree education improves mortality and failure-to-rescue rates, this study showed that degree education also enhances nurse-reported patient outcomes (overall less falls with injury, less pressure ulcer development after admission and less medication errors compared to apprenticeship trained nurses) and patient satisfaction with nurse care.

This study contributes to previous research knowledge in that it compared the care processes and patient-related outcomes of nurses with various educational backgrounds including different types of degrees and apprenticeship training. The study also provided insights about the hospital-based and country-specific contexts, which affected differently educated nurses in the provision of care. The study's findings suggest that it is a mixture of factors, rather than nurse education alone, which play a role in improving patient outcomes and patient satisfaction with nursing care.

The following chapter elaborates on the areas of further research, and provides recommendations for practice, education and policy based on the key findings and the discussion of findings.

CHAPTER 8: KEY CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

8.1 Introduction

This case study research explored the role of nurse education in improving patient outcomes and patient satisfaction with nursing care within different hospital-based and country-specific contexts. Findings generated from the Irish and German arms of the RN4CAST project were analysed in depth to develop new insights on the interactions between the composition of nursing, the types of degrees, nurse characteristics, working conditions and care. This chapter outlines the key conclusions. Based on the key conclusions, recommendations for nursing education, practice, policy and research are presented. The recommendations for this case study are followed by a discussion of the limitations, and the overall conclusion of the study.

8.2 Key Conclusions

The accounts of patients and nurses, who participated in this case study, overall affirmed that nurse education at degree level contributes positively to patient outcomes and patient satisfaction with nursing care. The study adds to previous knowledge through the utilisation of an exploratory case study approach. Nurses with different educational backgrounds, from apprenticeship training to degree level education, took part in the study. They provided their individual perspectives on care processes and patient outcomes. Factors, which influence academically and non-academically educated nurses, were explored in as many ways as possible to gain insight into the contexts and structures which guided their practice. This case study assists in explaining ‘how’ apprenticeship training and degree education influences patient care and also ‘how’ nurses from various education backgrounds are influenced by national contexts, hospital structures, working conditions and professional working relationships.

The following key conclusions are based on the findings presented and discussed in the previous chapters. They are grouped under the following sub-headings for ease of reference:

- **Different contributions of degree and apprenticeship trained nurses**
- **Contextual factors which influence degree and apprenticeship trained nurses**
- **Country-specific nuances**

8.2.1 Different contributions of degree and apprenticeship trained nurses

One of the key conclusions of this case study research is that nurses who practice on apprenticeship training and degree level education provide care differently and achieve different patient outcomes. Nurses obtain various types of degrees, which seem to equip them differently for their responsibilities in practice. Despite variations in nurse education levels, patients rated the care they received overall positively. Degree educated nurses scored slightly better in regards to communication including carefully listening to what the patients had to say, explaining things in a way they could understand and in treating patients with courtesy and respect. This finding suggests that degree educated nurses satisfy patients by providing sensitive and dignified care. It challenges the notion that the care of degree educated nurses is less compassionate compared to apprenticeship trained nurses. There seems to be a need for highlighting more often the benefits of employing degree educated nurses, to the public and within the professional arena.

8.2.2 Contextual factors which influence degree and apprenticeship trained nurses

Another key conclusion of this case study research is that hospital-based factors influence the care provided by all nurses including degree educated nurses. Hospital bed occupancy seems to have influenced care processes and patient outcomes; a factor which partially may be attributed to the recent economic pressures (recession) across Ireland. Findings of this case study, however, also suggest that hospital management teams reacted differently to social and economic pressures during the time of data collection. The team with mostly degree educated nurses reported more adverse events involving their patients if patient flow and clinical activity exceeded recommended levels. There did not appear to be a system in place that allowed for patient-need driven nursing resource allocation. Having the patient as a focus in nursing resource allocation could have assisted in ensuring that patient needs are being met even under challenging working conditions.

Nurses reported more often feelings of frustration and fatigue in hospitals where structures were demanding. It is suggested that care delivery issues cannot be entirely overcome by simply adding qualified nurses with higher levels of education to the team. A system is required, which takes into account contextual factors and which allows management to deal with high bed occupancy and high levels of clinical activity. The goal should be to react to changes in working conditions in a timely fashion in order to preserve the health of staff and in order to provide patient-centred high quality care.

Over the past number of years research has shown that professional working relationships have a mediating influence on patient outcomes (Aiken et al. 2013, 2011). The findings of this case

study suggest that improved professional relationships do not always solve staffing issues, particularly not if the fundamental requirement for degree education is not being addressed sufficiently. Apprenticeship trained nurses in this case study reported poorer patient outcomes overall, although they rated professional working relationships positively. One of the advantages of degree education, as discussed previously is that it develops transferable skills (please refer to page 2 for details). Transferable skills, such as decision making, involve choosing between possible interventions (Thompson et al. 2004). Learning about decision making in their programme may enable degree students to provide more effective in patient care. The teams with degree educated nurses in this case study, reported overall more positive patient outcomes, suggesting that they chose more appropriate interventions.

8.2.3 Country-specific nuances

From the findings of this case study research, it may also be concluded that German nurses have to manage with less nursing resources overall. Nurse-to-patient ratios were reported as being much lower in the German team compared to both of the Irish teams, both in this case study and RN4CAST data. This evidence is in line with a number of previous findings including the recent large-scale analysis of RN4CAST data (Aiken et al. 2013) and the statistics published by OECD (Organisation for Economic Co-operation and Development 2012). Adverse consequences on patient care of low nurse staffing levels have been demonstrated in previous research as well (please refer to page 78 for details). In this case study, low NPRs seem to have influenced care processes of participating apprenticeship trained nurses which subsequently resulted in less effective patient care. In addition, the German team had less support from other care staff overall which may also have affected the care that apprenticeship trained nurses in this study were able

to provide. The following text presents the recommendations based on the findings and key conclusions of this study.

8.3 Recommendations for nursing education, practice, policy and research

This section presents the recommendations for nursing education, practice, policy and research, based on the findings and key conclusions of this case study. For ease of reference, recommendations are grouped into sub-headings, which are as follows:

- **Encouraging and enabling degree education**
- **Workforce quality and planning; managing the needs of differently educated nurses**
- **Addressing current hospital structures and clinical activity levels; and**
- **Further research**

Recommendations for education, practice and policy are made throughout within the text for the first three sub-headings. A separate section for further research provides recommendations in regards to research themes, topics and designs emerging from this case study.

8.3.1 Encouraging and enabling degree education

1. This case study supports the notion that the employment of degree educated nurses plays a role in improving patient-related outcomes on the whole. The aim in Ireland, where the proportion of degree educated nurses is at 58% (Aiken et al. 2014), should therefore be to keep this level of nurse graduate output and to continue to grow the levels of academically educated nurses working within hospitals.

2. Although nurse education levels were 58% at aggregate level there are, as has been shown in this case study and in the Irish RN4CAST data, between-hospital variations. The proportion of nurses holding degrees varies between 25-84% across Irish hospitals (please refer to page 143 for details). It seems necessary that these variations are addressed. A formal system to monitor levels of nurse education may need to be developed and implemented at organisational level, as this data does not seem to be available at the moment. In addition, between-ward variations could also be addressed using an organisation-based nurse education monitoring approach. It would also make sense to collect nurse education level data on a national level, for example through the Health Service Executive or Department of Health and Children, for monitoring and benchmarking purposes. This would promote transparency within the Irish and German hospital system as well as encouraging hospitals to employ degree educated nurses.

3. Based on the findings in regards to patient satisfaction with nurse communication, it is recommended that the developments in nurse education should be more often celebrated in Ireland and in Germany. The positive findings in regards to degree educated nurses' interpersonal skills are in line with a recent survey carried out by the An Bord Altranais (2013) on the public's perception of nursing compared to 15 other public sector professions. The study showed that nurses are considered by members of the Irish public (n=770) to be the most caring and compassionate of professions (77% 'high' or 'very high') (An Bord Altranais 2013). This calls for Irish nurses (and those interested in nursing) to spread the word about their passion for caring. Degree educated nurses, as shown in this case study, have the skill and will to communicate and listen well and treat their patients with dignity

and respect. Spreading the word about the positive aspects of care may also assist in changing some of the negative perceptions of nursing, which have been described in a small number of papers (Emeghebo 2012, Beer 2013).

4. Economic circumstances (recession), as has been discussed in this study (please refer to page 30 for details), played a role in Irish nursing. The Irish economy is now at a stage of recovery, which opens up new opportunities. One opportunity lies in the fact that Irish graduates do not have to leave the country anymore to find a suitable first nursing position. An incentivised package may encourage new graduates to stay in Ireland. It may also encourage already migrated nurses to return to work within the Irish health system.

5. In order to keep abreast with international developments, Germany needs to take large steps towards expanding the number of degree educated nurses working in practice. The Scientific Committee (Wissenschaftsrat 2012) of the German Government proposed that 10-20% of nurses should be educated at degree level. A timeline for this proportion of academically educated nurses was, however, not outlined in the report. The initiative would need to be supported financially, as costs for the expansion of existing, and the development of additional degree programmes, will emerge (Wissenschaftsrat 2012). Expanding the number of degree educated nurses in Germany will also require an increased transfer of responsibility from hospital-based training facilities to universities (Recken 2013) including nurse tutors and skills nurses. In nursing practice, an increase in the number of degree educated nurses will require experienced staff taking on the additional role of preceptorship in order to guide, supervise and assess students. At European level there are a number of

initiatives available, which could help support the transfer from apprenticeship training to degree education in Germany. One such initiative is the Erasmus+ Programme of the European Commission (2014), which aims at linking formal and informal learning and education between developed and less developed countries. Taking part in such an initiative could assist Germany to learning from countries such as Ireland in regards to implementing structures that support degree nursing education.

8.3.2 Workforce quality and planning; managing the needs of differently educated nurses

6. It is recommended that hospital management should take an active role in guiding their differently educated nurses. Depending on the level of education and the type of degree, nurses may require guidance as to the best way to apply their knowledge and skills to relevant patient groups. The clinical development needs of nurses could be established by means of on-going assessment in practice such as performance appraisal (Farndale and Kelliher 2013). In this case study, none of the participating hospitals engaged in regular performance appraisal of their staff (please refer to page 173 for details).

8.3.3. Addressing current hospital structures and clinical activity levels

7. A more patient-need driven resource allocation system at organisational level is required. Evidently it is insufficient to focus on solely employing large proportions of degree educated nurses. Nurses need to be supported in order to provide safe and effective care. Bed occupancy should be assessed regularly and used to establish when additional nurse staffing

is required. This will support nurses in their emotional well-being, and subsequently enhance patient outcomes.

8. A larger emphasis also needs to be placed on managing hospital bed occupancy levels at a regional level. The development of regional community services such as facilities for elderly patients could assist in easing the patient flow into the hospital.

8.3.4 Further Research

As well as exploring the role of nurse education in patient care, this case study has laid the foundation for further research.

9. While there is a growing body of evidence that advocates for the employment of degree educated nurses to general adult hospitals, limited data seems to be available for other branches such as mental health, intellectual disability or children's nursing. In addition, there has been less of a focus on developing knowledge of the contribution of degree educated and apprenticeship trained nurses within non-hospital and community services. Such research is required to establish if findings, such as the ones from this case study, can be replicated or if there are other contextual factors which influence the care provided by degree educated and apprenticeship trained nurses.
10. Additional research which takes into account country-specific aspects also seems to be required. This will assist in interpreting findings from large-scale studies and in order to understand nuances in different care contexts. Further studies, exploring country-specific

nuances of other countries, could help in affirming the findings with regards to nurse education in this study. Other research could focus on other aspects, which were not the primary focus of this study. One of such aspects could relate to nurse-to-patient ratios.

11. There is a need for research that develops this case study approach further. Future case study research could explore the differences between nurse-to-patient ratios internationally with regards to the processes of care, scopes of practice and care delivery models. While this study did not measure cost effectiveness, future studies could also explore the cost-effectiveness of degree educated and apprenticeship trained nurses. This aspect seems to be one of the central concerns in Germany (please refer to page 22 for details).

12. Future research into nurse experiences may assist in discovering more about what it is like to be an apprenticeship trained or a degree educated nurse working in a team, on a ward or in a hospital. In light of the findings of this case study, it seems also timely to conduct further research into the experiences of nurses with international degrees who work within Irish and German hospitals. Such research could be of qualitative (interpretivist) nature and explore the integration of degree educated and apprenticeship trained nurse coming from abroad into existing hospital structures and nursing teams. Another research angle could be gained from interviewing other members of staff such as clinical nurse managers, physicians and allied professionals. Findings from nurse managers, physicians and allied professionals could help in identifying the facilitators and barriers to effective integration of nurses with an international education background. Furthermore, the views of managers, physicians and allied professionals on the division of work roles in teams with differently educated nurses

could enrich the current knowledge on the impact of pre-registration, post-registration and international degree nurses on patient care.

13. This case study examined the role of nurse education in regards to three patient outcomes. It may be useful to expand the list of patient outcomes to investigate if nurses report similar strengths and weaknesses with regards to other patient outcomes beyond those measured in this case study. The outcomes included in this case study were directly relevant to clinical nursing care, however, the list of patient outcomes utilised in this case study is not exhaustive. Similarly, future research could expand on the patient satisfaction aspects measured in this study. Additional insights into patients' expectations with regards to degree and apprenticeship trained nurses could be valuable and could help identify if there are different expectations and what the difference in expectations is.
14. Additional case study research would be useful in further developing an understanding of the role of degree education in clinical practice. Such research would be useful in both kinds of countries i.e. countries where academic nurse education is established and countries where academic nurse education is developing.
15. Additional data on the influence of hospital bed occupancy levels on patient outcomes and patient satisfaction may be required within an Irish context to establish if high levels of clinical nursing activity are being perceived by patients as an influencing factor for suboptimal nursing care. To differentiate between findings, the identification of the nurse education composition within teams should be part of the investigation.

16. Further testing of the Structure-Process-Outcome model (Donabedian 2005), as utilised in this study, may also assist in developing further context-based nursing and nurse education research. In this study, utilisation of the Structure-Process-Outcome model assisted in identifying the factors which interacted with nurse education in the participating hospitals and nursing teams. Through the analysis existing factors in the model were refined and new factors were added. It would be interesting to examine, if the factors identified in this study hold true in other research, or if further hospital-based and country-specific factors can be added.

8.4 Limitations of the study

As this case study investigated small samples of hospitals, nursing teams and patients, it precludes statistical generalisations of the findings to larger populations. The knowledge generated from this case study is unique and situated in that findings are specific to each team, hospital, country and to the time period in which data were collected. According to Stake (2006), however, there is value in situated knowledge. Through within-case and cross-case analysis factors and nuances, which influenced participating degree and apprenticeship trained nursing teams, were identified. As such, findings should have at least two purposes. Firstly, the factors and nuances identified are valid for the participating hospitals and nursing teams of this case study. They may facilitate local policy and practice development for the population of cases of those studied (Stake 2006). The factors and nuanced insights identified from this case study may also guide further research (as discussed in the section above). Analytical generalisability has

been achieved through the development and testing of theoretical propositions in this study. The theoretical propositions affirmed by the findings in this study may be tested further in future research (Yin 2014). Rather than being statistically generalisable, the findings of this case study might also be transferable (Stake 2006) to hospitals and nursing teams operating under similar factors and circumstances.

I used existing RN4CAST data such as hospital, nurse survey and patient survey data. In doing so, the data may have lost some of its richness. There were no observations, no fieldwork, nor were there interviews undertaken to triangulate quantitative with qualitative data, although I am familiar with the kinds of sites explored or similar ones. According to Yin (2014), it is not the method of data collection but the aim of the research that defines a case study. The reports of hospital management, nursing teams and patients of participating hospitals were taken into account in this study. Country-specific factors were identified and national economic circumstances explored. Quantitative data from multiple sources (hospital, nurse and patient surveys) were triangulated to develop an understanding of the contribution of nurses educated at various levels and the contextual factors, which play a role in improving patient-related outcomes. Considering the depth that can be gained from survey data (Yin 2014), however, it is suggested for future studies that a qualitative or an observation/fieldwork element would be beneficial to strengthen study findings (Lalor et al. 2013).

Using observation of specific care episodes as a data collection method could have enhanced objectivity of patient outcome data. In this study, patient outcome data were by and large nurse-reported, which arguably may seem subjective (Tvedt et al. 2014). Nurses' accounts may have

been influenced by their understanding and interpretation of adverse patient events relating the tasks necessary, but left undone and in regards to patient outcomes. The main rationale for utilising nurse-reports in this case study was that the tasks reported and the patient outcomes were relevant to nursing care. Using observation could have enhanced objectivity in that actual practice and patient outcomes would have been observed by the researcher. Observation could have also assisted in increasing validity of findings in that patient outcome reports of nurses could have been affirmed through independent observation. Using nurse-reported patient outcomes, however, did provide me with sufficient data to gain initial insights into the care processes and patient outcomes as perceived by nurses practicing from various levels of education.

In order to complement nurses' reports, patient satisfaction data provided a crucial perspective on care and outcomes in this case study. It could, however, be argued that patient satisfaction is yet another subjective outcome measure. According to the research conducted by Meredith and Wood (1995), Lis, Gupta and Grutsch (2008) and Jibodh et al. (2010), patient satisfaction depends on the physical and emotional state of the patient at the point of data collection. In order to collect unbiased data, patient satisfaction ratings were collected following the acute stage of illness when patients were less likely to be in physical and emotional discomfort. Collecting patient satisfaction data some three days following admission also increased authenticity as patients had some time to become acquainted with the nurses who cared for them. For future studies, it is envisaged that both subjective and objective data should be used to increase the level of insight and to further enhance validity of patient outcome findings.

The surveys utilised in this study collected data at one point in time according to the cross-sectional data collection protocol in RN4CAST. In order to learn more about the role of nurse education and the associated factors interacting with nurse education and patient outcomes a longitudinal approach to data collection could have been beneficial. In particular a longitudinal approach could have assisted in detecting changes and developments (Polit and Beck 2009) in the care provided by nurses with different educational backgrounds by collecting more than one set of data. This approach to data collection could have also assisted in exploring the long-term influences of hospital-based factors on care processes and patient-related outcomes by observing the same hospitals and nursing teams over an extended period of time. The cross-sectional approach utilised in this study was, however, very useful in comparing the various factors relating to the three hospitals and nursing teams in this study. In addition, the approach enabled data collection without manipulating the study environment or the participants of this study, which is a prime requirement for case study research (Yin 2005, 2014).

As stated by Yin (2014) case study researchers may be criticised for selectivity. This argument holds also true for this case study where hospitals and nursing teams were selected purposefully. Random sampling, due to the small number of hospitals and nursing teams required for this case study, would have likely resulted in an unrepresentative sample that did not fit the research aims or questions (Seawright and Gerring 2008, Sharp et al. 2012). In this case study multi-stage purposeful sampling proved useful in selecting cases that represented the population such as hospitals and nursing teams with mostly degree, both degree and apprenticeship and all apprenticeship trained nurses (please refer to page 144 for details).

Finally, the researcher of this study could be accused of bias towards verification. I am a lecturer involved in degree nurse education. Hence I could have used the case study design to confirm my preconceived notions (Flyvbjerg 2006). Prior to conducting this study, I had read some of the key publications on the topic and was aware of the positive contributions of degree nurses depicted in the literature. As I also have extensive years of experience in clinical nursing practice, I had a prior hunch that the role of degree education was influenced by factors beyond those included in key publications. There was also a notion, based on my own clinical experience from the past, that apprenticeship trained nurses play a role in improving patient outcomes.

In order to collect unbiased data, I kept neutral throughout the conducting of the study, as to the education level which enabled participating nurses to achieving the best patient outcomes and patients' satisfaction levels. During analysis I maintained an open mind in order to discover factors, rather than affirming my preconceived notions. This open-mindedness enabled me to provide a detailed, nuanced and accurate account of the role of nurse education in improving patient outcomes and patient satisfaction with nursing care.

8.5 Final Conclusions

This case study identified the role of nurse education in the provision of improved patient-related outcomes such as the key contributions of nurses practicing from various education levels, and the contexts which played a part in the provision of safe and effective care in two Irish and one German hospital. Whilst confirming a previous finding that degree education contributes positively towards improved patient outcomes, this case study was unique in a number of ways.

The case study design assisted in generating and testing theoretical propositions, which are relevant to local policy and practice and which may become the subject of future research. The case study design utilised in this research also facilitated the discovery of hospital-based and country-specific nuances. Adding knowledge in regards to country-specific nuances contributes to an understanding of workforce administration as practiced locally and abroad. In contrast to previously conducted large-scale research, this case study distinguished between various degree educated nurses and apprenticeship trained nurses. Data were explored within its real-world context 'the hospital'. The contributions of differently educated nurses to nursing relevant measures such as nurse-reported patient outcomes and patient satisfaction with nursing care were examined in this case study.

Although findings are tentative and situated within participating hospitals and nursing teams, it is envisaged that this case study will assist in the development of positive working environments for degree educated and apprenticeship trained hospital nurses. Conducting a case study was a challenging but enriching experience in that I was required to examine complex data sets which reflected the reality of nursing care as it occurred in participating hospitals in Ireland and in Germany during the time of data collection. Whilst my previous work experience in both of the selected countries assisted me in interpreting case study findings, research supervision and training enabled me to keep an open mind and remain neutral throughout the process of developing and conducting the study. It is suggested that the findings of this case study advance the understanding of the role of nurse education in improving patient-related outcomes.

References

- Adhikari, R. and Melia, K.M. 2013. The (mis)management of migrant nurses in the UK: a sociological study. *Journal of Nursing Management*, 23(3), pp359-367.
- Ahyow, L.C., Lambert, P.C., Jenkins, D.R., Neal, K.R. and Tobin, M. 2013. Bed Occupancy Rates and Hospital-Acquired Clostridium difficile Infection: A Cohort Study. *Infection Control & Hospital Epidemiology*, 34(10), pp1062-1069.
- Aiken, L.H., Smith, H.L. and Lake, E.T. 1994. Lower Medicare mortality among a set of hospitals known for good nursing care. *Medical Care*, 32(8), pp771-787.
- Aiken, L.H., Sloane, D. M., Lake, E.T., Sochalski, J. and Weber, A.L 1999. Organization and Outcomes of Inpatient AIDS Care. *Medical Care*, 37 (8), pp760-772.
- Aiken, L. and Havens, D. 2000. The Magnet Nursing Services Recognition Program – a comparison of two groups of Magnet hospitals. *American Journal of Nursing*, 100(3), pp26–36.
- Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J. A., Busse, R., Clarke, H., Giovanetti, J.A., Hunt, J., Rafferty, A.M. and Shamian, J. 2001. Nurses' reports on hospital care in five countries. *Health Affairs*, 20(3), pp43- 53.
- Aiken, L. H., Clarke, S. P., Sloane, D. M., Sochalski, J., and Silber, J. H. 2002. Hospital nurse staffing and patient mortality, nurse burnout, and job dissatisfaction. *JAMA*, 288, 1987-1993.
- Aiken, L. H., Clarke, S. P., Cheung, R. B., Sloane, D. M., and Silber, J. H. 2003. Educational levels of hospital nurses and surgical patient mortality. *JAMA*, 290, 1617- 1623.
- Aiken, L.H., Clarke, S.P., Cheung, R.B., Sloane, D.M., Silber, J.H. 2004. Reply to letters that raised concerns about Aiken et al.'s (2003) study. *JAMA*, 291(11), pp1322-1323.
- Aiken, L.H., Xue, Y., Clarke, S.P. and Sloane, D.M. 2007. Supplemental Nurse Staffing in Hospitals and Quality of Care. *Journal of Nursing Administration*, 37(7-8), pp335-342.
- Aiken, L.H., Clarke, S.P., Sloane, D.M., Lake, E.T. and Cheney, T. 2008. Effects of hospital care environment on patient mortality and nurse outcomes. *Journal of Nursing Administration*, 38(5), pp223-229.
- Aiken, L.H., Sermeus, W., Van den Heede, K., Sloane, D.M., Busse, R., McKee, M., Bruyneel, L., Rafferty, A.M., Griffiths, P., Tishelman, C., Moreno-Casbas, M.T., Scott, P.A., Brzostek, T., Schwendimann, R., Kinnunen, J., Heinen, M., Zikos, D., Strømseng Sjetne, I., Smith, H.L. and Kutney-Lee, A. 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. *BMJ*, 344, (online) DOI: <http://dx.doi.org/10.1136/bmj.e1717> [last accessed September 2015].

Aiken, L.H., Sloane, D.M., Bruyneel, L., Van Den Heede, K., Sermeus, W. and RN4CAST Consortium 2013. Nurses' reports of working conditions and hospital quality of care in 12 countries in Europe. *International Journal of Nursing Studies*, 50(2), pp143-153.

Aiken, L.H., Sloane, D.M., Bruyneel, L., Van Den Heede, K., Griffiths, P., Busse, R., Diomidous, M., Kinnunen, J., Kózka, M., Lesaffre, E., McHugh, M.D., Moreno-Casbas, M.T., Rafferty, A.M., Schwendimann, R., Scott, P.A., Tishelman, C., Van Achterberg, T., Sermeus, W. and the RN4CAST consortium 2014. Nurse staffing and education and hospital mortality in nine European countries: a retrospective observational study. *Lancet*, 383(9931), pp1824-1830.

Al-Kandari, F. and Thomas, D. 2009. Factors contributing to nursing task incompleteness as perceived by nurses working in Kuwait general hospitals. *Journal of Clinical Nursing*, 18, pp3430–3440.

American Hospital Association 2012. *Hospitals, beds, and occupancy rates, by type of ownership and size of hospital: United States, selected years 1975–2010*. (online) Available from <http://www.cdc.gov/nchs/data/abus/2012/106.pdf> [last accessed September 2015].

An Bord Altranais 1994. *The future of nurse education and training in Ireland*. Dublin: An Bord Altranais.

An Bord Altranais 2000. *Scope of Nursing and Midwifery Practice*. Dublin: Stationery Office.

An Bord Altranais 2003. *Guidelines on the key points that may be considered when developing a quality clinical learning environment*. Dublin: An Bord Altranais.

An Bord Altranais 2005. *Requirements and Standards for Nurse Registration Education Programmes*. 3rd ed. Dublin: An Bord Altranais.

An Bord Altranais 2010b. *Requirements and Standards for Post-Registration Nursing and Midwifery Education*. Dublin: Stationery Office.

An Bord Altranais 2012. *Nursing/Midwifery – a career for you. Pre-registration Honours Degree Programmes 2012*. Dublin: Nursing Career Centre, An Bord Altranais.

An Bord Altranais. 2013. *Public Attitudes to Nurses & Midwives. An Amárach Research Survey for An Board Altranais*. (online) Available from <http://www.nursingboard.ie/en/news-article.aspx?article=abfbcf56-47ed-4087-aa78-ec8b4243668> [last accessed September 2015].

An Foras Áiseanna Saothair 2009. *A Quantitative Tool for Workforce Planning in Healthcare: Example Simulations*. Dublin: Fàs.

An Foras Áiseanna Saothair 2013. *Healthcare Assistant Traineeship*. (online). Available from <http://www.fas.ie/en/Training/Traineeships/Traineeship+Courses/Personal+Service+Occupations/Care+Assistant+Care+for+the+Elderly+Traineeship.htm> [last accessed September 2015].

Årestedt, K., Saveman, B.I., Johansson, P. and Blomqvist, K. 2012. Social support and its association with health-related quality of life among older patients with chronic heart failure. *European Journal of Cardiovascular Nursing*, 12(1), pp69–77.

Ausserhofer, D., Zander, B., Busse, R., Schubert, M., De Geest, S., Rafferty, A.M., Ball, J.E., Scott, P.A., Kinnunen, J., Heinen, M., Sjetne, I.S., Moreno-Casbas, T., Kózka, M., Lindqvist, R., Diomidous, M., Bruyneel, L., Sermeus, W., Aiken, L.H., Schwendimann, R. and RN4CAST consortium. 2014. Prevalence, patterns and predictors of nursing care left undone in European hospitals: results from the multicountry cross-sectional RN4CAST study. *BMJ Quality and Safety*, 23(2), pp126-135.

Bae, H.J., Yoon, D.S., Lee, J., Kim, B.K., Koo, J.S., Kwon, O. and Park, J.M. 2005. In-Hospital Medical Complications and Long-Term Mortality after Ischemic Stroke. *Stroke*, 36, pp2441-2445.

Bae, S.H., Mark, B. and Fried, B. 2009. Impact of Nursing Unit Turnover on Patient Outcomes in Hospitals. *Journal of Nursing Scholarship*, 42(1), pp40-49.

Ball, J.E. 2011. *Guidance on safe nurse staffing levels in the UK*. London: RCN.

Ball, J.E., Murrells, T., Rafferty, A.M., Morrow, R. and Griffiths. 2014. ‘Care left undone’ during nursing shifts: associations with workload and perceived quality of care. *BMJ Quality and Safety*, 23, pp116-125.

Bartels, Y., Simon, A. and Plohmann, S. 2012. Pflegeakademisierung in Deutschland – Bedarf und Angebot. Ergebnisse einer exploratorischen, qualitativen Analyse. *Pflegewissenschaft*, 10(12), pp548-558.

Bartlett, H., Simonite, V., Westcott, E. and Taylor, H.R. 2000. A comparison of the nursing competence of graduates and diplomates from UK nursing programmes. *Journal of Clinical Nursing*, 9, pp369-381.

Beer, G. 2013. *Too Posh to Wash? Reflections on the Future of Nursing*. London: 2020health.org

Benner, P. 1984. *From novice to expert: Excellence and power in clinical nursing practice*. Menlo Park, CA: Addison-Wesley.

Benner, P., Tanner, C.A. and Chesla, C.A. 1996. *Expertise in Nursing Practice*. New York: Springer Publishing Company.

Berkow, S., Virkstis, K., Stewart, J. and Conway, L. 2008. Assessing new graduate nurse performance. *JONA*, 38(11), pp468-474.

Berney, B. and Needleman, J. 2006. Impact of Nursing Overtime on Nurse-Sensitive Patient Outcomes in New York Hospitals, 1995-2000. *Policy, Politics, & Nursing Practice*, 7(2), pp87-100.

- Bernier, S. 2004. RN education. A matter of degrees. *Issues in Nursing*, 34(3), p50.
- Blanzola, C., Lindeman, R. and King, M.L. 2004. Nurse Internship Pathway to Clinical Comfort, Confidence, and Competency. *Journal for Nurses in Staff Development*, 20(1), pp27-37.
- Blegen, M.A. and Vaughn, T.E. 2001. Nurse experience and education: effect on quality of care. *JONA*, 31(1), pp33-39.
- Blum, K., Isfort, M., Schilz, P. and Weidner, F. 2006. *Pflegeausbildung im Umbruch – Pflegeausbildungsstudie Deutschland (PABiS)*. Düsseldorf: Deutsche Krankenhaus Verlagsgesellschaft.
- Blythe, J., Baumann, A., Rhéaume, A. and McIntosh, K. 2009. Nurse migration to Canada: pathways and pitfalls of workforce integration. *Journal of Transcultural Nursing*, 20(2), pp202-210.
- Bobay, K., Gentile, D.L. and Hagle, M.E. 2009. The relationship of nurses' professional characteristics to levels of clinical nursing expertise. *Applied Nursing Research*, 22(1), pp48-53.
- Bobay, K., Yakusheva, O. and Weiss, M.E. 2011. Outcomes and cost analysis of the impact of unit-level nurse staffing on post-discharge utilisation. *Nursing Economics*, 29(2), pp69-87.
- Boggs, G.R. 2004. Relationship between patient mortality and nurses' level of education. *JAMA*, 291 (11), p1322.
- Borgetto, B. 2003. Selbsthilfe als bürgerschaftliches Engagement. (online) Available from http://www.z-sozialreform.de/ccm/cms-service/stream/asset/49_03_12%20Borgetto.pdf?asset_id=880053 [last accessed September 2015].
- Botti, M. and Reeve, R. 2003. Role of knowledge and ability in student nurses' clinical decision-making. *Nursing and Health Sciences*, 5, pp39–49.
- Boyle, D.K., Gajeswski, B.J. and Miller, P.A. 2012. A Longitudinal Analysis of Nursing Specialty Certification by Magnet® Status and Patient Unit Type. *JONA*, 42(12), pp567-573.
- Boyle, J., Zeitz, K., Hoffman, R., Khanna, S. and Beltrame, J. 2013. Probability of Severe Adverse Events as a function of Hospital Occupancy. *IEEE Journal of Biomedical and Health Informatics*, 18(1), pp15-20.
- Boyle, J., Zeitz, C., Hoffman, R., Khanna, S. and Beltrame, J. 2014. Probability of Severe Adverse Events as a function of Hospital Occupancy. *IEEE J Biomed Health Inform*, 18(1), pp15-20.
- Bruyneel, L., Van den Heede, K., Diya, L., Aiken, L. and Sermeus, W. 2009. Predictive validity of the International Hospital Outcomes Study questionnaire: An RN4CAST pilot study. *Journal of Nursing Scholarship* 41(2), pp202-210.

Bruyneel, L., Li, B., Aiken L.H., Lesaffre, E., Van Den Heede, K. and Sermeus, W. 2013. A multi-country perspective on nurses' tasks below their skill level: reports from domestically trained nurses and foreign trained nurses from developing countries. *International Journal of Nursing Studies*, 50(2), pp202-209.

Bundesagentur für Arbeit 2014a. *Ausländische Pflegekräfte für den deutschen Arbeitsmarkt*. Bonn: Bundesagentur für Arbeit.

Bundesagentur für Arbeit 2014b. *Steckbrief: Gesundheits- und Krankenpflegehelfer/in*. (online) Available from www.arbeitsagentur.de [last accessed September 2015].

Bund-Länder-Arbeitsgruppe Weiterentwicklung der Pflegeberufe 2012. *Eckpunkte zur Vorbereitung des Entwurfs eines neuen Pflegeberufgesetzes*. (online) Available from <http://www.bmfsfj.de/RedaktionBMFSFJ/Abteilung3/Pdf-Anlagen/Eckpunkte-pflegeberufegesetz,property=pdf,bereich=bmfsfj,sprache=de,rwb=true.pdf> [last accessed September 2015].

Bundesministerium für Gesundheit 2003. *Ausbildungs- und Prüfungsverordnung für die Berufe in der Krankenpflege 'KrPflAPrV'*. (online) Available from http://msagd.rlp.de/fileadmin/masgff/menschenpflegen/Bundesgesetze/6_KrPflAPrV.pdf [last accessed September 2015].

Bundesministerium für Bildung und Forschung 2014. *Bestandsaufnahme der Ausbildung in den Gesundheitsfachberufen im europäischen Vergleich*. Berlin: Bundesministerium für Bildung und Forschung. (online) Available from http://www.bmbf.de/pub/berufsbildungsforschung_band_15.pdf [last accessed September 2015].

Busse, R. and Riesberg, A. 2005. *Health Care Systems in Transition: Germany*. Copenhagen: WHO.

Byron, J.G., Boyle, D.K., Miller, P.A., Oberhelman, F. and Dunton, N. 2010. A multilevel confirmatory factor analysis of the practice environment scale: a case study. *Nursing Research*, 59(2), pp147-153.

Carlson, E., Wann-Hansson, C. and Philhammar, E. 2009. Teaching during clinical practice: Strategies and techniques used by preceptors in nursing education. *Nurse Education Today*, 29, pp522-526.

Castledine, G. 2001. The problems of student supernumerary status. *British Journal of Nursing*, 10(9), p626.

Cheema, J.R. 2014. Some General Guidelines for Choosing Missing Data Handling Methods in Educational Research. *Journal of Modern Applied Statistical Methods*, 13(2), pp53-75.

Central Statistics Office 2011a. *Number of male deaths classified by age*. [online] Available from http://www.cso.ie/statistics/deaths_by_age_sex.htm [last accessed September 2015].

Central Statistics Office 2011b. *Number of female deaths classified by age*. [online] Available from http://www.cso.ie/statistics/deaths_by_age_sex.htm [last accessed September 2015].

Central Statistics Office 2014. *Statistical yearbook of Ireland 2014*. (online) Available from <http://www.cso.ie/en/releasesandpublications/ep/p-syi/statisticalyearbookofireland2014/> [last accessed September 2015].

Chan, E.A., Jones, A., Fung, S. and Wu, S.C. 2011. Nurses' perception of time availability in patient communication in Hong Kong. *Journal of Clinical Nursing*, 21, pp1168–1177.

Cheema, J. R. 2014. Some general guidelines for choosing missing data handling methods in educational research. *Journal of Modern Applied Statistical Methods*, 13(2), pp53-75.

Cho, E., Sloane, D.M., Kim, E.Y., Kim, S., Choi, M., Yoo, Y., Sun Lee, H. and Aiken, L.H. 2015. Effects of nurse staffing, work environments, and education on patient mortality: An observational study. *International Journal of Nursing Studies*, 52, pp535-542.

Choi, Y.S., Lawler, E., Boenecke, C.A., Ponatoski, E.R. and Zimring, C.M. 2011. Developing a multi-systemic fall prevention model, incorporating the physical environment, the care process and technology: a systematic review. *Journal of Advanced Nursing*, 67(12), pp2501-2524.

Choi, J.S. and Staggs, V.S. 2014. Comparability of nurse staffing measures in examining the relationship between RN staffing and unit-acquired pressure ulcers: A unit-level descriptive, correlational study. *International Journal of Nursing Studies*, 51(10), pp1344-1352.

Cimiotti, J.P., Aiken, L.H., Sloane, D.M. and Wu, E.S. 2012. Nurse staffing, burnout, and health care-associated infection. *American Journal of Infection Control*, 40(6), pp486–490.

Clark, T. and Holmes, S. 2007. Fit for practice? An exploration of the development of newly qualified nurses using focus groups. *International Journal of Nursing Studies*, 44, pp1210-1220.

Closs, S.J. and Tierney, A.J. 1993. The complexities of using a structure, process and outcome framework: the case of an evaluation of discharge planning for elderly patients. *Journal of Advanced Nursing*, 18, 1279-1287.

Collins, B., Flemming, L., Hine, B.A., Stevenson, J., Veach, K., Anderson, S., Mawson, T. and Webster, J. 2010. Nursing resource implications of the unoccupied bed. *The Australian Journal of Advanced Nursing*, 27(4), pp13-17.

Collins, S. and Hewer, I. 2014. The impact of the Bologna process on nursing higher education in Europe: A review. *International Journal of Nursing Studies*, 51, pp150-156.

Cortès, P. and Pan, J. 2012. Relative quality of foreign nurses in the United States. *Centre for Research and Analysis of Migration CReAM*, Discussion Paper 31/12 (online) Available from http://www.cream-migration.org/publ_uploads/CDP_31_12.pdf [last accessed September 2015].

Cortès, P. and Pan, J. 2014. Foreign Nurse Importation to the United States and the Supply of Native Registered Nurses. FRB of Boston working Paper, No14-7. (online) Available from http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2512428 [last accessed September 2015].

Cowman, S. 2002. The approaches to learning of student nurses in the Republic of Ireland and Northern Ireland. *Journal of Advanced Nursing*, 28(4), pp899-910.

Cranwell-Bruce, L.A. 2008. The connection between patient falls and medication. *MEDSURG Nursing*, 17(3), 189-191.

Damianakis, T., Wagner, L.M., Bernstein, S. and Marziali, L. 2007. Volunteers' experiences visiting the cognitively impaired in nursing homes: a friendly visiting program. *Canadian Journal on Aging*, 26, pp343-356.

Davies, H.T.O., Nutley, S.M. and Mannion, R. 2000. Organisational culture and quality of health care. *Quality in Health Care*, 9, pp111-119.

Davies, R. 2008. The Bologna process: the quiet revolution in nursing higher education. *Nurse Education Today*, 28, pp935-942.

Deasy, C., Doody, O. and Tuohy, D. 2011. An exploratory study of role transition from student to registered nurse (general, mental health and intellectual disability) in Ireland. *Nurse Education in Practice*, 11(2), pp109-113.

Department of Health and Children 2005. *Report of the Working Group to: examine the development of appropriate systems to determine nursing and midwifery staffing levels*. Dublin: DoHC.

Department of Health 2011a. *Health Statistics – Section H Acute Hospital Services*. Dublin DoH. (online) Available from <http://health.gov.ie/wp-content/uploads/2014/03/Health-Statistics-2011-Section-H-Acute-Hospital-Services.pdf> [last accessed September 2015].

Department of Health 2011b. *Report on progress and savings under the Public Service Agreement (PSA) – Health Section Action Plan*. (online) Available from http://health.gov.ie/wp-content/uploads/2014/03/psa_oct2011.pdf [last accessed September 2015]

Department of Health 2012. *Report of the Review of Undergraduate Nursing and Midwifery Degree Programmes*. (online) Available from http://health.gov.ie/wp-content/uploads/2014/03/Report_Review_Undergrad_NMDP_2012.pdf [last accessed September 2015].

Deutscher Bildungsrat für Pflegeberufe 2006. *Pflege offensiv: Das Bildungskonzept des Deutschen Bildungsrates für Pflegeberufe*. München: Elsevier Urban & Fischer.

Deutscher Berufsverband für Pflegeberufe 2011. *Handlungsfelder der Pflege*. Berlin: DBfK.

Deutscher Berufsverband für Pflegeberufe 2015a. *Aktionsprogramm 2020*. Berlin: DBfK. (online) Available from http://www.dbfk.de/de/presse/allgemeinepresseinformationen/DBfK_BV_Aktionsprogramm200_100909.pdf [last accessed September 2015].

Deutscher Berufsverband für Pflegeberufe 2015b. *Empfehlungen der BAG Pflegemanagement für die strategische Personalentwicklung in Gesundheits- und Pflegeeinrichtungen mit Blick auf BSN-Absolvent/innen*. (online) Available from <http://www.dbfk.de/media/docs/download/Allgemein/Empfehlungen-der-BAG-PM-fuer-die-strategische-Personalentwicklung-BSN-Absolv-2015-01-19.pdf> [last accessed September 2015].

Deutscher Pflegerat 2011. *Reform der Pflegeausbildung jetzt! Statement des Deutschen Pflegerates*. (online) Available from <http://www.deutscher-pflegerat.de/pflegeberuf/Generalistik.php> [last accessed September 2015].

Deutscher Pflegerat und Deutsche Gesellschaft für Pflegewissenschaft 2014. *Arbeitsfelder akademisch ausgebildeter Pflegefachpersonen*. Berlin, Duisburg: DPR and DGP.

Devitt, C. and Bebek, A. 2015. *WORK→INT Assessing and enhancing integration in workplaces. Background report. Migrant workers in the Irish healthcare sector*. Dublin: Trinity College Dublin.

Di Luzio, G. 2009. Explaining the continuation of technical college nursing training in Germany. *International Journal of Sociology and Social Policy*, 29(5/6), pp252-263.

Diya, L., Van Den Heede, K., Sermeus, W. and Lesaffre, E. 2012. The relationship between in-hospital mortality, readmission into the intensive care nursing unit and/or operating theatre and nurse staffing levels. *Journal of Advanced Nursing*, 68(5), pp1073-1081.

Dolan G. 2003. Assessing student nurses' clinical competency: will we ever get it right? *Journal of Clinical Nursing*, 12 (1), pp.132–141.

Donabedian, A. 1966. Evaluating the Quality of Medical Care. *The Milbank Memorial Fund Quarterly*, 44(3), pp166-206. (online) Available from <http://www.jstor.org/stable/3348969> [last accessed September 2015].

Donabedian, A. 1969. Measuring and Evaluating Nursing Care. Part II – Some issues in evaluating the quality of nursing care. *American Journal Public Health and Nations Health*, 59(10), pp1833-1836.

Donabedian, A. 1988. Quality assessment and assurance: unity of purpose, diversity of means. *Inquiry*, 25(1), pp173-192.

Donabedian, A. 2005. Evaluating the Quality of Medical Care. (Reprint). *Millbank Memorial Fund Quarterly*, 40(3), pp 691-729.

- Donaldson, M.S. 1999. *Measuring the quality of health care*. A Statement by The National Roundtable on Health Care Quality - Division of Health Care Services of the Institute of Medicine. Washington: National Academy Press. (online) Available from <http://www.nap.edu/catalog/6418.html> [last accessed September 2015].
- Duffield, C., Gardner, G. and Catling-Paull, C. 2008. Nursing work and the use of nursing time. *Journal of Clinical Nursing*, 17(24), pp3269–3274.
- Eckert, J. 2011. *National profile of migration of health professionals – Germany*. WIAD Scientific Institute of the Medical Association of German Doctors. [online] Available from <http://www.mohprof.eu> [last accessed September 2015].
- Economic and Social Research Institute 2010. *Activity in Acute Public Hospitals in Ireland. Annual Report 2009*. Dublin: ESRI.
- Edwards, P., Roberts, I., Clarke, M., DiGiuseppi, C., Pratap, S., Wentz, R. and Kwan, I. 2002. Increasing response rates to postal questionnaires: systematic review. *BMJ*, 234, pp1138-1147.
- Edwards, P.J., Roberts, I., Clarke, M.J., DiGiuseppi, C., Wentz, R., Kwan, I., Cooper, R., Felix, L.M. and Pratap, S. 2009. Methods to increase response to postal and electronic questionnaires. *Cochrane Database of Systematic Reviews*, 3, doi:10.1002/14651858.MR000008.pub4.
- Einhäupl, K.M. 2013. *Von der Akademisierung zu Bildung und Forschung für die Gesundheit: Neue Anforderungen an das Wissenschafts- und Gesundheitssystem*. Round Table Discussion at the International Conference ‘Gesundheitsberufe der Zukunft. Perspektiven der Akademisierung’ of the Wissenschaftlicher Beirat, 18th September 2013 in Berlin, Germany.
- Elliott, N. 2010. ‘Mutual intacting’: a grounded theory study of clinical judgement practice issues. *Journal of Advanced Nursing*, 66(12), pp2711–2721.
- Emeghebo, L. 2012. The image of nursing as perceived by nurses. *Nurse Education Today*, 32, pp e49–e53.
- Estabrooks, C.A., Midodzi, W.K., Cummings, G.G., Ricker, K.L. and Giovanetti, P. 2005. The impact of hospital nursing characteristics on 30-day mortality. *Nursing Research*, 54, pp74-84.
- Estabrooks, C.A., Cummings, G.G., Olivo, S.A., Squires, J.E., Giblin, C. and Simpson, N. 2009. Effects of shift length on quality of patient care and health provider outcomes: systematic review. *Quality and Safety Health Care*, 18, pp181-188.
- European Commission 2014. *Erasmus+ Programme Guide*. (online) Available from http://ec.europa.eu/programmes/erasmus-plus/documents/erasmus-plus-programme-guide_en.pdf [last accessed September 2015].

European Higher Education Area 1999. *The Bologna Declaration of 19 June 1999*. (online) Available from http://www.ehea.info/Uploads/Declarations/BOLOGNA_DECLARATION1.pdf [last accessed September 2015].

European Higher Education Area 2010. *Bologna Process History*. [online] Available from <http://www.ehea.info/article-details.aspx?ArticleId=3> [last accessed September 2015].

European Hospital and Healthcare Federation 2011. *Hospitals in Europe. Healthcare data 2011*. (online) Available from http://www.hope.be/03activities/quality_eu-hospitals/eu_country_profiles/00_hospitals_in_europe-synthesis.pdf [last accessed September 2015].

Evans, S.M., Berry, J.G., Smith, B.J., Esterman, A., Selim, P., O'Shaughnessy, J. and DeWit, M. 2006. Attitudes and barriers to incident reporting: a collaborative hospital study. *Quality and Safety in Health Care*, 15, pp39–43.

Farndale, E. and Kelliher, C. 2013. Implementing performance appraisal: exploring the employee experience. *Human Resource Management*, 52(6), pp879–897.

Fealy, G.M. 2006. *A History of Apprenticeship Nurse Training in Ireland*. Abingdon, Oxon: Routledge.

Federal Statistics Office 2012. *Statistical Yearbook 2012*. (online) Available from https://www.destatis.de/EN/Publications/Specialized/Population/StatYearbook_Chapter2_50110_01129004.pdf?__blob=publicationFile [last accessed September 2015].

Federal Statistics Office 2015. *Population Projection*. (online) Available from <https://www.destatis.de/EN/FactsFigures/SocietyState/Population/PopulationProjection/PopulationProjection.html> [last accessed September 2015].

Fero, L.J., Witsberger, C.M., Wesmiller, S.W., Zullo, T.G. and Hoffman, L.A. 2009. Critical thinking ability of new graduate and experienced nurses. *Journal of Advanced Nursing*, 65(1), pp139-148.

Fero, L.J., O'Donnell, J.M., Zullo, T.G., Dabbs, A.D., Kitutu, J., Samosky, J.T. and Hoffman, L.A. 2010. Critical thinking skills in nursing students: comparison of simulation-based performance with metrics. *Journal of Advanced Nursing*, 66(10), pp2182–2193.

Fitzgerald, E., Cawley, D. and Rowan, N.J. 2011. Irish staff nurses perceptions of clinical incident reporting. *International Journal of Nursing and Midwifery*, 3(2), pp14-21.

Fleischmann, N. 2013. *Arbeitsmarktperspektiven für Absolventen pflegebezogener Studiengänge*. IN Zängle, P. (ed) *Pflegeforschung trifft Pflegepraxis*. Pp91-102.

Flynn, M. and McCarthy, G. 2008. Magnet hospital characteristics in acute general hospitals in Ireland. *Journal of Nursing Management*, 16, pp1002–1011.

Flynn, L., Liang, Y., Dickson, G.L., Xie, M. and Suh, D.C. 2012. Nurses' Practice Environments, Error Interception Practices, and Inpatient Medication Errors. *Journal of Nursing Scholarship*, 44(2), pp180-186.

Flyvbjerg, B. 2006. Five misunderstandings about case-study research. *Qualitative Inquiry*, 12(2), pp. 219-245.

Foster, R. 2012. *UK Hospital Guide 2012*. (online) Available from <http://www.drfooster.com/wp-content/uploads/2014/08/hospital-guide-2012.pdf> [last accessed September 2015].

Friese, C.R., Lake, E.T., Aiken, L.H., Silber, J. and Sochalski, J. 2008. Hospital nurse practice environments and outcomes for surgical oncology patients. *Health Services Research*, 43(4), pp1145-1163.

Gasta, C.M. 2008. Cross-Cultural Knowledge, Business Practices, and Student Learning via Study Abroad. *Global Business Languages*, 13(4) Available from http://lib.dr.iastate.edu/language_pubs/4 [last accessed September 2015].

Gerring, J. 2004. What is a case study and what is it good for? *American Political Science Review*, 98(2), pp341-354.

Ghaferi, A.A., Osborne, N.H., Birkmeyer, J.D. and Dimick, J.B. 2010. Hospital Characteristics Associated with Failure to Rescue from Complications after Pancreatectomy. *Journal of the American College of Surgeons*, 211, pp325–330.

Ghasemi, H.E., Vanaky, Z., Nayeri, N.D., Salehi, T., Salsali, M. and Faghihzadeh, S. 2007. Management of objective approach in nursing performance appraisal and its impact on quality of nursing care. *HAYAT*, 13(3), pp84-89.

Giles, L.C., Bolch, D., Rouvray, R., McErlean, B., Whitehead, C.H., Phillips, P.A. and Crotty, M. 2006. Can volunteer companions prevent falls among inpatients? A feasibility study using a pre-post comparative design. *BMC Geriatrics*, pp6:11.

Girot, E.A. 2000. Graduate nurses: critical thinkers or better decision makers? *Journal of Advanced Nursing*, 31(2), pp288-297.

GKV-Spitzenverband 2015. *Quality – improving, assuring, publishing. Annual Report 2014*. Berlin: GKV-Spitzenverband.

Golubic, R., Milosevic, M., Knezevic, B. and Mustajbegovic, J. 2009. Work-related stress, education and work ability among hospital nurses. *Journal of Advanced Nursing*, 65(10), pp2056-2066.

Gonzalez-Valentin, A., Padin-Lopez, S. and De Ratnon-Garrido, E. 2005. Patient satisfaction with nursing care in a Regional University Hospital in Southern Spain. *Journal of Nursing Care Quality*, 20(1), pp63-72.

Government of Ireland 1998. *Report of the Commission on Nursing: A blueprint for the future*. Dublin: Stationery Office.

Government of Ireland 2010. *Public Service Agreement 2010-2014*. (online) Available from <http://implementationbody.gov.ie/the-public-service-agreement-2010-2014/> [last accessed September 2015].

Griffiths, P. 1995. Progress in measuring nursing outcomes. *Journal of Advanced Nursing*, 21, pp1092-1100.

Griffiths, P., Dall'Ora, C., Simon, M., Ball, J., Lindqvist, R., Rafferty, A.M., Schoonhoven, L., Tishelman, C., Aiken, L.H. and RN4CAST Consortium 2014. Nurses' shift length and overtime working in 12 European countries: the association with perceived quality of care and patient safety. *Medical Care*, 52(11), pp975-981.

Grünewald, M., Hild, T.C., Jeske, R., Langer, S., Moullion, S., Rausch, A., Reimers, S. and Strohbücker, B. 2014. Einsatz akademisch ausgebildeter Pflegefachpersonen in der Praxis unter Berücksichtigung des Qualifikationenmix am Beispiel der Betreuung eines Patienten nach Herzinfarkt. (online) Available from http://www.vpu-online.de/de/pdf/presse/2014-04-10_skillmix_abschlussbericht_final5.pdf [last accessed September 2015].

Hair, J.F., William, C., Black, B. and Babin, J. 2010. *Multivariate data analysis. A global perspective*. New Jersey: Pearson Education.

Han, C.H., Connolly, P.M. and Canham, D. 2003. Measuring patient satisfaction as an outcome of nursing care at a teaching hospital of Southern Taiwan. *Journal of Nursing Quality Care*, 18(2), pp143-150.

Hanrahan, N.P. 2007. Measuring inpatient psychiatric environments: psychometric properties of the Practice Environment Scale – Nursing Work Index (PES-NWI). *The International Journal of Psychiatric Nursing Research*, 12(3), pp1521-1527.

Hasselhorn H.M., Müller B.H. and Tackenberg P. 2005. *The Nursing Early Exit Study (NEXT) Scientific Report*. Vallingby: Elanders Gotab AB. (online) Available from <http://www.next.uniwuppertal.de/download/NEXTscientificreportjuly2005.pdf> [Accessed 6 October 2011]

Health Boards Executive 2003. *Admission and Discharge Guidelines*. Dublin: HBE.

Health Service Executive 2007. *Transformation Programme 2007-2010*. Dublin: HSE.

Health Service Executive 2008a. *Report of the Post-Registration Nursing and Midwifery Education Education Review Group*. Dublin: Office of the Nursing Services Director.

Health Service Executive 2008b. *Health Statistics Section H: Acute Hospital Services*. Dublin: HSE.

Health Service Executive 2009a. *Findings from the survey of 2007 graduates. Where are they now?* Dublin: Office of the Nursing Services Director.

Health Service Executive 2009b. *Attrition from undergraduate nursing education programmes in Ireland. Findings from programmes which commenced 2002, 2003 and 2004 and recommendations for addressing attrition in the future*. Dublin: Office of the Nursing Services Director.

Health Service Executive 2009c. *Findings from the survey of venepuncture and intravenous cannulation education and training*. Dublin: Office of the Nursing Services Director.

Health Service Executive 2009d. *Integrated Risk Management Policy*. Dublin: HSE.

Health Service Executive 2010a. *Findings from the survey of 2008 graduates. Where are they now?* Dublin: Office of the Nursing Services Director.

Health Service Executive 2010b. *National Clinical Policy and Procedural Guideline for Nurses and Midwives undertaking Venepuncture in Adults*. Dublin: Office of the Nursing Services Director.

Health Service Executive 2010c. *HSE National Health Service Plan*. Dublin: HSE.

Health Service Executive 2013. *Annual Report and Financial Statements 2013*. Dublin: HSE.

Hegge, M. and Larson, V. 2008. Stressors and Coping Strategies of Students in Accelerated Baccalaureate Nursing Programs. *Nurse Educator*, 33(1), pp26-30.

Hekkert, K.D., Cihangir, S., Kleefstra, S. M., Van Den Berg, B. and Kool, R.B. 2009. Patient satisfaction revisited: a multilevel approach. *Social Science & Medicine*, 69, pp 68-75.

Hemsley, B., Balandin, S. and Worrall, L. 2011. Nursing the patient with complex communication needs: time as a barrier and a facilitator to successful communication in hospital. *Journal of Advanced Nursing*, 68(1), pp116–126.

Henry, L. 2007. Institutionalised disadvantage: older Ghanaian nurses' and midwives' reflections on career progression and stagnation in the NHS. *Journal of Clinical Nursing*, 16(12), pp2196-2203.

Henry, K.J. 2014. *Nurses' perceptions of nurse staffing and the impact on patient falls*. Master of Science in Nursing. Paper 45. (online) Available from http://digitalcommons.ric.edu/school_of_nursing/45 [last accessed September 2015].

Higgs, J. and Titchen, A. 2001. *Practice knowledge and expertise in the health professions*. Oxford: Butterworth-Heinemann.

Hong, S.I., Morrow-Howell, N., Proctor, E., Wentz, J.A. and Rubin, E. 2008. The quality of medical care for comorbid conditions of depressed elders. *Aging & Mental Health*, 12(3), pp323-332.

Horton, S., Lane, K. and Shiggins, C. 2015. Supporting communication for people with aphasia in stroke rehabilitation: transfer of training in a multidisciplinary stroke team. *Aphasiology*, (online), DOI:10.1080/02687038.2014.1000819

Houghton, C.E., Casey, D., Shaw, D., and Murphy, K. 2013. Students' experiences of implementing clinical skills in the real world of practice. *Journal of Clinical Nursing*, 22, pp1961-1969.

Hourican, S. McGrath, M., Lyng, C., McMahan, C. and Lehwaldt, D. 2008. Effectiveness of simulation on promoting student nurses management skills. *International Journal of Clinical Skills*, 2(1), pp20-25.

Houser, J. 2003. A Model for Evaluating the Context of Nursing Care Delivery. *Journal of Nursing Administration*, 33(1), pp39-47.

Huczynski, A. and Buchanan, D.A. 2013. *Organisational Behaviour*. New York: Pearson.

Hugonnet, S., Chevrolet, J.C. and Pittet, D. 2007. The effect of workload on infection risk in critically ill patients. *Critical Care Medicine*. 35(1), pp76-81.

Hugonnet, S., Uckay, I., and Pittet, D. 2007. Staffing level: a determinant of late-onset ventilator-associated pneumonia. *Critical Care*, 11(4), pp80-85.

Humphries, N., Brugha, R. and McGee, H. 2008. *Nurse Migration to Ireland: An Overview. Nurse Migration Project Policy Brief 1*. Dublin: Royal College of Surgeons in Ireland.

Humphries, N., Brugha, R. and McGee, H. 2009. *A Profile of Migrant Nurses in Ireland: Policy Brief 4*. Dublin: Royal College of Surgeons in Ireland.

Humphries, N., Brugha, R. and McGee, H. 2012. Nurse migration and health workforce planning: Ireland as illustrative of international challenges. *Health Policy*, (107), pp44-53.

Humphries, N., McAleese, S., Matthews, A. and Brugha, R. 2015. 'Emigration is a matter of self-preservation. The working conditions . . . are killing us slowly': qualitative insights into health professional emigration from Ireland. *Human Resources for Health*, 13, 35 (online) Available from DOI 10.1186/s12960-015-0022-6

Hunt, B. 2007. Managing equality and cultural diversity in the health workforce. *Journal of Clinical Nursing*, 16(12), pp2252-2259.

Hyde, A. and Brady, D. 2002. Staff nurses' perceptions of supernumerary status compared with rostered service for Diploma in Nursing students, *Journal of Advanced Nursing*, 38(6), pp624–632.

Iezzoni, L.I. 2003. *Risk Adjustment for Measuring Health Care Outcomes*. 3rd ed. London: Health Administration Press.

Institute of Medicine 2004. *Executive Summary: Final report of the Task Force on the North Carolina Nursing Workforce*. Durham: North Carolina Institute of Medicine.

International Council of Nurses 2010a. *Global Issues and Trends in Nursing Education*. Geneva: International Council of Nurses.

International Council of Nursing 2010b. *Definition of Nursing*. (online) Available from <http://www.icn.ch/about-icn/icn-definition-of-nursing/> [last accessed September 2015].

Irish Society for Quality & Safety in Healthcare 2003. *Measurement of patient satisfaction guidelines*. Tullamore: The Health Service Executive.

Irvine, D., Sirdani, S. and McGillis Hall, L. 1998. Linking outcomes to nurse's roles in health care. *Nursing Economics*, 16(2), pp58-64, 87.

Irvine Doran, D., Sidani, S., Keatings, M. and Doidge, D. 2002. An empirical test of the Nursing Role Effectiveness Model. *Journal of Advanced Nursing*, 38(1), pp29–39.

Isfort, M. 2008. Akademisch oder nicht? – Welches Pflegepersonal brauchen wir? *Die Schwester Der Pfleger*, 47, p8.

Isfort, M., Weidner, F., Neuhaus, A., Kraus, S., Köster, V.H. and Gehlen, D. 2010. *Pflege-Thermometer 2009*. Köln: Deutsches Institut für angewandte Pflegeforschung.

Jansen N.W.H., Kant, I. Van Amelsvoort, L.G.P., Nijhuis, F.J.N. and Van den Brandt, P.A. 2003. Need for recovery from work: evaluating short-term effects of working hours, patterns and schedules. *Ergonomics*, 46(7), pp664-80.

Jarvis, P. 2004. *Adult education and life-long learning*. 4th edition. London: Routledge.

- Jibodh, S.R., Kandil, A.O., Malchau, H. and Estok, D.M. 2010. Do commonly reported outcome measures reflect patient satisfaction after revision hip arthroplasty? *The Journal of Arthroplasty*, 25(1), pp41-45.
- Jones, S., Bottle, A. and Griffiths, P. 2011. *An assessment of "failure to rescue" derived from routine NHS data as a nursing sensitive patient safety indicator for surgical inpatient care*. London: National Research Unit Kings College London.
- Kaddoura, M.A. 2010. New Graduate Nurses' Perceptions of the Effects of Clinical Simulation on Their Critical Thinking, Learning, and Confidence. *The Journal of Continuing Education in Nursing*, 41(11), pp507-516.
- Kaier, K., Mutters, N.T. and Frank, U. 2012. Bed occupancy rates and hospital-acquired infections—should beds be kept empty? *Clinical Microbiology and Infection*, 18(10), pp941-945.
- Kalish, B.J. and Lee, K.H. 2011. Nurse staffing levels and teamwork: a cross-sectional study of patient care units in acute care hospitals. *Journal of Nursing Scholarship*, 43(1), pp82-88.
- Kalra, L., Evans, A., Perez, I., Melbourn, A., Patel, A., Knapp, M. and Donaldson, N. 2004. Training carers of stroke patients: randomised controlled trial. *BMJ*, 328(7448), pp1099-1108.
- Kanai-Pak, M., Aiken, L., Sloane, D.M. and Poghosyan, L. 2008. Poor work environments and nurse inexperience are associated with burnout, job dissatisfaction and quality deficits in Japanese hospitals. *Journal of Clinical Nursing*, 17, 3324-3329.
- Kawi, J. and Xu, Y. 2009. Facilitators and barriers to adjustment of international nurses: an integrative review. *International Nursing Review* 56, pp174–183
- Kelly, D., Kutney-Lee, A., Lake, E.T. and Aiken, L.H. 2013. The critical care work environment and nurse-reported health care-associated infection. *American Journal of Critical Care*, 22(6), pp482–488.
- Kendall-Gallagher, D. and Blegen, M.A. 2009. Competence and Certification of registered nurses and safety of patients in intensive care units. *American Journal of Critical Care*, 18(2), pp106–114.
- Kendall-Gallagher, D., Aiken, L.H., Sloane, D.M. and Cimiotti, J.P. 2011. Nurse Specialty Certification, Inpatient Mortality, and Failure to Rescue. *Journal of Nursing Scholarship*. 43(2), pp 188-194.
- Keogh, B., O'Brien, F. and Neenan, K. 2009. The clinical experiences of mature mental health nursing students in Ireland. *Nurse Education in Practice*, 9(4), pp271-276.

- Keogh, J., Loewenhardt, C., Herchet, D. and Bleses, H. 2012. *Nurse Education in Fulda: Simulation as a Means to Attain Clinical Competence*. IN Poikela, E and Poikela, P. (eds) *Towards Simulation Pedagogy*. Rovaniemi: Rovaniemi University of Applied Sciences Publications. Pp62-72.
- King, G., Currie, M., Bartlett, D.J., Strachan, D., Tucker, M.A. and Willoughby, C. 2007. The development of expertise in paediatric rehabilitation therapists: The roles of motivation, openness to experience, and types of caseload experience. *Australian Occupational Therapy Journal*, 55, pp108–122.
- Kingston, M.J. Evans, S.M., Smith, B.J. and Berry, J.G. 2004. Attitudes of doctors and nurses towards incident reporting: a qualitative analysis *Medical Journal of Australia*, 181(1), pp36-39.
- Kirwan, M., Matthews, A. and Scott, P.A. 2013. The impact of the work environment of nurses on patient safety outcomes: A multi-level modelling approach. *International Journal of Nursing Studies*, 50(2), pp253-263.
- Kneafsey, R., Clifford, C. and Greenfield, S. 2015. Perceptions of hospital manual handling policy and impact on nursing team involvement in promoting patients' mobility. *Journal of Clinical Nursing*, 24(1-2), pp289-299.
- Kovner, C.T. and Schore, J. 1998. Differentiated levels of nursing work force demand. *Journal of Professional Nursing*, 14, 242-253.
- Kramer, M. and Hafner, L. P. 1989. Shared values: Impact on staff nurse job satisfaction and perceived productivity. *Nursing Research*, 38, pp172-177.
- Kristl, K.H. 2011. *Generalistische Pflegeausbildung. Proletarisierung statt Professionalisierung*. Bayreuth: Förderkreis Vereint Lernen und Pflegen e.V.
- Kunaviktikul, W. , Wichaikhum, O., Nantsupawat, A., Nantsupawat, R., Chontawan, R., Klunklin, A., Roongruangsri, S., Nantachaipan, P., Supamane, T., Chitpakdee, B., Akkadechanunt, T. and Sirakamon, S. 2015. Nurses' extended work hours: patient, nurse and organizational outcomes. *International Nursing Review*, (online) Available from DOI: 10.1111/inr.12195
- Kutney-Lee, A. and Aiken, L.H. 2008. Effect of nurse staffing and education on the outcomes of surgical patients with comorbid serious mental illness. *Psychiatric Services*, 59 (12), pp1466-1469.
- Kutney-Lee, A., McHugh, M.D., Sloane, D.M., Cimiotti, J.P., Flynn, L., Felber Neff, D. and Aiken, L.H. 2009. Nursing: A Key To Patient Satisfaction. *Health Affairs*, 28(4) pp669-677.
- Kutney-Lee, A., Sloane, D.M. and Aiken, L.H. 2013. An increase in the number of nurses with baccalaureate degrees is linked to lower rates of postsurgery mortality. *Health Affairs*, 32(3), pp579–586.

- Lake, E. T. 2002. Development of the Practice Environment Scale of the Nursing Work Index. *Research in Nursing & Health*, 25, pp176-188.
- Lake, E. T. 2007. The Nursing Practice Environment: Measurement and evidence. *Medical Care Research and Review*, 64(2), pp104S-122S.
- Lake, E.T., Shang, J., Klaus, S. and Dunton, N.E. 2010. Patient falls: association with hospital Magnet status and nursing unit staffing. *Research Nursing Health*, 33(5), pp413-425.
- Lalor, J.G., Casey, D., Elliott, N., Coyne, I., Comiskey, C., Higgins, A., Murphy, K., Devane, D. and Begley, C. 2013. Using case study within a sequential explanatory design to evaluate the impact of specialist and advanced practice roles on clinical outcomes: the SCAPE study. *BMC Medicine*, 13(55) doi:10.1186/1471-2288-13-55 [last accessed September 2015].
- Landenberger, M., Stöcker, G., Filkins, J., De Jong, A., Them, C., Seelinger, Y. and Schön, P. 2004. *Ausbildung der Pflegeberufe in Europa*. Halle: Robert Bosch Stiftung.
- Lang, T.A., Hodge, M., Olson, V., Romano, P.S. and Kravitz, R.L. 2004. A systematic review on the effects of nurse staffing on patient, nurse employee and hospital outcomes. *JONA*, 34(7/8), pp326-337.
- Lang, D.S.P., Teo, A.H.Y., Abdul, F. Pang, S.A.C. and Ang, E.N.K. 2007. Nurses implementing fall prevention strategies: an ethnographic study. *Asian Journal of Nursing*, 10(3), pp179-183.
- Larsen, J.A. 2007. Embodiment of discrimination and overseas nurses' career progression. *Journal of Clinical Nursing*, 16(12), pp2187-2195.
- Leiter, M. P., and Spence Laschinger, H.K. 2006. Relationships of work and practice environment to professional burnout. *Nursing Research*, 55(2), pp137-146.
- Leufer, T. and Cleary-Holdforth, J. 2007. Advancing Evidence-Based Practice through nurse education. *CARE Journal*, 1(1), pp3-14.
- Likosky, D.S., Nugent, W.C., Clough, R.A., Weldner, P.W., Quinton, H.B., Ross, C.S. and O'Connor, G.T. 2006. Comparison of Three Measurements of Cardiac Surgery Mortality for the Northern New England Cardiovascular Disease Study Group. *Ann Thorac Surg*, 81, pp1393-1395.
- Liou, S. R. and Chen, C. Y. 2009. Using the Practice Environment Scale of the Nursing Work Index on Asian Nurses. *Nursing Research*, 58(3), pp218-225.
- Lis, C.G., Gupta, D. and Grutsch, J.F. 2008. The relationship between insomnia and patient satisfaction with quality of life in cancer. *Support Cancer Care*, 16, pp261-266.
- Litchfield, C. and Chater, K. 2007. Can I do everything? time management in neonatal unit. *Australian Journal of Advanced Nursing*, 25(2), pp36-45.

- Liu, W., Edwards, H. and Courtney, M. 2011. The development and descriptions of an evidence-based case management educational program. *Nurse Education Today*, 31, pp e51-e57.
- Liu, L.F., Lee, S., Chia, P.F., Chi, S.C. and Yin, Y.C. 2012. Exploring the Association Between Nurse Workload and Nurse-Sensitive Patient Safety Outcome Indicators. *Journal of Nursing Research*, 20(4), pp300-309.
- Lucero, R.J., Lake, E.T. and Aiken, L.H. 2010. Nursing care quality and adverse events in US hospitals. *Journal of Clinical Nursing*, 19, pp2185-2195.
- Luxford, K., Axam, A., Hasnip, F., Dobrohotoff, J., Strudwick, M. Reeve, R., Hou, C. and Vieny, R. 2015. Improving clinician–carer communication for safer hospital care: a study of the ‘TOP 5’ strategy in patients with dementia. *International Journal for Quality in Health Care*, mzv026.
- Lyng, C., Hourican, S., McGrath, M. and Lehwaldt, D. 2009. Challenges encountered during development of scenarios for a management simulation exercise for undergraduate student nurses. *International Journal of Clinical Skills*, 3(2), pp108-114.
- Maier, T. and Afentakis, A. 2013. Forecasting supply and demand in nursing professions: impacts of occupational flexibility and employment structure in Germany. *Human Resources for Health*, 11, 24.
- Manojlovich, M. and Talsma, A. 2007. Identifying Nursing Processes to Reduce Failure to Rescue. *JONA*, 37(11), pp504-509.
- Maslach, C., Jackson, S.E., Leitner, M.P. 1996. *Maslach Burnout Inventory*. 3rd ed. IN Zalaquett CP, Woods RJ, (eds). *Evaluating stress: a book of resources*. Lanham (MD): Scarecrow Press: Pp191–218.
- McAleese, S., Clyne, B., Matthews, A., Brugha, R. Humphries, N. 2015. Gone for good? A survey of emigrant health professionals. *Early Career Poster presented in March 2015*.
- McCabe, C. 2004. Nurse–patient communication: an exploration of patients’ experiences. *Journal of Clinical Nursing*, 13, pp41–49.
- McCarthy, B. and Murphy, S. 2010. Preceptors' experiences of clinically educating and assessing undergraduate nursing students: an Irish context'. *Journal of Nursing Management*, 18, pp234-244
- McClure, M., Poulin, M., Sovie, M. and Wandelt, M. 1983. *Magnet Hospitals: Attraction and Retention of Professional Nurses*. American Academy of Nursing, Kansas City: MO Publications.

- McCusker, J., Dendukuri, N., Cardinal, L., Laplante, J. and Bambonye, L. 2004. Nursing work environment and quality of care: Differences between units at the same hospital. *International Journal of Health Care Quality Assurance Incorporating Leadership in Health Services*, 17(6), pp313-322.
- McDonald, W.K. 1995. Comparison of performance of students in an accelerated baccalaureate nursing program for college graduates and a traditional nursing program. *The Journal of Nursing Education*, 34(3), pp123-127.
- McGillis Hall, L. and Doran, D. 2007. Nurses' perceptions of hospital work environments. *Journal of Nursing Management*, 15, pp264-273.
- McKeon, K. 2010. *National audit of end-of-life care in hospitals. Report 5*. Dublin: Hospice Friendly Hospitals.
- McNiesh, S. 2011. The lived experience of students in an accelerated nursing program: Intersecting factors that influence experiential learning. *Journal of Nursing Education*, 50(4), pp197-203.
- Mehta, S., Nair, J. and Rao, S. 2015. Role of discharge planning and other determinants in total discharge time at a large tertiary care hospital. *Journal of Health Research*, 2, pp46-50.
- Meredith, J. and Wood, N. 1995. The development of the Royal College of Surgeons of England's patient satisfaction audit service. *Journal Quality in Clinical Practice*, 15, pp67-74.
- Meretoja, L. Eriksson, E. and Leino-Kilpi, L. 2002. Indicators for competent nursing practice. *Journal of Nursing Management*, 10(2), pp95–102.
- Meretoja, R., Leino-Kilpi, H. and Kaira, A.M. 2004. Comparison of nurse competence in different hospital work environments. *Journal of Nursing Management*, 12(5), pp329-336.
- Meyer, R.M., Wang, S., Li, X.Q., Thomson, D. and O'Brien-Pallas, L. 2009. Evaluation of a Patient Care Delivery Model: Patient Outcomes in Acute Cardiac Care. *Journal of Nursing Scholarship*, 41(4), pp399-410.
- Michel, G. and Stratulat, S. 2010. Good Reasons to Implement Transnational European Diploma Programs in Computer Science. *Proceedings of the 1st International Conference on European Transnational Education*, (online) Available from http://www.hal.inria.fr/hal-00553078/PDF/MicStr_2010.pdf [last accessed September 2015].
- Moran, A. 2008. The Person's Experience of End Stage Renal Disease and Haemodialysis Therapy. PhD Thesis. (Online) Available from http://doras.dcu.ie/558/2/Aoife_MoranPhD2008.pdf [last accessed September 2015].

Morrison, A. L., Backman, U., Durie, M., Carless, R. and Gillies, D.M. 2001. The effects of Nursing Staff Inexperience (NSI) on the occurrence of adverse patient experiences in ICUs. *Australian Critical Care*, 14(3), pp116-121.

Moughrabi, S. and Wallace, D.R. 2015. The effectiveness of simulation in advancing quality and safety education for nurses-based competency in accelerated nursing students. *Journal of Nursing Education and Practice*, 5(8), pp17-25.

Moyce, S., Lash, R. and De Leon Siantz, M.L. 2015. Migration Experiences of Foreign Educated Nurses. *Journal of Transcultural Nursing*, (online) Available from doi: 10.1177/1043659615569538

Myhre, K. 2011. Exchange students crossing language boundaries in clinical nursing practice. *International Nursing Review*, 58, pp428–433.

Myrick, F. and Yonge, O. 2004. *Nursing Preceptorship: Connecting Practice and Education*. New York: LWW.

Myrick, F., Yonge, O. and Billay, D. 2010. Preceptorship and practical wisdom: A process of engaging in authentic nursing practice. *Nurse Education in Practice*, 10, pp82-87.

National Institute for Health and Clinical Excellence 2014. *Safe staffing for nursing in adult inpatient wards in acute hospitals*. London: NICE.

Needleman, J., Buerhaus, P., Mattke, S., Steward, M. and Zelevinsky, K. 2002a. Nurse-staffing levels and the quality of care in hospitals. *The New England Journal of Medicine*, 346(22), pp1715-1722.

Needleman, J., Buerhaus, P., Mattke, S., Steward, M. and Zelevinsky, K. 2002b. Nurse staffing and quality of care in hospitals in the United States. *Policy, Politics and Nursing Practice*, 3, pp306-314.

Needleman, J., Buerhaus, P., Pankratz, S., Leibson, C.L., Stevens, S.R. and Harris, M. 2012. Nurse staffing and inpatient hospital mortality. *The New England Journal of Medicine*, 364, pp1037-1045.

Nelson, M.A. 2002. Education for professional nursing practice: looking backward into the future. *Online Journal of Issues in Nursing*, 7(3), Manuscript 3.

New York State Education Department 2010. Nursing License Requirements. (online) Available from <http://www.op.nysed.gov/prof/nurse/nursing.htm> [last accessed September 2015].

Noonan, B.J., Hughes, M., Hayes, C.C., Hartigan, I., O'Connell, L., Cummins, A. and Fehin, P. 2009. The effectiveness of the lecturer practitioner role in clinical practice: An Irish perspective. *Nurse Education Today*, 29, pp561-565.

Nordehn, G., Meredith, A. and Bye, L. 2006. Grand rounds. A preliminary investigation of barriers to achieving patient-centered communication with patients who have stroke-related communication disorders. *Topics in Stroke Rehabilitation*, 13(1), pp68-77.

Nursing and Midwifery Board of Ireland 2015a. *How to register as a nurse or midwife. A guide for all applicants who trained outside of Ireland.* (online) Available from http://www.nursingboard.ie/en/trained_outside_ireland.aspx [last accessed September 2015].

Nursing and Midwifery Board of Ireland 2015b. *Statistics.* (online) Available from <http://www.nursingboard.ie/en/statistics.aspx> [last accessed September 2015].

Nursing and Midwifery Board of Ireland 2015c. *Pre-registration Programmes.* (online) Available from http://www.nursingboard.ie/en/edu-pre_reg.aspx [last accessed September 2015].

Nursing and Midwifery Board of Ireland 2015d. *Composition of the Board.* (online) Available from http://www.nursingboard.ie/en/about_board_members.aspx [last accessed September 2015].

Nursing and Midwifery Board of Ireland 2015e. *Role of NMBI.* (online) Available from http://www.nursingboard.ie/en/role_of_board.aspx [last accessed September 2015].

Nursing and Midwifery Council 2008. *A review of pre-registration nursing education. Report of consultation findings.* London: NMC.

O'Brien, A., Giles, M., Dempsey, S., Lynne, S., McGregor, M.E., Kable, A., Parmenter, G. and Parker, V. 2014. Evaluating the preceptor role for pre-registration nursing and midwifery student clinical education. *Nurse Education Today*, 34(1), pp19-24.

O'Brien-Pallas, L., Li, M., Wang, S., Meyer, R.M. and Thomson, D. 2010. Evaluation of a patient care delivery model: system outcomes in acute cardiac care. *Canadian Journal of Nursing Research*, 42(2), pp98-120.

O'Callaghan, N. and Slevin, E. 2003. An investigation of the lived experiences of registered nurses facilitating supernumerary nursing students. *Nurse Education Today*, 23, pp123-130.

O'Dwyer, P. 2007. The educational preparation of nurses in Ireland. *Nursing Education Perspectives*, 28(3), pp 136-139.

Olds, D.M. and Clarke, S.P. 2010. The Effect of Work Hours on Adverse Events and Errors in Health Care. *Journal of Safety Research*, 41(2), pp153-162.

O'Loughlin, R., Allwright, S., Barry, J., Kelly, A. and Teljeur, C. 2005. Using HIPE data as a research and planning tool: limitations and opportunities, *Irish Journal of Medical Science*, 174, pp41-46.

O'Neill, F. 2011. From language classroom to clinical context: The role of language and culture in communication for nurses using English as a second language. A thematic analysis. *International Journal of Nursing Studies*, 48, pp1120–1128

Organisation for Economic Co-operation and Development 2011. *Health at a Glance 2011: OECD Indicators*. OECD Publishing. (online) Available from http://dx.doi.org/10.1787/health_glance-2011-en [last accessed September 2015].

Organisation for Economic Co-operation and Development 2012. *Health at a Glance Europe 2012*. OECD Publishing. (online) Available from <http://dx.doi.org/10.1787/9789264183896-en> [last accessed September 2015].

Papp, I., Markkanen, M. and Von Bonsdorff, M. 2003. Clinical environment as a learning environment: student nurses' perceptions concerning clinical learning experiences. *Nurse Education Today*, 23, pp262-268.

Parand, A., Dopson, S., Renz, A. and Vincent, C. 2014. The role of hospital managers in quality and patient safety: a systematic review. *BMJ Open*, 4(9), e005055. (online) Available from doi:10.1136/bmjopen-2014-005055

Pardue, S.F. 1987. Decision-making skills and critical thinking ability among associate degree, diploma, baccalaureate, and master's-prepared nurses. *Journal of Nursing Education*, 26(9), pp354-361.

Parker, D., Tuckett, A., Eley, R. and Hegney, D. 2010. Construct validity and reliability of the Practice Environment Scale of the Nursing Work Index for Queensland nurses. *International Journal of Nursing Practice*, 16, pp352-358.

Pasupathy, K.S. and Barker, L.M. 2012. Impact of fatigue on performance in registered nurses: data mining and implications for practice. *Journal for Healthcare Quality*, 34(5), pp22-30.

Payne, G. and Payne, J. 2004. *Key Concepts in Social Research*. Cardiff: Sage Publications.

Pennsylvania Centre for Health Careers 2004. *Addressing Pennsylvania's Nurse Education System Capacity*. Harrisburg: Workforce Investment Board.

Pfaff, K.A., Baxter, P.E., Jack, S.M. and Ploeg, J. 2014. Exploring new graduate nurse confidence in interprofessional collaboration: A mixed methods study. *International Journal of Nursing Studies*, 51(8), pp1142-1152.

Poghosyan, L. Aiken, L.H. and Sloane, D.M. 2009. Factors structure of Maslach burnout inventory: an analysis of data from large-scale cross-sectional surveys of nurses from eight countries. *International Journal of Nursing Studies*, 46(7), pp894-902.

- Poikela, P. 2012. *Simulation-Based Teaching in Health Care*. IN Poikela, E. and Poikela, P. (eds). *Towards Simulation Pedagogy. Developing Nurse Simulation in a European Network*, Rovaniemi: Rovaniemi University of Applied Sciences Publications. Pp30-40.
- Polit, D.F., Beck, C.T. and Owen, S.V. 2007. Is the CVI and acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health*, 30, pp459-467.
- Polit, D.F. and Beck, C.T. 2009. *Essentials of Nursing Research*. 7th ed. Philadelphia: Lippincott-Williams & Wilkins.
- Polsky, D., Ross, S.J., Brush, B.L. and Sochalski, J. 2007. Trends in characteristics and country of origin among foreign-trained nurses in the United States, 1990 and 2000. *American Journal of Public Health*, 97(5), pp895-899.
- Price Waterhouse Coopers 2010. *Fachkräftemangel - Stationärer und ambulanter Bereich bis zum Jahr 2030*. Frankfurt am Main: Price Waterhouse Coopers.
- Qu, H., Shewchuk, R.M., Chen, Y and Richards, J.S. 2010. Evaluating the quality of acute rehabilitation care for patients with spinal cord injury: an extended Donabedian model. *Quality Management in Health Care*, 19(1), pp47-61.
- Ragin, C.C. 1999. The Distinctiveness of Case-oriented Research. *Health Services Research*, 34 (5 Pt2) pp1137-1151.
- Rassin, M. and Silner, D. 2007. Trends in nursing staff allocation: the nurse-to-patient ratio and skill mix issues in Israel. *International Nursing Review*, 54, pp63-69.
- Recken, H. 2013. Stellungnahme zum Eckpunktepapier der „Bund-Länder-Arbeitsgruppe zur Weiterentwicklung der Pflegeberufe“. *Berufs-und Wirtschaftspädagogik*, (online) Available from http://www.bwpat.de/ht2013/ft14/recken_ft14-ht2013.pdf [last accessed September 2015].
- Rico, J.S., Beal, J. and Davies, T. 2010. Promising practices for faculty in accelerated nursing programs. *The Journal of Nursing Education*, 49(3), pp150-155.
- Rindfleisch, A., Malter, A.J., Ganesan, S. and Moorman, C. 2008. Cross-Sectional Versus Longitudinal Survey Research: Concepts, Findings, and Guidelines. *Journal of Marketing Research*, pp261-279.
- Robins, J. 2000. *Nursing and Midwifery in Ireland in the Twentieth Century*. Dublin: An Bord Altranais.
- Robinson, S., Murrells, T., Hickey, G., Clinton, M. and Tinklge, A. 2003. *A tale of two courses: comparing careers and competencies of nurses prepared via three-year degree and three-year diploma courses*. London: Nursing Research Unit, School of Nursing and Midwifery, Kings College London.

- Robinson, S. and Griffiths, P. 2007. *Nursing education and regulation: international profiles and perspectives*. London: National Nursing Research Unit.
- Robinson, S. and Griffiths, P. 2008. Scoping review: *Moving to an all-graduate nursing profession: assessing potential effects on workforce profile and quality of care*. London: National Nursing Research Unit.
- Rocheffort, C.M. and Clarke, C.M. 2010. Nurses' work environments, care rationing, job outcomes, and quality of care on neonatal units. *Journal of Advanced Nursing*, 66(10), pp2213–2224.
- Rogers, A.E., Hwang, W.T., Scott, L.D., Aiken, L.H. and Dinges, D.F. 2004. The working hours of hospital staff nurses and patient safety. *Health Affairs*, 23(4), pp202-212.
- Royal College of Nursing 2012. *Quality with compassion: the future of nursing education. Report of the Willis Commission on Nursing Education*. London: RCN.
- Ryan, A.M. 2000. General Nursing. IN Robins, J. (ed.) *Nursing and Midwifery in Ireland in the Twentieth Century*. Dublin: An Bord Altranais. Pp77-100.
- Ryan, D. 2008. Third-level nurse education: learning from the Irish experience. *British Journal of Nursing*, 17(22), pp1402-1407.
- Sachverständigenrat zur Begutachtung der Entwicklung im Gesundheitswesen 2007. *Kooperation und Verantwortung-Voraussetzungen einer zielorientierten Gesundheitsversorgung*. 82. Deutscher Bundestag Drucksache 16/6339. Bonn: Bundesanzeiger.
- Salonen, A.H., Kaunonen, M., Meretoja, R. and Tarkka, M.T. 2007. Competence profiles of recently registered nurses working in intensive and emergency settings. *Journal of Nursing Management*, 15, pp792-800.
- Santiago, A.L. 2008. Competing in a global environment: the value of international qualification of potential managers across ownership structure. *Philippine Management Review*, 15, pp37-50.
- Sasichay-Akkadechanunt, T., Scalzi, C.C. and Jawad, A.F. 2003. The relationship between nurse staffing and patient outcomes. *JONA*, 33(9), pp478-485.
- Scheckel, M. 2009. Nursing education: Past, present, future. IN G. Roux and J. Halstead (eds) *Issues and trends in nursing*. Pp. 27-55. Sudbury, Massachusetts: Jones and Bartlett.
- Schilling, P.L., Campbell, D.A., Englesbe, M.J. and Davis, M.M. 2010. A comparison of in-hospital mortality risk conferred by high hospital occupancy, differences in nurse staffing levels, weekend admission, and seasonal influenza. *Medical Care*, 48(3), pp224-232.
- Schmid, A., Hoffman, L., Happ, M.B., Wolf, G.A. and DeVita, M. 2007. Failure-to-rescue. A literature review. *JONA*, 37(4), 188-198.

- Schubert, M., Glass, T.R., Clarke, S.P., Aiken, L.H., Schaffert-Witvliet, B., Sloane, D.M. and De Geest, S. 2008. Rationing of nursing care and its relationship to patient outcomes: the Swiss extension of the International Hospital Outcomes Study. *International Journal for Quality in Health Care*, 20(4), pp227–237.
- Schumacher, E.J. 2010. Foreign born nurses in the US labour market. *Health Economics*, (online) Available from doi: 10.1002/hec.1595
- Schwab, F., Meyer, E., Geffers, C. and Gastmeier, P. Understaffing, overcrowding, inappropriate nurse ventilated patient ratio and nosocomial infections: which parameter is the best reflection of deficits? *Journal of Hospital Infection*. 80(2), pp133-139.
- Scott, P.A., Matthews, A. and Corbally, M.A. 2003. *Irish Nurses' and Midwives' Understanding and experiences of empowerment in Ireland. Final Report*. Dublin: DoHC.
- Scott, P.A., Treacy, M.P., MacNeela, P., Hyde, A., Morris, R., Drennan, J., Byrne, A., Henry, P., Butler, M., Clinton, G., Corbally, M. and Irving, K. 2006a. *Report on the Delphi Study of Irish Nurses to Articulate the Core Elements of Nursing Care in Ireland*. Dublin: Dublin City University.
- Scott, L.D., Rogers, A.E., Hwang, W.T. and Zhang, Y. 2006b. Effects of critical care nurses' working hours on vigilance and patients' safety. *American Journal of Critical Care*, 15, pp30-37.
- Scott, P.A., Kirwan, M., Matthews, A., Lehwaldt, D., Morris, R. and Staines, A. 2013. *Report of the Irish RN4CAST Study 2009-2011: A nursing workforce under strain*. (online) Available at <http://doras.dcu.ie/19344/> [last accessed September 2015].
- Scott, P.A., Matthews, A. and Kirwan, M. 2013. What is nursing in the 21st century and what does the 21st century health system require of nursing? *Nursing Philosophy*, 15(1), pp23-34.
- Seawright, J. and Gerring, J. 2008. Case selection techniques in case study research: a menu of qualitative and quantitative options. *Political Research Quarterly*, 61, pp294-308.
- Sermes, W., Aiken, L.H., Van den Heede, K., Rafferty, A.M., Griffiths, P., Moreno-Casbas, M.T., Busse, R., Lindqvist, R., Scott, P.A., Bruyneel, L., Brzostek, T., Kinnunen, J., Schubert, M., Schoonhoven, L., Zikos, D. and RN4CAST consortium. 2011. Nurse forecasting in Europe (RN4CAST): Rationale, design and methodology. *BMC Nursing*, 10(6) doi: 10.1186/1472-6955-10-6.
- Shahian, D.M, Silverstein, T. Lovett, A.F., Wolf, R.E. and Normand, S.T. 2007. Comparison of Clinical and Administrative Data Sources for Hospital Coronary Artery Bypass Graft Surgery Report Cards. *Circulation*, 115, pp1518-1527.
- Shahian, D.M., Wolf, R.E., Iezzoni, L.I., Kirle, L. and Normand S.L.T. 2010. Variability in the Measurement of Hospital-wide Mortality Rates. *The New England Journal of Medicine*, 363 (26), pp2530-2539.

- Sharp, J.L., Mobley C., Hammond C., Withington C., Drew S., Stringfield S. and Stipanovic, N. 2012. A mixed methods sampling methodology for a multisite case study. *Journal of Mixed Methods Research*, 6(1), pp34-54.
- Shin, K.R., Lee, J.H., Ha, J.Y. and Kim, K.H. 2006a. Critical thinking dispositions in baccalaureate nursing students. *Journal of Advanced Nursing*, 56(2), pp182–189.
- Shin, K.R., Jung, D.Y., Shin, S. and Kim, M.S. 2006b. Critical Thinking Dispositions and Skills of Senior Nursing Students in Associate, Baccalaureate, and RN-to-BSN Programs. *Journal of Nursing Education*, 45(6), pp233-237.
- Shuldham, C., Parkin, C., Firouzi, A., Roughton, M., Lau-Walker, M. 2009. The relationship between nurse staffing and patient outcomes: A case study. *International Journal of Nursing Studies*, 46(7), pp986-992.
- Silber, J.H., Williams, S.V., Krakauer, H. and Sanford-Schwartz, J. 1992. Hospital and Patient Characteristics Associated with Death after Surgery: A Study of Adverse Occurrence and Failure to Rescue. *Medical Care*, 30(7), pp615-629.
- Silber, J.H., Rosenbaum, P. and Ross, R. 1995. Comparing the contributions of groups of predictors: which outcomes vary with hospital rather than patient characteristics. *Journal of the American Statistical Association*, 90, pp7-18.
- Silber, J.H., Rosenbaum, P., Williams, S.V., Ross, R. and Sandford-Schwartz, J. 1997. The Relationship Between Choice of Outcome Measure and Hospital Rank in General Surgical Procedures: Implications for Quality Assessment. *International Journal for Quality in Health Care*, 9(3), pp 193-200.
- Skye, C.M., Shore, A.D., Hari, N., Edil, B. H., Hirose, K., Anders, R.A., Wolfgang, C.L., Schulick, R.D., Choti, M.A. and Pawlik. T.M. 2011. Refining the definition of perioperative mortality following hepatectomy using death within 90 days as the standard criterion. *Journal of the Hepato-Pancreato-Biliary Association*, 13(7), pp 473–482.
- Smith, J. and Crawford, L. 2003. The link between perceived adequacy of preparation to practice, nursing error, and perceived difficulty of entry-level practice. *JONA's Healthcare Law, Ethics, & Regulation*, 5(4), pp100-103.
- Somerville, D. and Keeling, J. 2004. A practical approach to promote reflective practice within nursing. *Nursing Times*, 100(12), pp42–45.
- Spence-Laschinger, H.K., Wilk, P., CHO, J. and Greco, P. 2009. Empowerment, engagement and perceived effectiveness in nursing work environments: does experience matter? *Journal of Nursing Management*, 17, pp636–646.
- Spence-Laschinger, H.K. 2014. Impact of workplace mistreatment on patient safety risk and nurse-assessed patient outcomes. *JONA*, 44(5), pp284-290.

- Sprangers, S., Dijkstra, K. and Romijn-Luijten, A. 2015. Communication skills training in a nursing home: effects of a brief intervention on residents and nursing aides. *Clinical Interventions in Aging*, 10, pp311–319.
- Squires, A. and Amico, A. 2015. An integrative review of the role of remittances in international nurse migration. *Nursing: Research and Reviews*, 5, pp1-12.
- Squires, A., Bruyneel, L., Aiken, L.H., Van Den Heede, K., Brzostek, T., Busse, R., Ensio, A., Schubert, M., Zikos, D. and Sermeus, W. 2012. Cross-cultural evaluation of the relevance of the HCAHPS survey in five European countries. *International Journal for Quality in Health Care*, pp1-6.
- Stake, R.E. 1995. *The art of case study research*. California: Sage Publications.
- Stake, R.E. 2006. *Multiple case study analysis*. New York: The Guilford Press.
- Stake, R.E. 2010. *Qualitative research. Studying how things work*. New York: Guilford Press.
- Standing, M. 2007. Clinical decision-making skills on the developmental journey from student to registered nurse: a longitudinal inquiry. *Journal of Advanced Nursing*, 60(3), pp257-269.
- Statistisches Bundesamt 2015. *Bevölkerung Deutschlands bis 2060. 13. koordinierte Bevölkerungsvorausberechnung*. Wiesbaden: Statistisches Bundesamt.
- Steffen, P. and Löffert, S. 2010. *Ausbildungsmodelle in der Pflege*. Düsseldorf: Deutsches Krankenhaus Institut e.V.
- Stone, P.W., Mooney-Kane, C., Larson, E.L., Horan, T., Glance, L.G., Zwanziger, J. and Dick, A.W. 2007. Nurse working conditions and patient safety outcomes. *Medical Care*, 45, pp571-578.
- Stöver, M. 2010. *Die Neukonstruierung der Pflegeausbildung in Deutschland*. Düsseldorf: Jacobs Verlag.
- Suliman, W.A. 2006. Critical thinking and learning styles of students in conventional and accelerated programmes. *International Nursing Review*, 53, pp.73–79.
- Sun-Hyun, C., Jeong, H.H. and Jaiyon, K. 2008. Nurse Staffing and Patient Mortality in Intensive Care Units. *Nursing Research*, 57(5), pp322-330.
- Thomas, G. 2011. *How to do your Case Study: A Guide for Students and Researchers*. London: Sage Publications.
- Thomson, S., Jowett, M. and Mladovsky, P. 2014. *Health system responses to financial pressures in Ireland. Policy options in an international context*. Copenhagen: World Health Organisation.

Thomas-Hawkins, C., Flynn, L. and Clarke, S.P. 2008. Relationships Between Registered Nurse Staffing, Processes of Nursing Care, and Nurse-Reported Patient Outcomes in Chronic Hemodialysis Units. *Nephrology Nursing Journal*, 35(2), pp123–131.

Thompson, C., Cullum, N., McCaughan, D., Sheldon, T., Raynor, P. 2004. Nurses, information use, and clinical decision making—the real world potential for evidence-based decisions in nursing. *Evidence-Based Nursing*, 7, pp68-72.

Top Level Appointment Committee 2011/12. *Procedures and Practices of the Top Level Appointment Committee*. (online) Available from <http://hr.per.gov.ie/files/2011/12/here.pdf> [last accessed September 2015].

Tourangeau, A.E., Giovannetti, P., Tu, J.V. and Wood, M. 2002. Nursing-related determinants of 30-day mortality for hospitalised patients. *Canadian Journal of Nursing Research*, 33(4), pp71-88.

Tourangeau, A.E., Doran, D.M., McGillis Hall, L., O'Brien Pallas, L., Pringle, D., Tu, J.V. and Cranley, L.A. 2007. Impacts of hospital nursing care on 30-day mortality for acute medical patients. *Journal of Advanced Nursing*, 57(1), pp32-44.

Tourangeau, R. and Yan, T. 2007. Sensitive Questions in Surveys. *Psychological Bulletin*, 133(5), pp859-883.

Trellis, W. 1997. Application of a case study methodology. *The Qualitative Report*, 3(3). Available from <http://www.nova.edu/ssss/QR/QR3-3/tellis2.html>

Trinkoff, A.T., Johantgen, M., Storr, C.L., Gurses, A.P., Liang, Y. and Han, K. 2011. Nurses' work schedule characteristics, nurse staffing, and patient mortality. *Nursing Research*, 60(1), pp1-8.

Tvedt, C., Strømseng Sjetne, I., Helgeland, J. and Bukholm, G. 2014. An observational study: associations between nurse-reported hospital characteristics and estimated 30-day survival probabilities. *BMJ Quality and Safety*, 23, pp757–764.

Twigg, D., Duffield, C., Bremner, A., Rapley, P. and Finn, J. 2011. The impact of the nursing hours per patient day (NHPPD) staffing method on patient outcomes: a retrospective analysis of patient and staffing data. *International Journal of Nursing Studies*, 48, pp540-548.

Twigg, D., Gelder, L. and Myers, H. 2015. The impact of understaffed shifts on nurse-sensitive outcomes. *Journal of Advanced Nursing*, (online) Available from doi:10.1111/jan.12616 [last accessed September 2015]

Tzeng, H.M and Yin, C.Y. 2007. Using family visitors, sitters, or volunteers to prevent inpatient falls. *JONA*, 37(7/8), pp329-334.

Ullmann, P. and Lehwaldt, D. 2013. Hochschulische Masterprogramme im Kontext der modernen Pflegebildung: die nationale Perspektive. *Berufs-und Wirtschaftspädagogik*, (online) Available from http://www.bwpat.de/ht2013/ft14/ullmann_lehwaldt_ft14-ht2013.pdf [last accessed September 2015].

US Advisory Council on Nurse Education. 2000. *Nurse Education and Practice Report to the Secretary of the Department of Health and Human Services on the Basic Registered Nursing Workforce*. Rockville: National Advisory Council on Nurse Education.

US Department of Health and Human Services 2000. *The Registered Nurse Population. National Sample Survey of Registered Nurses - March 2000. Findings from the National Sample Survey*. (online) Available from <http://bhpr.hrsa.gov/workforcestudies/rnsurveys/rnsurvey2000.pdf> [last accessed September 2015].

US Health Resources and Services Administration Bureau of Health Professions 2013. *The U.S. Nursing Workforce: Trends in Supply and Education*. (online) Available from <http://bhpr.hrsa.gov/healthworkforce/reports/nursingworkforce/nursingworkforcefullreport.pdf> [last accessed September 2015].

Vahey, D.C., Aiken, L.H., Sloane, D.M., Clarke, S.P. and Vargas, D. 2004. Nurse burnout and patient satisfaction. *Medical Care*. 42(2 Suppl): II57–II66.

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(11-12), pp1664-1674.

Van Den Heede, K., Lesaffre, E., Diya, L., Vleugels, A., Clarke, S. P., Aiken, L.H. and Sermeus, W. 2009a. The relationship between inpatient cardiac surgery mortality and nurse numbers and education level: analysis of administrative data. *International Journal of Nursing Studies*, 46, pp796-803.

Van Den Heede, K., Sermeus, W., Diya, L., Clarke, S. P., Lesaffre, E., Vleugels, A., and Aiken, L.H. 2009b. Nurse staffing and patient outcomes in Belgian acute hospitals: cross-sectional analysis of administrative data. *International Journal of Nursing Studies*, 46, pp928-939.

Van Den Heede, K. and Aiken, L.H. 2013. Nursing workforce a global priority area for health policy and health services research: A special issue. *International Journal of Nursing Studies*, 50, pp141-142.

Van De Mortel, T.F. 2008. Faking it: social desirability response bias in self report research. *Australian Journal of Advanced Nursing*, 25(4), pp40-48.

Vesperoni, P. and Masera, G. 2015. Strangers in a strange land: work experiences of foreign nurses in Parma's territory. *Acta Biomed for Health Professions*, 86, S1, pp46-50.

- Viterito, A. 2006. A critique of 'Education levels of hospital nurses and surgical patient mortality'. *Teaching and Learning in Nursing*, 1, pp2-3.
- Volpe, F.M., De Miranda, A.C., and Rocha, A.R. 2013. High bed occupancy rates: Are they a risk for patients and staff? *International Journal of Evidence-Based Healthcare*, 11, pp312–316.
- Wagensteen, S., Johansson, I.S., Bjorkstrom, M.E. and Nordstrom, G. 2010. Critical thinking dispositions among newly graduated nurses. *Journal of Advanced Nursing*, 66(10), pp2170–2181.
- Weinberg, D.B., Cooney-Miner, D. and Perloff, J.N. 2012. Analyzing the Relationship Between Nursing Education and Patient Outcomes. *Journal of Nursing Regulation*, 3(2), pp4-10.
- Weisberg, R.W. 2003. *Case studies of innovation. Ordinary thinking, extraordinary outcomes.* IN The International Handbook of Innovation, Shavinina, L.V. (ed) Oxford: Elsevier Science Ltd. Pp204-248.
- Weitzel, M.L. and McCahon, C.P. 2008. Stressors and supports for baccalaureate nursing students completing an accelerated program. *Journal of Professional Nursing*, 24(2), pp85-89.
- Westbrook, J., Rob, M., Woods, A. and Parry, D. 2011. Errors in the administration of intravenous medications in hospital and the role of correct procedures and nurse experience. *BMJ Quality & Safety*. 20(12), pp1027-1034.
- Wiley, M. 2005. Using HIPE data as a research and planning tool: limitations and opportunities: A Response. *Irish Journal of Medical Science*, 174(2), pp52-57.
- Williams, R.P., Walker, J.T., Martin, T., Northington, L., Waltman, P., Beacham, T. and Grant, L. 2008. Comparing clinical competencies between nursing students with degrees and traditional students. *Issues in Educational Research*. 18(1), pp90-100.
- Wissenschaftsrat 2012. Empfehlungen zu hochschulischen Qualifikationen für das Gesundheitswesen. (online) Available from <http://www.wissenschaftsrat.de/download/archiv/2411-12.pdf> [last accessed September 2015].
- Wissenschaftsrat 2015. Mitglieder. (online). Available from <http://www.wissenschaftsrat.de/ueber-uns/mitglieder.html> [last accessed September 2015].
- Witkoski-Stimpfel, A., Lake, E.T., Barton, S., Chavanu-Gorman, K. and Aiken, L.H. 2013. How Differing Shift Lengths Relate to Quality Outcomes in Pediatrics. *JONA*, 43(2), pp95–100.
- World Health Organisation 2001. *European Strategy for Nursing and Midwifery Education*. Copenhagen: WHO.

World Health Organisation 2009a. *Nurses and Midwives: A force for health. Survey on the situation of nursing and midwifery in the Member States of the European Region of the World Health Organisation*. Copenhagen: WHO.

World Health Organisation 2009b. *Global standards for the initial education of professional nurses and midwives*. Geneva: WHO.

World Health Organisation 2010. *Achieving health-related Millennium Development Goals: strengthening nursing and midwifery workforce in the WHO European Region*. Sofia: WHO.

Yang, M., Webster, B. and Prosser, M. 2011. Travelling a thousand miles: Hong Kong Chinese students' study abroad experience. *International Journal of Intercultural Relations*, 35, pp69-78.

Yeates, N. 2009. Migration and Nursing in Ireland: An Internationalist History. *Translocations: Migration and Social Change E-Journal*. Available from <http://oro.open.ac.uk/19007/> [last accessed September 2015].

Yin, R.K. 1981. The case study crisis: some answers. *Administrative Sciences Quarterly*, 26, pp58-65.

Yin, R.K. 2003. *Case Study Research. Design and Methods*. 3rd ed. California: Sage Publications.

Yin, R.K. 2009. *Case Study Research. Design and Methods*. 4th ed. California: Sage Publications.

Yin, R.K. 2011. *Applications of case study research*. 3rd ed. California: Sage Publications.

Yin, R.K. 2014. *Case Study Research. Design and Methods*. 5th ed. California: Sage Publications.

You, L.M., Aiken, L.H., Sloane, D.M., Liu, K., He, G.P., Jiang, X.H., Li, X.H., Li, X.M., Liu, H.P., Shang, S.M., Kutney-Lee, A. and Sermeus, W. 2013. Hospital nursing, care quality, and patient satisfaction: Cross-sectional surveys of nurses and patients in hospitals in China and Europe. *International Journal of Nursing Studies*, 50(2), pp154-161.

Youssef, F.A. and Goodrich, N. 1996. Accelerated versus traditional nursing students: a comparison of stress, critical thinking ability and performance. *International Journal of Nursing Studies*, 33(1), pp76–82.

Zander, B., Blümel, M. and Busse, R. 2013. Nurse migration in Europe—Can expectations really be met? Combining qualitative and quantitative data from Germany and eight of its destination and source countries. *International Journal of Nursing Studies*, 50, pp210-218.

Zander, B., Dobler, L. and Busse, R. 2013. The introduction of DRG funding and hospital nurses' changing perceptions of their practice environment, quality of care and satisfaction: Comparison of cross-sectional surveys over a 10-year period. *International Journal of Nursing Studies*, 50, pp219-229.

Zander, B., Dobler, L., Bäuml, M. and Busse, R. 2014. Nursing tasks left undone in German acute care hospitals - results from the international study RN4Cast. *Gesundheitswesen*, 76(11), pp727-734.

Zhu, X.W., You, L.M., Zheng, J., Liu, K., Fang, J., Hou, S., Lu, M. Lv, A., Ma, W., Wu, Z. and Zhang, L. 2012. Nurse Staffing Levels Make a Difference on Patient Outcomes: A Multisite Study in Chinese Hospitals. *Journal of Nursing Scholarship*, 44(3), pp266-273.

APPENDICES

Appendix A: Ethical approval letter (REC-U)

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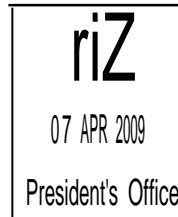
Appendix H: RN4CAST study protocol

Appendix A: Ethics approval letter (REC-U)

Dublin City University
Oibcod Chathan Shada Atha Cliath

DCU

Office of the Vice-President for Research
Oubhlll 9, Ireland



Prof. Anne Scott
School of Nursing

31st March 2009

REC Reference: DCUREC/2009/049

Proposal Title: Nurse Forecasting: Human Resources Planning in
Nursing: RN4CAST

Applicants: Prof. Anne Scott, Dr. Anne Matthews, Prof. Anthony Staines, Ms. Daniela Lehwaldt, Ms. Marcia Kirwan

Dear Anne,

Further to expedited review, the DCU Research Ethics Committee approves this research proposal. Should substantial modifications to the research protocol be required at a later stage, a further submission should be made to the REC.

Yours sincerely,

A handwritten signature in blue ink, appearing to read 'Brian Trebleh'.

Mr. Brian Trebleh
Chair
DCU Research Ethics Committee



Appendix B: Hospital (Organisational) survey



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]

a) Total Inpatient Admissions (n)	
<i>i) Inpatient Elective Admissions (n)*</i>	
<i>ii) Inpatient Emergency Admissions (n)*</i>	
b) Day Case Admissions (n)*	
c) Total ambulatory/outpatient attendances (n)*	
<i>i) Emergency department visits (n)</i>	
<i>ii) Planned ambulatory/outpatient attendances (n)*</i>	
d) Total Annual Expenditure	
e) (year end date dd/mm/yy)	

12. Bed Numbers (mean for year)

	Total number of open beds (N)	Mean Occupancy (%)
Total		
Total Acute Beds		
<i>Of which</i>		
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

14. 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

15. 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:

16. 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: Letter gaining access to nursing staff, link person and hospital profiles

To: Director of Nursing
Hospital
Address

September 2009

RE: Nurse Forecasting: Human Resources Planning in Nursing (RN4CAST)

Dear Director of Nursing,

We recently received ethical approval and a letter granting access to HIPE data for the above study from your hospital. I will be acting as the researcher for your hospital on behalf of the research team at DCU. I now wish to arrange dates for data collection within your hospital, specifically to organise the nurse survey. This involves requesting all nurses working in 2 general medical and 2 surgical wards to complete a questionnaire, which may take up to 20 minutes. If you require any additional information about the study at this stage, please let me know.

In order to begin this process, I wonder if you can supply me with the name of a **link person within the hospital** with whom we can liaise in relation to ward inclusion criteria and nurse survey issues, including data collection dates. This could be a member of the nurse management team, such as an Assistant Director of Nursing or the Nurse Practice Development Coordinator or similar. I will visit the hospital at the point of data collection for information giving and form distribution.

During the data collection phase of the project, I will also send you the Organisational (Hospital) Profile form to be completed either by yourself or your nominee. I will be available during my visit at the beginning of the nurse survey data collection phase to meet with you in order to clarify any issues you may have with this.

In the meantime I would be happy to discuss the project with you further if you have any queries or if clarification is required on any issue. My contact details are as follows: daniela.lehwaldt@dcu.ie or by telephone at 01 700 8534.

With best wishes

Daniela Lehwaldt
Researcher RN4CAST Project
Lecturer, School of Nursing and Human Sciences, DCU.

Research team: Professor Anne Scott (Principal Investigator), Dr Anne Matthews, Ms. Marcia Kirwan, Professor Anthony Staines, School of Nursing and Human Sciences, Dublin City University, Dublin 9.

Appendix D: Letter requesting permission to obtain patient discharge data

Chief Executive Officer/General Manager
Hospital
Address

September 2009

Request for permission to access [name of hospital] HIPE data through the Health Atlas (HSE)

Dear Chief Executive Officer/General Manager,

Dublin City University is a member of a consortium that has been funded under the 7th Framework Programme of the European Commission (FP7) to carry out the **Nurse Forecasting: Human Resources Planning in Nursing (RN4CAST)** study. This is a three-year project (1 January 2009- 31 December 2011) which aims to develop innovative workforce forecasting methods by addressing not just the level of activity, and the corresponding quantity of nursing staff, the volumes, but also the quality of nursing staff, as well as the quality of patient care. This study has been approved by [relevant ethics committee] at their meeting on [date] (letter attached).

Within the project we are measuring patient outcomes using routinely collected discharge data; in Ireland, Hospital In Patient Enquiry (HIPE) data. A core element of the study is the linking of nursing and organisational data with patient outcomes at hospital level. Therefore we require access to hospital-level HIPE data so that we can link these with organisational and nurse survey data. Once these data have been linked, no hospital will be identified in any reports on the study. As you know, the HIPE data submitted by your hospital to the Economic and Social Research Institute (ESRI) are currently also being used by the Health Service Executive (HSE) within the Health Atlas project of the HSE's Health Intelligence function of the Population Health directorate.

We have secured an agreement from the Assistant Director for Population Health (Health Intelligence) that a HSE employee working on the RN4CAST project could gain access to hospital level HIPE data for this project if each hospital gives this permission in writing. Therefore I am requesting your permission to access your hospital data for the latest year available, as part of our application for ethical approval and access to carry out the study at your hospital. We guarantee that once the sets of data (HIPE, nursing data, organisational profile data) have been linked, that each hospital will be coded and no hospital will be identified in any reporting. We will retain hospital identifiers for these codes in a locked facility to enable us to provide feedback to hospitals seeking their own results only. Therefore if you wish to have this feedback we would be happy to facilitate this at your convenience.

Yours faithfully
Professor P Anne Scott
Principal Investigator, R4CAST project, Ireland
Phone: 01 7008271; Anne.scott@dcu.ie

Appendix E: Memorandum of Understanding



Dublin City University
Ollscoil Chathair Bhaile Atha Cliath

MEMORANDUM OF UNDERSTANDING

between

Principal Investigator (PI) German RN4CAST Team
Prof. Dr. med. Reinhard Busse
Fakultät Wirtschaft und Management, Technische Universität (TU) Berlin,
Straße des 17. Juni 135, 10623 Berlin, Germany

and

Principal Investigator (PI) Irish RN4CAST Team
Prof. Anne Scott
Deputy President
Dublin City University, Dublin 9, Ireland

On 'RN4CAST Data'

Date: 5th April 2011

Background

TU Berlin and Dublin City University are members of a 13-country consortium that has been funded under the 7th Framework Programme of the European Commission (FP7) to carry out the Nurse Forecasting: Human Resources Planning in Nursing (RN4CAST) study. This is a three-year project (1 January 2009- 31 December 2011) which aims to develop innovative forecasting methods by addressing not only volumes, but quality of nursing staff as well as quality of patient care. The consortium is led by Prof. Walter Sermeus, University of Leuven, Belgium and Prof. Linda Aiken, University of Pennsylvania, USA. Prof Anne Scott at DCU is the Principal Investigator of the Irish RN4CAST team and Prof Dr. med. Reinhard Busse is the Principal Investigator of the German RN4CAST team.

Details about the Arrangement

Daniela Lehwaldt (DL) is a PhD student on the Irish RN4CAST project team. Her study will compare nursing in the two countries, Ireland and Germany. To achieve this, DL will need full access to the German RN4CAST data. DL's main priority for the next year is to carry out analysis of RN4CAST data and to write her PhD thesis. Access to data through PI RN4CAST TU Berlin will be acknowledged in the thesis.

Intellectual Property Ownership and Copyright

While the PhD thesis is the intellectual property of the student (DL), timelines, topics and authorship for publications/presentations will be agreed with Professors Scott & Busse and other co-authors in advance of any submissions.

Terms of Agreement

In the event of any dispute arising in respect of any provision of the Agreement, the dispute shall be referred to Prof W. Sermeus, RN4CAST coordinator in the first instance, who may resolve the dispute or appoint an agreed independent arbitrator for that purpose.

Signature/Date:

Handwritten signature of Prof Anne Scott in black ink.

PI RN4CAST DCU
Prof Anne Scott

11 April 2011

Signature/Date:

Handwritten signature of Prof. Dr. med. Reinhard Busse in black ink.

PI RN4CAST TU Berlin
Prof. Dr. med. Reinhard Busse

Professor P. Anne Scott
B.A.(Hons), MSc., PhD., RCN

Deputy President / Registrar
Dublin 9, Ireland

T +353 1 700 8271
F +353 1 700 5888
E anne.scott@dcu.ie
www.dcu.ie

Appendix F: Nurse survey invitation letter and questionnaire



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 7008534 or me at e-mail Daniela.lehwaldt@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:

Daniela Lehwaldt (Researcher for this hospital)

Research team: Professor Anne Scott (Principal Investigator), Dr Anne Matthews, Ms. Marcia Kirwan, Professor Anthony Staines, School of Nursing and Human Sciences, 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 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
2. Physicians and nurses have good working relationships.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
3. A supervisory staff that is supportive of nurses.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
4. Active staff development or continuing education programs for nurses.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
5. Career development/clinical ladder opportunity.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
6. Opportunity for registered nurses to participate in policy decisions.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
7. Physicians value nurses’ observations and judgments.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
8. Enough time and opportunity to discuss patient care problems with other nurses.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
9. Enough registered nurses on staff to provide quality patient care.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
10. A nurse manager who is a good manager and leader.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
11. A chief nursing officer who is highly visible and accessible to staff.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
12. Enough staff to get the work done.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
13. Physicians recognize nurses’ contributions to patient care.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
14. Praise and recognition for a job well done.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
15. High standards of nursing care are expected by the management.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
16. A chief nursing officer is equal in power and authority to other top level hospital executives.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
17. A lot of team work between nurses and physicians.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
18. Opportunities for advancement.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
19. A clear philosophy of nursing that pervades the patient care environment.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>
20. Working with nurses who are clinically competent.	1 <input type="radio"/>	2 <input type="radio"/>	3 <input type="radio"/>	4 <input type="radio"/>

	Strongly Disagree 1 ○	Somewhat Disagree 2 ○	Somewhat Agree 3 ○	Strongly Agree 4 ○
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 how frequently 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 <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
2. I feel used up at the end of the workday.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
3. I feel fatigued when I get up in the morning and have to face another day on the job	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
4. I can easily understand how my patients feel about things.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
5. I feel I treat some patients as if they were impersonal objects.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
6. Working with people all day is really a strain for me.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
7. I deal very effectively with the problems of my patients.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
8. I feel burned-out from my work.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
9. I feel I'm positively influencing other people's lives.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
10. I've become more callous toward people since I took this job.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
11. I worry that this job is hardening me emotionally.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
12. I feel very energetic.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
13. I feel frustrated by my job.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
14. I feel I'm working too hard on my job.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
15. I don't really care what happens to some patients.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>

	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 <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
17. I can easily create a relaxed atmosphere with my patients.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
18. I accomplish many worthwhile things in this job.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
19. I feel exhilarated after working closely with my patients.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
20. I feel like I'm at the end of my rope.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
21. In my work, I deal with emotional problems very calmly.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>
22. I feel patients blame me for some of their problems.	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>	⁶ <input type="radio"/>

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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 Acceptable 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 <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
2. Important patient care information is often lost during shift changes.	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
3. Things "fall between the cracks" when transferring patients from one unit to another.	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
4. Staff feel free to question the decisions or actions of those in authority.	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
5. In this unit, we discuss ways to prevent errors from happening again.	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
6. We are given feedback about changes put into place based on event reports.	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
7. The actions of hospital management show that patient safety is a top priority.	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>

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	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
2. Pressure ulcers after admission	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
3. Patient falls with injury	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
4. Healthcare-associated infection:							
1. Urinary tract infections	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
2. Bloodstream infections	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
3. Pneumonia	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
5. Complaints from patients or their families	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
6. Verbal abuse toward nurses							
1. By patients and/or families	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
2. By staff	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
7. Physical abuse toward nurses							
1. By patients and/or families	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
2. By staff	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
8. Work related physical injuries to nurses	<input type="radio"/> 0	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 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 <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
2. Performing non-nursing care	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
3. Arranging discharge referrals and transportation (including to long term care)	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
4. Routine phlebotomy/blood draw for tests	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
5. Transporting of patients within hospital	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
6. Cleaning patient rooms and equipment	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
7. Filling in for non-nursing services not available on off-hours	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
8. Obtaining supplies or equipment	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>
9. Answering phones, clerical duties	⁰ <input type="radio"/>	¹ <input type="radio"/>	² <input type="radio"/>

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 <input type="radio"/>	¹ <input type="radio"/>
b. Infection control	⁰ <input type="radio"/>	¹ <input type="radio"/>
c. Blood transfusion practice	⁰ <input type="radio"/>	¹ <input type="radio"/>
d. CPR	⁰ <input type="radio"/>	¹ <input type="radio"/>
e. Manual handling	⁰ <input type="radio"/>	¹ <input type="radio"/>
f. Adverse event reporting	⁰ <input type="radio"/>	¹ <input type="radio"/>
g. Informed Consent	⁰ <input type="radio"/>	¹ <input type="radio"/>
h. Open disclosure for adverse clinical events	⁰ <input type="radio"/>	¹ <input type="radio"/>

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 <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
b. When a mistake is made but it has no potential to harm the patient how often is this FORMALLY reported?	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>
c. When a mistake is made that could harm the patient but does not, how often is this FORMALLY reported?	¹ <input type="radio"/>	² <input type="radio"/>	³ <input type="radio"/>	⁴ <input type="radio"/>	⁵ <input type="radio"/>

Thank you for taking the time to complete the survey

Appendix G: Patient satisfaction instruction letter and questionnaire

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. Do not write your name on the survey. Your answers are anonymous. 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

Hospital ID	
Unit ID	
Questionnaire number	

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 <input type="checkbox"/> | ⁰¹ <input type="checkbox"/> | ⁰² <input type="checkbox"/> | ⁰³ <input type="checkbox"/> | ⁰⁴ <input type="checkbox"/> | ⁰⁵ <input type="checkbox"/> | ⁰⁶ <input type="checkbox"/> | ⁰⁷ <input type="checkbox"/> | ⁰⁸ <input type="checkbox"/> | ⁰⁹ <input type="checkbox"/> | ¹⁰ <input type="checkbox"/> |
| 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 overall health?

¹ Excellent ² Very good ³ Good ⁴ Fair ⁵ Poor

24. What is the highest grade or level of school that you have completed?

¹ <input type="checkbox"/>	² <input type="checkbox"/>	³ <input type="checkbox"/>	⁴ <input type="checkbox"/>	⁵ <input type="checkbox"/>	⁶ <input type="checkbox"/>
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 H: RN4CAST study protocol

RN4CAST

Nurse Forecasting: Human Resources Planning in Nursing

HEALTH-2007-3.2-4: Health care human resource planning in nursing

Grant agreement no.: 223468



RN4CAST

Irish protocol

Professor P Anne Scott

Dr Anne Matthews

Professor Anthony Staines

Marcia Kirwan

Daniela Lehwaldt

Funded under the Seventh Framework Programme of the European Union



1. THE Irish PROTOCOL

1.2. Regulation

This IRISH PROTOCOL, herein after referred to as PROTOCOL conforms to the terminology and regulations of the Consortium Agreement. Thereby, it follows that this PROTOCOL is bound to all documents to which Parties of the RN4CAST consortium have agreed:

- Proposal for the Project to the European Commission as part of the Seventh Framework Programme of the European Community for Research, Technological Development and Demonstration Activities, hereinafter referred to as DOW
- RN4CAST Core Nurse Survey, hereinafter referred to as CORE NURSE SURVEY
- RN4CAST Core Patient Survey, hereinafter referred to as the CORE PATIENT SURVEY
- RN4CAST Core Organizational Survey, hereinafter referred to as the CORE ORGANIZATIONAL SURVEY
- RN4CAST Core Translation Implementation Plan, hereinafter referred to as the CORE TRANSLATION PLAN
- RN4CAST Minutes of the meetings, hereinafter referred to as MINUTES

1.2. Researchers involved

Professor Anne Scott (PhD MSc BA Mod RGN), Deputy President, Dublin City University has extensive experience of leading large nursing research projects. She also has extensive experience in PhD training and supervision. She is the Principal Investigator of the Irish RN4CAST team.

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Dr Anne Matthews (PhD, MSc Econ, BSocSc, RGN, RM) is a Lecturer in Nursing, DCU and is an experienced nursing and health researcher.

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Professor Anthony Staines (PhD, MRCPI (Medicine of Childhood), MFPHM, FFPHMI, MSc (Epidemiology), HDip, DCH, MB, BCh, BAO, BA) is the Professor of Health Systems Research, at the School of Nursing, DCU. He has extensive health service research experience and in particular in working with patient outcome data, including HIPE data and the Health Atlas.

Anthony.staines@dcu.ie

Marcia Kirwan (Msc. RGN RM) is an experienced nurse and is a PhD student working on the project, under the supervision of Prof Scott and Dr Anne Matthews.

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Daniela Lehwaldt (RGN RNT MSc) is an experienced nurse and lecturer in nursing. She is a PhD student working on the project, under the supervision of Prof Anne Scott and Dr Anne Matthews.

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2. METHODOLOGY

2.1 Study setting and sample:

There are 51 acute public hospitals in Ireland. Only public hospitals submit routine administrative/discharge data, therefore we have excluded private hospitals from this study. When specialist hospitals, hospitals with fewer than 100 beds and hospitals without routine administrative/discharge data are excluded, there are 33 remaining hospitals. Therefore we will be applying for ethical approval to undertake this study at 33 acute adult general hospitals in Ireland (See Appendix 1 for a list of hospitals that will be invited to participate).

We will identify all medical and surgical wards with the relevant people in each participating hospital (most likely nursing managers/Directors of Nursing). We will then select at least 2 medical and 2 surgical wards per hospital, where 2 of each is available. Where there are more than two we will randomly select 2 medical and 2 surgical wards per hospital. All nursing staff in each chosen unit will be asked to participate

Within the hospitals that approve the study, all nurses on the selected wards will be asked to complete a questionnaire and a nominated person in the hospital will be asked to complete an organisational profile questionnaire about the organisation. Within the ethical approval application for each hospital permission will be sought to access the hospital's patient discharge data (collected routinely as Hospital In Patient Enquiry (HIPE) data) and this access will be facilitated through the Health Service Executive (HSE) Health Intelligence Section, via the *Health Altas*. This process has been agreed in principle with the HSE, pending each hospital's individual permission to access their HIPE data.

2.2. Data sources and instruments

2.2.1. Nurse survey

Nurse survey data will be collected using a questionnaire battery similar to that used in the International Hospital Outcomes Study, including the Practice Environment Scale of the Nursing Work Index, the Maslach Burnout Inventory, questions about the perception of quality of care, and other questions relevant for human resources management of the nursing profession. This questionnaire battery, the CORE NURSE SURVEY is the standard for all Parties to adapt a national nurse survey questionnaire from, one which must not differ in any way from the CORE NURSE SURVEY. Any modifications to the latter must be discussed with and approved by the Work Package 4 coordinator.

2.2.2. Patient data

Patient outcomes will be measured using available routinely collected discharge data for patients with specific medical conditions or who had specific surgical procedures- to be established by Patient Outcomes Work Package Leader (at King's College London- KCL). Each hospital will also be asked for permission for the study team to access their routinely collected patient discharge summary (HIPE) data.

Therefore, within RN4CAST patient outcomes data collection, there will be no formal recruitment of patients. The primary source of data for these outcomes will be hospital discharge abstract datasets, which summarize key information about each hospital stay over a specific time period and contain useful details that can be used to gauge the quality of care being delivered across facilities. Patients will be selected from the discharge databases in

accordance with the medical and surgical codes selected by the Work Package leader of Patient Outcomes data collection (KCL). Records in these data files include a facility identifier indicating where the hospitalization occurred, patient demographics, characteristics of the admission, principal and secondary International Classification of Diseases diagnosis and procedure codes, payer, length of stay, discharge status (alive/dead) and destination.

2.2.3. Organisational survey

2.2.3.1. Instrument

This survey among the participating hospitals will provide data about the number of employees, vacancies, the number of intensive care beds e.g. This data will not be collected on the unit-level.

2.2.3.2. Data collection

It will be clearly communicated in the letter of invitation that hospitals may expect this survey. In hospitals that will be visited before the nurse survey data collection, the survey will be handed over to the nursing chief officer of the participating hospital the day of the visit. If the hospital is not visited before the nurse survey data collection, the survey will be handed over to the nursing chief officer of the participating hospital the day the nurse survey questionnaire is distributed. If the chief nursing officer is not present that day, the survey will be handed over to the administrative assistant of the chief nursing officer.

2.2.4. Patient survey

Pending securing additional funding, we are also planning to undertake a patient survey which asks patients to anonymously complete a short questionnaire asking about their level of satisfaction with their hospital experience. This would be undertaken in the participating hospitals at the same time as the nurses' survey. If funding is secured, this will be carried out using a patient satisfaction questionnaire developed within the RN4CAST project.

2.2.5. Factors of supply and demand for nursing personnel

Factors of supply and demand for nursing personnel will be collected for Work Package 3 of the RN4CAST project.

2.4. Follow up of data collection

Hospital	Date of distribution	# of questionnaires distributed	Date of reminder	# of questionnaires collected at reminder	Date of final collection	# of questionnaires collected at final collection	# of questionnaires received from hospital afterwards	Total # of collected questionnaires	% response	HIPE data accessed	Organizational survey returned?	Remarks
X												
X												
X												
X												

2.5. Ethical approval

2.5.1. General principles

As agreed upon in the Description of Work (DOW), country-specific databases will be stored in each country on a secured server and partners can only analyze the data of their own country. Only researchers directly involved in the data analysis will have access to the data. A copy of each database will be sent to the leader of work package 7 who will store a linked inter-country database on a secured server that is only accessible for researchers of the KULEUVEN-team directly involved in the project. A copy of this inter-country linked database will be stored on a secured central server of the co-leader of Work Package 7 that is only accessible for researchers of the Penn-team directly involved in the project. A copy of the data stored on the central server will be sent to each team with data of their own country only.

All data will be stripped of patient identifiers and hospitals and nursing units will be assigned an anonymous identifier.

Teams will commit themselves to respect the confidentiality of institution specific data that will be collected and analyzed (including a commitment to never release or publish institution-specific data to any other entity in an identifiable manner).

The protocol for the Irish branch of the study will be submitted to all hospitals being invited to participate as part of each hospital's ethical approval process. An application for ethical approval has been submitted to the Research Ethics Committee at Dublin City University where the project is based and approval has been granted. Following approval in DCU, ethical approval will be sought from each of the 33 acute adult general hospitals identified for the project. A list has been compiled by the Irish team of contacts and meeting dates relating to the ethics committee for each hospital. In many cases in Ireland ethics committees represent groups of hospitals and in these cases only one application is required. In all other cases, ethical approval will be sought on a hospital by hospital basis. With each application for ethical approval the Irish team will include the protocol for the Irish branch of the project and details of the project aims and benefits, and copies of all data

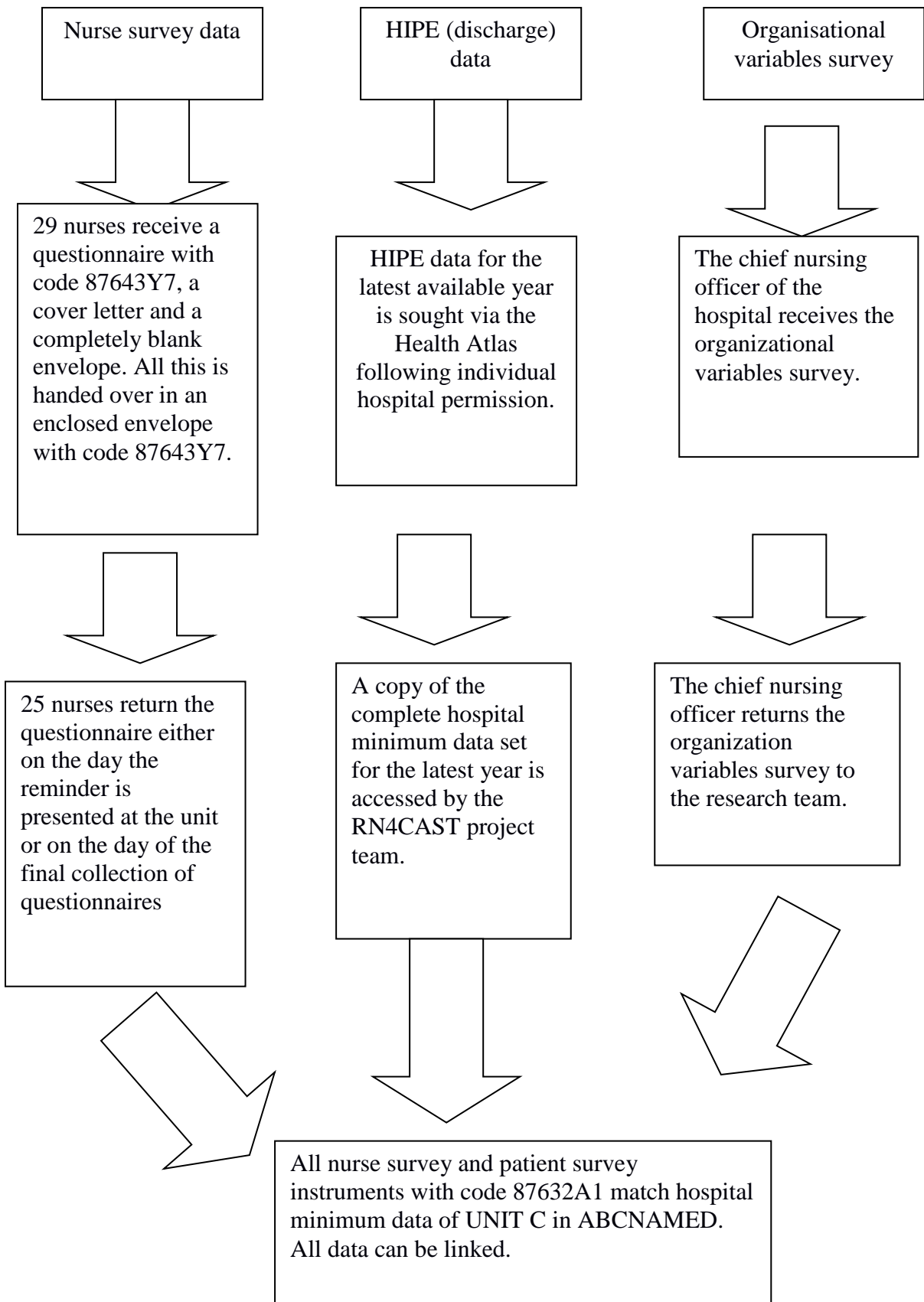
collection instruments, related letters and timelines. It is envisaged that this process of obtaining ethical approval will take 3-4 months.

2.5.2 Linking data

Example: a hospital (ABCNAMED) participates in the project RN4CAST. 2 units of that hospital (UNIT C, UNIT D) are selected (since no more units were available). On UNIT C, 30 nurses are employed and 29 of them participate (1 is excluded because of long-term sickness). ABCNAMED has hospital code 199. UNIT C has unit code 4487. These codes are the codes of ABCNAMED and UNIT C in the hospital minimum data set. The research team will make a database like the example below:

HOSPITAL NAME/UNIT NAME	CODE IN THE HOSPITAL MINIMUM DATA SET	RANDOMLY ASSIGNED CODE BY OUR RESEARCH TEAM	CODE ON THE NURSE & PATIENT SURVEY
ABCNAMED	199	876	
UNIT C	4487	43Y7	87643Y7
UNIT D	4679	98I6	87698I6
DEFNAMED			
...			

Thus, for the meta-analytic data set on the country level. Data collection and merging these different data sets for UNIT C in hospital ABCNAMED is illustrated in the next figure:



3. National stakeholders committee

In addition to an international stakeholder committee, all RN4CAST partners must form a national stakeholder committee (NSC). On the international as well as on the national level, stakeholders of the RN4CAST project are persons or organizations who are involved in, contributing to or affected by the project or its outcomes. We will ensure that key stakeholders and their interests are identified and strategies are developed to engage with them. The Irish RN4CAST team also commits itself to quarterly determine the following:

- If interest or influence in the project among the national stakeholder committee has changed
- If new stakeholders have become known to the project
- The current level of support each stakeholder has for the project
- Any significant up-coming events or impacts from the stakeholders business areas

3.1. Members of the national stakeholders committee

Name	Role / Institution
Ms Mary Day	Director of Nursing, Mater Hospital, Dublin
Dr Davida de la Harpe	Assistant National Director, Health Intelligence, HSE
Mr Liam Duffy	CEO, Beaumont Hospital, Dublin
Ms Maureen Flynn	Nursing Services Division, Health Service Executive
Ms Annette Kennedy	Director of Professional Development Centre, Irish Nurses' Organisation
Ms Mary McCarthy	HSE – Clinical Skills Development Director
Mr Stephen McMahon	Chairman, Irish Patients' Association
Ms Sheila O'Malley	Chief Nurse, Department of Health and Children
Professor Miriam Wiley	Head of Health Information Division, Economic and Social Research Institute

3.2. Meetings

All meetings will take place at either Dublin City University or a venue suitable for participants. Bi-annual meetings are planned. A briefing meeting took place in September 2008 to introduce the project; the first meeting of the NSC took place in January 2009 and the meetings are planned to take place in January and September yearly during the project, subject to project developments.

4. Plan of communication

A number of meetings with key stakeholders will be held to create an awareness of the forthcoming RN4CAST project. Information on the project will also be available on the Irish Nurses Organisation (INO) website and the National Council for the Professional Development of Nursing and Midwifery (NCNM) homepage. The list below outlines the meetings and key stakeholders:

What	Who	When
Connolly Hospital	Director of Nursing	03.03.2009
Beaumont Hospital	Director of Nursing	13.03.2009
Dublin City University	Professional Advisory Group	19.03.2009
Irish Nurses and Midwifery Practice Development Association (INMPDA)	Meeting chair of INMPDA	19.03.2009
Irish Association of the Directors of Nursing and Midwifery (IADNM)	Meeting with chair of IADNM	13.05.2009
St. Vincent's University Hospital Dublin	Meeting with Director of Nursing	11.05.2009

Irish Medical Organisation (IMO)	Meeting with president of IMO	TBC
Irish Hospital Consultant Association (IHCA)	Meeting with president of IHCA	TBC
Royal College of Physicians in Ireland (RCPI)	Meeting with president of RCPI	TBC
Royal College of Surgeons of Ireland (RCSI)	Meeting with president of RCSI	28.05.2009
Letters and press package		
Irish Nurses Organisation (INO) website	Information package on RN4CAST	
National Council for the Professional Development of Nursing and Midwifery (NCNM) homepage	Information package on RN4CAST	Available now
Publications in nursing journals		
INO newsletter	TBC	
NCNM newsletter	TBC	Oct/Nov 2009

5. INTERNATIONAL AND IRISH TIME SCHEDULE

The Irish plan of communication is explained above.

RN4CAST International	RN4CAST Ireland
January 2009 January 22 nd : An example of the UK patient experience survey will be send to Linda Aiken (Peter	January 2009 January 26: Send all detailed comments on the nurse survey to

<p>Griffiths and Jane Ball)</p> <p>January 26th: All detailed comments on the nurse survey should be sent to Linda Aiken (all RN4CAST partners)</p> <p>January 26th: A new shortened draft of the organisational variables survey will be send out to all partners (Peter Griffiths)</p> <p>January 26th: Questionnaire on forecasting will be distributed to all partners (Juha Kinnunen)</p> <p>January 31st: A proposition of how a patient survey would look like will be drafted and distributed (Linda Aiken)</p> <p>January 31st: Inclusion list of internal medicine and general surgical nursing units will be drafted (Linda Aiken)</p>	<p>Linda Aiken</p>
<p>February 2009</p> <p>February 15th: All partners will investigate the possibility to organize a patient survey during one day in 5 hospitals based on the proposition of Linda Aiken. Comments regarding this proposal should be forwarded to Linda Aiken</p> <p>February 16th : Feedback on the new draft of the organisations variables survey should be send to Peter Griffiths</p> <p>February 16th: Final draft of:</p> <ul style="list-style-type: none"> • the nurse survey (with an annotated part that facilitates translation) • the organisational survey • the patient survey 	<p>February 2009</p> <p>February 15: send comments regarding the patient experience proposal to Linda Aiken</p> <p>February 16: Send feedback on the new draft of the organizations variables survey to Peter Griffiths</p> <p>February 16: Send revised versions of the country-specific protocol for the patient outcomes to Peter Griffiths and Linda Aiken</p> <p>February 16: send revised protocol</p>

<p>will be distributed to all partners (Linda Aiken and Peter Griffiths)</p> <p>February 16th: Revised versions of the country-specific protocols for the patient outcomes should be send to WP-leaders 6 (Peter Griffiths) & 4 (Linda Aiken)</p> <p>February 16th: Revised Protocols for selection of nursing units & nurses will have to be submitted;</p> <p>February 16th: Country specific protocol on how the nurse survey data collection is organized and how data are entered (scanning, manual input) is submitted to WP-leaders 5 (ISCII) and 4 (Linda Aiken)</p> <p>February 16th: Press release for all five identified stakeholder categories (Anne-Marie Rafferty)</p> <p>February 23th: All partners should critically review the final draft and sent final comments to Linda Aiken (nurse survey) & Peter Griffiths</p> <p>February 28th: Approval country specific protocols by WP leader 4 in collaboration with the leaders of WP-management team</p> <p>February 28th: a final version of:</p> <ul style="list-style-type: none"> • Approved country specific protocols • the nurse survey • the patient survey • the organisational survey • requirements to derive patient outcomes 	<p>for selection of nursing units & nurses</p> <p>February 16: send protocol on how the nurse survey data collection is organized and how data are entered to ISCIII and Penn</p> <p>February 23: Send final comments on instruments to Linda Aiken and Peter Griffiths</p>
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<p>from hospital discharge data will be distributed to all partners (Peter Griffiths and Linda Aiken)</p>	
<p>March 2009 March 1st: Starting applications for ethical approval March 31st: Translation of the final instruments. (Countries with the same languages should make translation arrangements) March 31st: The questionnaire on forecasting, distributed by the Finnish research team, must be completed by the end of March</p>	<p>March 2009 Ethical approval sought and received from Dublin City University Research Ethics Committee.</p>
<p>April 2009 April 30th: Results of CVI are distributed (Allison Squires)</p>	<p>April 2009 Begin hospital-by-hospital ethical approval processes</p>
<p>May 2009</p>	<p>May 2009 Continue ethical approval process</p>
<p>June 2009</p>	<p>June 2009 Continue ethical approval process</p>
<p>July 2009</p>	<p>July 2009 Continue ethical approval process</p>
<p>August 2009</p>	<p>August 2009</p>
<p>September 2009 September 10th: Ready to start data collection</p>	<p>September 2009 Commence data collection</p>