PATIENT SAFETY AND GAPS MANAGEMENT BY REGISTERED NURSES

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Submitted in fulfilment of the requirements for the degree of
Doctor of Philosophy

Deakin University

September, 2013
I am the author of the thesis entitled ‘Patient safety and gaps management by registered nurses’

submitted for the degree of Doctor of Philosophy

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CANDIDATE DECLARATION

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is the result of my own work and that where reference is made to the work of others, due acknowledgment is given.

I also certify that any material in the thesis which has been accepted for a degree or diploma by any university or institution is identified in the text.

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ABSTRACT

Background/problem identification

‘Gaps’, defined for the purposes of this study as ‘discontinuities’ or breakdowns in the sequence or continuity of care, are prevalent in health care and increase the risk of preventable adverse events. Research has investigated the role of nurses in managing risk, recovering medical errors and surveillance. The role and expertise of nurses in anticipating, detecting, and bridging gaps, however, have not been formally investigated in the cultural context of Australia. A key objective of this study was to redress this oversight.

Aims

The key aims of this study were to:

- describe the patient care gaps that nurses commonly anticipate, detect and bridge;
- provide a comprehensive explanation of how nurses anticipate, detect and bridge:
  - familiar gaps;
  - new and unfamiliar gaps; and
  - familiar gaps whose characteristics have changed.
- describe the processes used by nurses to do so;
- propose a practice model of gap management by nurses;
- propose a hypothesis of possible linkages between gaps management and patient safety outcomes for further investigation.

Research questions

The research questions driving this study were:

- What are the gaps that are commonly anticipated, detected and bridged by nurses?
- How do nurses anticipate, detect and bridge gaps that are familiar to them?
- How do nurses anticipate, detect and bridge new and unfamiliar gaps?
- How do nurses anticipate, detect and bridge familiar gaps whose characteristics have changed?
- How do nurses bridge gaps once detected?
Method
The study was conducted as a naturalistic inquiry using a qualitative exploratory descriptive approach. A purposeful sample of 71 registered nurses was recruited using snowballing and professional networking from emergency, critical care, perioperative, neurosciences, rehabilitation and transitional care settings. Data were collected via in-depth, semi-structured interviews using three methods: face-to-face, telephone, and e-mail interviewing. The purpose of the interviews was to elicit information about the types of gaps nurses discern and how they anticipate, detect and bridge these gaps. The audio-recorded interviews were transcribed verbatim and the data analysed using content and thematic analysis strategies.

Findings
This study found that gaps in patient care created the opportunity for something to go wrong in the form of an error or adverse event. When gaps were present, patient care was disjointed and lacking organisation such that the normal, expected or planned sequence of events was delayed, disrupted or did not occur as it should. The gaps identified in this study and found to be familiar to nurses were failure to recognise and respond to the deteriorating patient; inattention to the ‘simple things’; the practice of taking ‘short cuts’; failure to communicate the information required to plan and deliver care safely; and lapses in critical thinking. The study also identified three gaps involving technology or equipment that were new and unfamiliar to nurses. These gaps were unanticipated, occurred in critical care settings, and created the potential for catastrophic patient harm. A close examination of the data failed to identify any gaps that were familiar to nurses but their characteristics had changed.

The study found that the anticipation, identification and bridging (management) of gaps were based on nurses’ knowledge and experience of: where gaps occur; the types of gaps that occur; the things that happen, go wrong and are overlooked; the clinical environment; available equipment; and correct processes and procedures. Furthermore, nurses’ clinical knowledge and experience, intuition and higher order thinking abilities (critical thinking and clinical judgement) were key attributes that underpinned successful gaps management. The same processes were used by nurses to manage gaps, irrespective of whether the gaps were familiar or new and unfamiliar.

The strategies used by nurses to anticipate, identify and bridge gaps were surveillance, teamwork and communication. Effective nursing surveillance was
found to be a complex process with many components: a systematic, comprehensive, head-to-toe and ‘hands-on’ approach to patient assessment; vigilance; observing and looking; checking; and making sure. Happenstance (luck) also played a part in the management of gaps.

**Conclusions**

Patient safety initiatives have conventionally focussed on adverse events, ascertaining their root causes via structured processes such as root cause analysis and determining what went ‘wrong’. This study has demonstrated that valuable lessons can also be learned from the investigation of how nurses manage gaps and ‘get it right’. The study provides a rich description of effective nursing surveillance and successful everyday nursing performance in hospital settings. The elements of nursing expertise and strategies captured in this study embody what has been termed the ‘nursing safety net’. The study has concluded that the ‘nursing safety net’ creates safety in hospital settings and protects patients from the harmful effects of gaps in health care. The management of gaps and patient safety would be further enhanced through efforts to promote close, attentive and thorough observation and assessment of patients using a careful, well organised and systematic approach.
ACKNOWLEDGEMENTS

To my principal supervisor Professor Megan-Jane Johnstone, I extend my sincere thanks and deep gratitude for her expertise, insight, encouragement and enthusiasm throughout my candidature.

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The successful completion of this research would not have been possible without an Australian Postgraduate Award and the support of the Australian College of Nursing through a Research Scholarship from the Victorian Research Trust. The views expressed in this thesis are solely those of the author and do not necessarily represent those of the Australian College of Nursing.

This study could not have been completed without the support and interest of nurses who work tirelessly to keep patients safe. I would like to thank them for their generosity and willingness to share their stories.
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LIST OF ABBREVIATIONS

ACSQHC - Australian Commission for Safety and Quality in Health Care
AHRQ - Agency for Healthcare Research and Quality
ANMAC - Australian Nursing and Midwifery Accreditation Council
ANMC - Australian Nursing and Midwifery Council
CMC - computer mediated communication
CREPS - Centre of Research Excellence in Patient Safety
CT - computerised tomography
CVC - central venous catheter
CRM - crew resource management
ECG - electrocardiograph
ECMO - extra corporeal membrane oxygenation
ED - emergency department
EN - Enrolled Nurse
ENIT - early nurse intervention team
ET - endotracheal
IOM - Institute of Medicine
ICN - International Council of Nurses
ICPS - International Classification for Patient Safety
INR - international normalised ratio
JCAHO - Joint Commission on Accreditation of Health care Organizations, now known as The Joint Commission (TJC)
HMPS - Harvard Medical Practice Study
HRO - high reliability organisation
MRSA - methicillin resistant Staphylococcus aureus
NHMRC - National Health and Medical Research Council
NMBA - Nursing and Midwifery Board of Australia
NPSA - National Patient Safety Agency
QAHCS - Quality in Australian Health Care Study
QED - qualitative exploratory descriptive
RN - Registered Nurse
TED - thrombo-embolic deterrent
WHA - World Health Assembly
WHO - World Health Organisation
GLOSSARY

To enhance the comparability and transferability of the findings of this thesis, the preferred terms and definitions of the International Classification for Patient Safety (ICPS), proposed by the World Alliance for Patient Safety of the World Health Organisation (WHO) have been used (Runciman et al. 2009; The World Alliance For Patient Safety Drafting Group et al. 2009).

**Adverse event:** an incident that resulted in harm to a patient.

**Detection:** an action or circumstance that results in the discovery of an incident.

**Enrolled Nurse:** a nurse who works under the direction and supervision of a Registered Nurse as stipulated by the relevant nurse registering authority. The care provided by the enrolled nurse is determined by the registering authority’s license to practise, educational preparation and the context of care.

**Error:** failure to carry out a planned action as intended or application of an incorrect plan.

**Event:** something that happens to or involves a patient.

**Hazard:** a circumstance, agent or action with the potential to cause harm.

**Harm:** impairment of structure or function of the body and/or any deleterious effect arising there from. Harm includes disease, injury, suffering, disability and death.

**Health care:** services received by individuals or communities to promote, maintain, monitor or restore health.

**Near miss:** an incident which did not reach the patient.
**Patient:** a person who is a recipient of health care.

**Patient outcome:** the impact upon a patient which is wholly or partially attributable to an incident.

**Patient safety:** a state in which the risk of unnecessary harm associated with health care has been reduced to an acceptable minimum.

**Patient safety incident:** an event or circumstance that could have resulted, or did result, in unnecessary harm to a patient.

**Preventable:** accepted by the community as avoidable in the particular set of circumstances.

**Resilience:** the degree to which a system continuously prevents, detects, mitigates or ameliorates hazards or incidents.

**Registered Nurse (Division One):** a first-level nurse who has completed an approved educational program of at least three years leading to nurse registration. A Registered Nurse practices without supervision and is accountable and responsible for their practice. In Australia all registered nurses are now educated in the university system and receive a Bachelor of Nursing. A number of participants in this study, however, completed their initial nursing education in hospital training programs prior to their transition to the tertiary sector in the 1980s.

**Risk:** the probability that an incident will occur.
Root cause analysis: a systematic iterative process whereby the factors that contribute to an incident are identified by reconstructing the sequence of events and repeatedly asking why, until the underlying root causes have been elucidated.

System failure: a fault, breakdown or dysfunction within an organization’s operational methods, processes or infrastructure.

System improvement: the result or outcome of the culture, processes, and structures that are directed towards the prevention of system failure and the improvement of safety and quality.

Violation: deliberate deviation from an operating procedure, standard or rule.
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AIMS AND OBJECTIVES

The key aims of this study are to:

- describe the patient care gaps that nurses commonly anticipate, detect and bridge;
- provide a comprehensive explanation of how nurses anticipate, detect and bridge:
  - familiar gaps;
  - new and unfamiliar gaps; and
  - familiar gaps whose characteristics have changed.
- describe the processes used by nurses to do so;
- propose a practice model of gap management by nurses;
- posit a hypothesis of possible linkages that exist between gaps management and patient safety outcomes for further investigation.

The related objectives of the study are to:

- describe the gaps commonly anticipated, detected and bridged by nurses;
- describe how nurses anticipate, detect and bridge:
  - familiar gaps
  - new and unfamiliar gaps, and
  - familiar gaps whose characteristics have changed.
- describe how nurses bridge gaps once detected;
- describe the relationship between gaps management and patient safety outcomes;
- develop base-line data that may be used to inform:
  - improvements in patient safety education and nursing practice, and
  - a multidisciplinary study of patient safety and gaps management by other health care professionals.
CHAPTER ONE
INTRODUCTION

Look at what goes right, as well as what goes wrong. Learn from what succeeds as well as from what fails. Indeed, try to learn from the situations where nothing out of the ordinary seemed to happen, by understanding what actually took place. Things do not go well because people simply follow the procedures. Things go well because people make sensible adjustments according to the demands of the situation. Find out what these adjustments are and try to learn from them! (Hollnagel 2012b, p. 8).

1.1 Introduction

This chapter provides a background to the study, outlines the scope of the inquiry, identifies the aims and related objectives of the study, and lists the research questions the study has sought to address. Attention is also given to describing the origin of the study. The chapter concludes by outlining the structure of this thesis and providing a synopsis of each chapter.

1.2 Background to the study

1.2.1 Nurses inseparably linked to patient safety

Nurses are widely recognised as being inseparably linked to patient safety and an indispensable ‘front line’ defence that protects patients from the harmful effects of health care errors and preventable adverse events (Page 2004; Savitz, Jones & Bernard 2005). In its position statement on patient safety, the International Council of Nurses (ICN)\(^1\) holds that patient safety is integral to the provision of quality nursing care (International Council of Nurses 2002). This stance is supported by other lead nursing organisations such as the Nursing and Midwifery Board of Australia (NMBA), formerly the Australian Nursing and Midwifery Council

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\(^1\) The International Council of Nurses (ICN) is a federation of more than 130 national nurses associations, representing the more than 13 million nurses worldwide.
Chapter 1. Introduction

(ANMC)\(^2\). The NMBA’s Professional Practice Framework acknowledges the key role of nurses in identifying and preventing health care errors that contribute to patient harm (Nursing & Midwifery Board of Australia 2008). These organisations and others, including the American Nurses Association (American Nurses Association 2010) and ICN (International Council of Nurses 2002), draw attention to the need for a non-punitive, systems approach to the management of human error in health care settings.

Evidence of nursing’s connection to patient safety can be traced back to Florence Nightingale, the founder of modern nursing science. Nightingale observed that mortality rates for some diseases were higher in hospital settings than in the community. Horrified by inadequate standards of care and appalling hospital conditions, she published her book *Notes on Hospitals*, to encourage much needed reform of hospital systems (Nightingale 1863). In the preface to this book, Nightingale holds that a hospital should ‘do the sick no harm’ (Nightingale 1863, p. III). While considered odd at the time, Nightingale’s message is a salient one in the context of current global efforts to reduce the incidence and impact of preventable adverse events and improve patient safety. As Nightingale (1863) writes:

> It may seem a strange principle to enunciate as the very first requirement in a Hospital that it should do the sick no harm. It is quite necessary, nevertheless, to lay down such a principle, because the actual mortality in hospitals, especially in those of large crowded cities, is very much higher than any calculation founded on the mortality of the same class of diseases among patients treated out of hospital would lead us to expect (p. III).

In an effort to reduce the mortality associated with treatment in hospitals, Nightingale conducted some of the first epidemiological research, assessing and aggregating data that demonstrated a link between unsanitary hospital conditions and patient deaths. While not widely recognised, Nightingale was also one of the first modern health professionals to identify the advantages of a systems approach to the management of human error (Johnstone & Kanitsaki 2006b). In her classic book,

\(^2\) The Australian Nursing and Midwifery Council (ANMC) was established in 1992 as a peak organisation to develop a national approach to nursing and midwifery regulation. Under a new National Registration and Accreditation Scheme the ANMC became the Australian Nursing and Midwifery Accreditation Council (ANMAC) in 2010 reflecting its role as the independent accrediting authority. With the onset of the National Scheme, the Nursing and Midwifery Board of Australia (NMBA) assumed responsibility for the regulation of nurses and midwives.
Chapter 1. Introduction

Notes on Nursing, first published in 1859, Nightingale described her experience of ‘fatal accidents’ that in ‘all probability’ would not have happened had there been ‘an organised system of attendance’ of trustworthy and qualified nurses (Nightingale 1969, p. 40). Worthy of note is Nightingale’s use of the term ‘accident’ to describe unplanned and harmful events, evidence of the ‘lessons learned’ from these events, and her refusal to punish the individuals concerned, insisting they be ‘absolved from all blame’ (Nightingale 1969, p. 40). As Nightingale (1969) writes:

If you look into the reports of trials or accidents, and especially of suicides, or into the medical history of fatal cases, it is almost incredible how often the whole thing turns upon something which has happened because ‘he’, or still oftener ‘she’, ‘was not there’ [...]. The person in charge was quite right not to be ‘there’, he was called away for quite sufficient reason, or he was away for a daily recurring and unavoidable cause; yet no provision was made to supply his absence....Upon my own experience I stand, and I solemnly declare that I have seen or known of fatal accidents, such as suicides in delirium tremens, bleedings to death, dying patients dragged out of bed by drunken Medical Staff Corps men, and many other things less patent and striking, which would not have happened in London civil hospitals nursed by women. The medical officers should be absolved from all blame in these accidents. How can a medical officer mount guard all day and all night over a patient (say) in delirium tremens? The fault lies in there being no organised system of attendance. Were a trustworthy man in charge of each ward, or set of wards, not as office clerk, but as head nurse, the thing would not, in all probability, have happened (p. 40).

1.2.2 The problem of patient safety

An adverse event is an incident arising from the process of health care that causes a patient harm in the form of disease, injury, suffering or disability that is physical, psychological or social in nature (Kohn, Corrigan & Donaldson, M 2000; Runciman et al. 2009). While adverse events may be minor, resulting in temporary symptoms, severe adverse events are a cause of significant and permanent disability and patient death. Although research has suggested that as many as half of all adverse events are avoidable in the particular set of circumstances, not all adverse events are attributable to error and considered preventable (Brennan et al. 1991; Leape et al. 1991; Runciman et al. 2009; Wilson et al. 1995). Conversely not all health care errors result in adverse events and harm to patients. On this point, McNeil and colleagues (2000, p. vi) hold that an adverse event may be considered an ‘acceptable complication of
treatment’ and that determining the preventability of such an event can be a difficult task. An adverse drug reaction, for example, to a drug that was correctly prescribed and for which the patient had no history of allergy is an example of what might be considered an ‘acceptable complication’ (Johnstone & Kanitsaki 2006c).

Improving patient safety by reducing the incidence and impact of preventable adverse events is a pressing global challenge. The scale of iatrogenic injury and adverse events in hospital contexts was unknown until publication of the Harvard Medical Practice Study (HMPS) revealed that such events occurred in 3.7 percent of hospitalised patients (Brennan et al. 1991; Leape et al. 1991). Extrapolation of the results from this epidemiological study suggested that as many as 98,000 deaths occurred annually in the United States alone. Further studies in the United States, the United Kingdom, Canada, Latin America and Australia have suggested that adverse events occur in 4 to 16.6 percent of hospitalisations and that in as many as 50 percent of cases these events are preventable (Aranaz-Andrés et al. 2011; Baker, GR et al. 2004; Thomas, Studdert, Burstin et al. 2000; Vincent, Neale & Woloshynowycz 2001; Wilson et al. 1995).

Nearly a decade after the Harvard Medical Practice Study, in response to widespread acceptance of the problem of preventable adverse events, the Institute of Medicine (IOM) released its report, To Err Is Human (Kohn, Corrigan & Donaldson, M 2000). The report is described as having:

converted an issue of growing professional awareness to one of substantial public concern in a manner and pace unprecedented in modern experience with matters of health care quality (Leape, Berwick & Bates 2002, p. 501).

The immediate adoption of a resolution on patient safety at the Fifty-fifth World Health Assembly (WHA) in 2002 placed patient safety at the forefront of policy development and public debate, transforming the drive for safer health care into a ‘world-wide endeavour’ (Donaldson, L 2002, p. 112). At this meeting preventable adverse events were identified as a threat to quality of care and a significant and avoidable cause of human suffering worldwide. Member states were urged to address the problem of patient safety (World Health Organisation 2002, Agenda Item 13.9).
The WHA resolution on patient safety set out four areas for action:

(i) to develop global norms, standards and guidelines for quality of care and patient safety; the definition, measurement and reporting of adverse events and near misses in health care; and, to provide support in developing reporting systems, taking preventative action, and implementing measures to reduce risks;

(ii) to promote framing of evidence-based policies, including global standards that will improve patient care, with particular emphasis on product safety, safe clinical practice in compliance with appropriate guidelines and safe use of medicinal products and medical devices;

(iii) to promote a culture of safety within health care organisations and to develop mechanisms, for example, through accreditation or other means […] to recognise the characteristics of health care providers that offer a benchmark for excellence in patient safety internationally;

(iv) to encourage research into patient safety, including epidemiological studies of risk factors (World Health Organisation 2002, pp. 1-2).

The need for immediate attention to the problem of patient safety was underpinned by the fact that all people requiring health care have a strong moral interest in being safe (Johnstone & Kanitsaki 2006c). This interest is particularly strong in health care contexts where people are already experiencing the harmful effects of disease, injury or illness (Kohn, Corrigan & Donaldson, M 2000). Patients enter the health care system in search of healing, comfort and protection, not expecting to be placed in danger or harmed during the course of their treatment (Johnstone & Kanitsaki 2006c). The fact that many people are needlessly harmed by the ‘system’ is unacceptable and not ‘right’ in a moral sense. At a very minimum the health care system must ensure that it will first do no harm (Kohn, Corrigan & Donaldson, M 2000).

1.2.3 The systems approach to human error management

The longstanding and dominant response to accidents in health care domains has been to ‘name’, ‘blame’ and ‘shame’ individuals (i.e. nurses, doctors and pharmacists) at the ‘sharp’ end of health care delivery where the system and human person interface (Reason 2000; 1995). This ‘person’ focussed, punitive approach to accidents holds that errors are a consequence of ‘aberrant mental processes’ such as forgetfulness, inattention, poor motivation or carelessness (Reason 2000, p. 768). While blaming individuals can be emotionally satisfying, its critical shortcoming is
the failure to identify and address the system factors that contribute to errors (Reason 2000). Furthermore, focussing on the failure of individuals discourages the development of a culture which encourages open reporting of incidents, near misses and ‘free lessons’ (Reason 2000, p. 769). The alternative and preferred system approach recognises that humans are fallible, to err is human, and that errors are to be expected, even in the best organisations and often from the best people (Kohn, Corrigan & Donaldson, M 2000; Reason 2000). Accordingly, Leape, Berwick and Bates (2002) have argued that:

the main thrust of the safety movement, [and] one of the most important learnings during the past decade is that safety is primarily a systems problem (p. 504).

A crucial feature of the latent failure model, developed by Reason (1990; 2000), is the contribution of upstream system factors in the form of latent conditions to accidents. These conditions (i.e. technology, processes, practices), described as ‘resident pathogens’, arise from the strategic decisions taken by managers, regulators, governments, designers and manufacturers. They can lie dormant within a system for long periods, encouraging errors by creating hazardous work conditions. Accidents occur when latent conditions combine with active failures (the errors and unsafe acts of individuals in direct contact with patients) to create weaknesses or windows of ‘accident opportunity’ in a system’s defences. Active failures have an immediate and direct impact on safety while latent conditions can be anticipated and remedied to prevent future failures (Reason 1991; 2000).

While system defences and safe-guards (i.e. equipment, people and processes) are generally effective in protecting individuals from local hazards and harm, they inevitably contain weaknesses or ‘holes’. Reason’s (2000) well-known Swiss cheese model of system accidents describes how the defensive layers of a system that protect people from harm are like slices of Swiss cheese with many holes. In complex, dynamic and rapidly changing environments, such as hospitals, these holes or vulnerabilities are continually opening, closing and shifting their location. A trajectory of accident opportunity is created when the holes in many levels of a system are momentarily aligned (Reason 2000). The trajectory originates in the higher levels of a hospital system and passes through a hole or window in each successive defensive layer until it reaches the patient and causes harm.
Widespread recognition that preventable adverse events in hospital contexts are largely the result of upstream system factors has shifted attention away from the errors and failings of individuals on the front-line (Dekker et al. 2008). The system approach focuses on identifying the many factors that contribute to errors and developing system defences that discourage errors and mitigate the impact on patients when they do occur (Leape et al. 1995).

1.2.4 A scientific basis for progress on patient safety

In the years following publication of the Harvard Medical Practice Study (Brennan et al. 1991; Leape et al. 1991) and a similar study of adverse events in Australia (The Quality in Australian Health Care Study, Wilson et al. 1995) attention turned to research on complex systems outside health care (i.e. aviation, marine safety and power generation) (Cook et al. 2004; Cook, Woods & Miller 1998; Woods & Cook 2002; 2004). In these industries, a number of highly publicised accidents provided the catalyst for research, many years before the scale of health care related preventable harm was fully appreciated (Cook & Woods 1994). In 1997, a workshop convened by three peak bodies in the United States of America (U.S.A.) (The National Patient Safety Foundation, the Department of Veterans Affairs and the Agency for Health Care Policy and Research) examined the lessons learned in these industries and their application to the problem of patient safety (Cook, Woods & Miller 1998).

(a) Two contrasting views of patient safety

A key theme of this workshop (Cook, Woods & Miller 1998) and other patient safety publications (Cook & Woods 1994; Cook et al. 2004; Cook, Render & Woods 2000; Hollnagel 2012a; 2012b; Patterson et al. in press; Woods & Cook 2002; 2004) is the presence of two contrasting views of safety. The ‘First Story’ is an account of patient safety based on the reconstruction of ‘celebrated’ and highly visible medical accidents that attracted widespread media coverage and captured the public’s attention (i.e. the Florida wrong leg case, the Colorado nurses case). The ‘Second

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3 These include the Three Mile Island and Chernobyl nuclear power accidents; various aircraft crashes; the explosion of Apollo 13 and the in flight break-up of the space shuttle Challenger; the capsizing of the Herald of Free Enterprise; and the grounding of the oil tanker the Exxon Valdez.

4 In Florida, a surgeon amputated the incorrect leg of a diabetic patient (Cook, Woods & Miller 1998).
Story’ presents an alternative view of safety based on closer examination of these and other less celebrated cases.

(b) The ‘First Story’

The ‘First Story’ is a superficial and simplistic view of accidents and their causation based on after the event reconstruction of celebrated cases (Cook, Woods & Miller 1998; Cook et al. 2004; Patterson et al. in press; Woods & Cook 2002; 2004). In this story, accidents are attributed to the errors and flaws of individuals ‘at the sharp end’ (Cook et al. 2004) and humans are widely regarded as an unreliable element that degrades an otherwise safe system (Paterson et al. in press). Efforts to forestall future accidents comprise classifying, measuring and reporting errors; rewriting and enforcing policies and procedures; educating and retraining individuals; and, the addition of technology and automation. There are, however, a number of weaknesses associated with these measures and a retrospective, simplistic approach to accidents.

Firstly, the retrospective investigation of accidents (i.e. after harm has occurred) is especially susceptible to hindsight bias, the tendency for knowledge of the outcome to influence perceptions about the predictability of an event and the processes and behaviours leading to that event (Cook & Woods 1994; Cook, Woods & Miller 1998; Woods & Cook 2002). In fact, Cook and Woods (1994, p. 295) have asserted that ‘hindsight bias is the greatest obstacle to evaluating the performance of humans in complex systems after bad outcomes’. Secondly, attention is given only to what went ‘wrong’ (Hollnagel 2012a) and the most straightforward explanation for the accident rather than the complex range of contributing factors, both human and system (Cook, Woods & Miller 1998). Finally, the underlying assumptions (i.e. the ‘fallibility’ of the human practitioner versus the ‘infallibility’ of automation and technology) and utility of the measures described above have been challenged (Cook & Woods 1994; Cook et al. 2004; Nemeth et al. 2008). It is suggested that some of these methods add to a system’s complexity, thereby rendering it more fragile and prone to failure (Cook & Woods 1994; Nemeth et al. 2008).

(c) The second story and ‘New Look’ approach to safety

Closer examination of celebrated medical accidents reveals a deeper and more complex ‘Second Story’. In the Colorado nurses case, for example, a series of gaps

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Footnote: In Colorado, the administration of benzathine penicillin intravenously by three nurses resulted in the death of a neonate (Smetzer 1998).
contributed to the intravenous administration of benzathine penicillin and death of a neonate (Cook, Render & Woods 2000). Nonetheless, in industries outside healthcare it is the rigorous investigation of uncelebrated cases that has been particularly instructive in revealing a contrasting approach to safety (Cook, Woods & Miller 1998; Cook et al. 2004; Patterson et al. in press; Cook & Woods 1994; Woods & Cook 2002; 2004). An important finding of this research is that efforts to improve safety by defining, measuring and reducing the incidence of human error are ‘neither the first step nor a useful step, but only a dead end’ (Woods & Cook 2004, p. 96). Furthermore, focussing on human error constrains efforts to understand the complex nature of failure and the contribution of humans to failure and success (Cook & Woods 1994). The alternative and somewhat counterintuitive approach, based on research, draws attention to a deeper understanding of technical work as it is performed at the sharp end.

The body of research underpinning this approach is known as the ‘New Look’ (Cook, Woods & Miller 1998). Informed by a range of disciplines (i.e. human performance, cognitive science, cognitive engineering and organisational theory) it includes studies of accidents, near-accidents (i.e. instances where harm was averted) and the behaviours of humans as they work in naturally complex settings (Woods & Cook 2004). The distinguishing features of the ‘New Look’ approach include its focus on (i) understanding sources of safety as well as threats to safety; (ii) human performance, as distinct from human error; and (iii) the contribution of human performance and other factors not only to failure but also to success (Cook, Woods & Miller 1998). This approach has yielded critical insights into the nature of system vulnerabilities in complex systems; the ways in which humans identify and respond to these vulnerabilities, contributing to success and failure; and the close relationship between success and failure. Woods and Cook (2004, p.106) contend that the compelling message from the ‘New Look’ body of research is that failures represent ‘breakdowns in [the] adaptations’ used by healthcare providers to manage complexity.

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(d) Human factors

‘Human factors’ as a science and as a discipline can be traced back to the Second World War and the investigation of human errors (Bogner 1994; Dekker 2005; Morath & Turnbull 2005). Early work in this field identified, for example, that the location and appearance of aircraft controls were a factor in pilot’s selecting the wrong control (Dekker 2005). Concerned with understanding the interaction between human persons and the elements that comprise a given system (Carthey 2013), research in this area aimed to maximise human and system performance, safety, health and satisfaction by informing system designs that reflected ‘a well-established understanding of human abilities, traits and variability’ (Catchpole & McCulloch 2010, p. 618).

Human factors research draws on a range of disciplines (i.e. psychology, anatomy, physiology, engineering, design) and has a particular focus on complex, socio-technical systems. In the decades following the Second World War, further conceptualisations of human factors were developed and applied in a range of hazardous industries and technologies (e.g., transportation, nuclear power generation). It was not until the late 1980s, however, that these concepts were identified as also having relevance in health care domains (Reason 1995). In the context of health care, human factors has been defined as:

Enhancing clinical performance through an understanding of the effects of teamwork, tasks, equipment, workspace, culture, organization on human behaviour and abilities, and application of that knowledge in clinical settings (Catchpole 2011).

Interest in human factors research and its possible application in health care followed increasing recognition of the scale of preventable adverse events in health care (Reason 1995; 2000). In recent years, there has been growing awareness of the need to integrate human factors into the design and development of ‘safer’ health care systems, processes and tasks (Carthey 2013). Key human factors concepts recognised as being important to health care and patient safety included organisational culture, leadership, communication, teamwork, situation awareness, decision making, stress, fatigue and the work environment (WHO 2009). Commensurate with these concepts tools have been developed to increase understanding of them and to guide the implementation, measurement and training of safety processes in health care settings (Carthey 2013; WHO 2009). An example of a
commonly advocated and widely used tool to reduce human factors variables in health care practice is SBAR (situation-background-assessment-recommendation) (Beckett & Kipnis 2009; Porteous et al. 2009). The SBAR tool provides a framework for clear and effective communication between health care providers and has been shown to reduce variation in handover practices (Beckett & Kipnis 2009; Porteous et al. 2009).

(e) Resilience Engineering

The term resilience has been used in a range of contexts, including ecology, metallurgy, psychology, supply chain management, strategic management and safety engineering (Bhamra, Dani & Burnard 2011). In recent years Resilience Engineering, a human factors concept, has emerged as a new way of approaching safety in complex systems (Dekker et al. 2008; Hollnagel et al. 2011; Hollnagel, Woods & Leveson 2006; Nemeth et al. 2008). Commonly, resilience refers to an element or system’s ability to return to a stable state in the presence of discontinuities and disruption (Bhamra, Dani & Burnard 2011). From a system perspective, resilience is a measure of a system’s ability to maintain continuity and smooth operations in the presence of gaps and complexity (Nemeth et al. 2008). Thus, resilience has been defined as:

the intrinsic ability of a system to adjust its functioning prior to, during, or following changes and disturbances so that it can sustain required operations, even after a major mishap or in the presence of continuous stress (Nemeth et al. 2008, p. 1).

Resilience Engineering represents a move away from traditional, retrospective approaches to safety management which have generally focussed on ‘reducing the number of things that go wrong’ (Hollnagel 2011, p. xxxvi). In contradistinction to these approaches, Resilience Engineering is not linked to the notion of error and the ‘negatives’ but is concerned with ‘the positive capabilities of people and organisations that allow them to adapt effectively and safely under pressure’ (Dekker et al. 2008, p. 3). In short, its main aim is to ‘increase the number of things that go right’ (Hollnagel 2011, p. xxxvi). Specifically, this new paradigm is concerned with a deeper understanding of:

how success is obtained – how people learn and adapt to create safety in a world fraught with gaps, hazards, trade-offs, and multiple goals (Woods & Hollnagel 2006, p. 3).
Westrum (2006) explains that resilience comprises different modes including the ability to (i) foresee and prevent bad things from happening; (ii) cope with instances of failure by preventing their evolution into something more serious or catastrophic; and (iii) recover and return to normal operations in the aftermath of failure. Woods (2006, p. 21) contends that the notion of resilience should encompass consideration of how a system adapts to ‘unanticipated variability or perturbations’ beyond its normal adaptive capacity. Hollnagel (2011, p. xxxvii) proposes ‘four cornerstones’ of system resilience, namely:

(i) ‘Knowing what to do’ - being able to respond to foreseen and unforeseen interruptions and disturbances; the ability to respond to the actual.
(ii) ‘Knowing what to look for’ - knowing ‘how to monitor that which is or can become a threat in the near term’; the ability to respond to the critical.
(iii) ‘Knowing what to expect’ - knowing ‘how to anticipate developments, threats, and opportunities’; the ability to respond to the potential.
(iv) ‘Knowing what has happened’ - being able to learn from success and failure; the ability to respond to the factual.

A key reason for the emergence of Resilience Engineering as an alternative theoretical construct is the evolution of complex socio-technical and largely intractable systems such as health care organisations (Hollnagel 2011). A key argument advanced by Hollnagel (2011) is that restricting the variability of human performance in these intractable systems is neither useful nor possible. In contradistinction to traditional conceptualisations of safety and error, resilience engineering holds that performance variability is an asset and essential for the successful functioning of complex, intractable systems (Hollnagel 2011).

(f) Humans as active creators of safety

Humans, in their key role as ‘active creators of safety’ (Cook, Woods & Miller 1998, p.13), are a source of resilience and integral to the successful functioning of complex systems such as hospital settings, ensuring that the scale of actual failures is vastly outweighed by the opportunities for failure (Cook et al. 2004; Cook & Woods 1994). Woods and Cook (2004, p. 104) contend that ‘progress on patient safety ultimately comes from helping workers and managers create safety’. As Cook and Woods
(1994) explain, humans are pivotal to the successful functioning of health care settings:

the systems are so complex and are operated under such variable conditions that only human operators can be expected to have the flexibility and judgment necessary to control them (p. 289).

Van der Schaaf (1995, p. 1236) underscores the indispensable role of humans in complex systems, arguing they are the ‘strongest link in the chain’. The inherent creativity and flexibility that is unique to humans allows them to recognise and solve new problems before accidents occur. Moreover, positive deviations in human behaviour that preserve safety and maintain reliability are worthy of investigation, providing valuable qualitative insights into how a system functions (Van der Schaaf 1995). Writing from the context of the chemical process industry, Van der Schaaf (1995, p. 1236), proposes that human recovery, the ‘ability to find (intuitively) original solutions to unexpected problems’, is deserving of our attention and especially important given that preventing human error is a difficult task.

Human recovery is defined as (i) the timely detection of abnormal warning signs, (ii) the correct diagnosis of their cause, and (iii) the timely and accurate execution of corrective action (van der Schaaf 1995, p. 1236). The investigation of human recovery can enhance understanding of the system defences that protect patients from preventable adverse events (Reason 1990; van der Schaaf 1995). Reason (2000, p. 770; 2008) concurs, noting that timely human adjustments and ‘human variability in the shape of compensations and adaptations to changing events’ are one of the most important safeguards of high reliability systems. On this point, Hollnagel (2012b) highlights the need to identify and learn from the ‘sensible adjustments’ that comprise successful performance, he suggests:

Things do not go well because people simply follow the procedures. Things go well because people make sensible adjustments according to the demands of the situation. Find out what these adjustments are and try to learn from them! (p. 8).

(g) The need to investigate ‘what goes right’

Safety has been characterised as a dynamic non-event that is largely invisible (Weick 1987). The dominant focus in safety management has, nonetheless, been the absence of safety which is highly visible and easily recognisable (Hollnagel 2011; Reason 1991; 2008). The ‘new look’ body of research challenges assumptions about the
nature of safety and the causes of failures, revealing that, in complex systems, success and failure are closely related and a function of the same processes (Rasmussen 1985; Woods & Cook 2004). Accordingly, Woods and Cook (2002) argue that research of successful performance in the presence of constraints and pressures provides a deeper understanding of failure:

> Failures occur in situations that usually produce successful outcomes. In most cases, the system produces success despite opportunities to fail. To understand failure requires understanding how practitioners usually achieve success in the face of demand, difficulties, pressures and dilemmas (p.139).

From a Resilience Engineering perspective, safety is ‘the sum of the accidents that do not occur’ (Hollnagel 2006, p. 9). Safety is ‘dynamically emergent’ and created by the system (Dekker et al. 2008). Within this paradigm, safety has been defined as ‘the ability to succeed under varying conditions’ and is thus considered the ‘flipside’ of failure (Hollnagel 2011, p. xxix). Hollnagel (2011, p. xxix) argues, therefore, that the investigation of how a system generally functions is both ‘necessary’ and ‘sufficient’ for understanding failure and how a system succeeds under varying conditions. Recently, Hollnagel (2012b) has expressed concern at the imbalance between proactive and reactive approaches to safety management in health care contexts. A key argument advanced by Hollnagel (2012a; 2012b) is that safety management has focussed overly on ‘what goes wrong’ (i.e. how the system fails) rather than on ‘what goes right’. He suggests that, in part, this is related to definitions of safety (i.e. the tendency to define safety in terms of its absence, in the form of adverse outcomes, hazards, accidents), regulatory frameworks that mandate the reporting of accidents, and media reports, data collection efforts and publications that have, as their focus, what went ‘wrong’. Hollnagel (2012a, p. 2) has concluded that ‘an unintended but unavoidable consequence of associating failure with things that go wrong is a creeping lack of attention to things that go right’.

Hollnagel (2012b, p. 3) contends that safety management requires a proactive approach that investigates ‘how everyday performance usually goes well rather than on why it occasionally fails’. Van der Schaaf (1995) similarly argues that important safety lessons can be learned from the investigation of positive outcomes. A key benefit of turning attention away from what has gone ‘wrong’ to what has gone ‘right’ is the vast array of data that is readily accessible for analysis (Hollnagel
Hollnagel (2012b) adds that efforts to improve safety must focus on learning from what succeeds as well as what fails:

Look at what goes right, as well as what goes wrong. Learn from what succeeds as well as from what fails. Indeed, try to learn from the situations where nothing out of the ordinary seemed to happen, by understanding what actually took place (p. 8).

Reason (2008 p. 3) contends that the role of humans in averting harm and bringing ‘troubled systems back from the brink of disaster’ is an under-investigated perspective in patient safety research. This study attempts to redress the imbalance between proactive and reactive approaches to patient safety by investigating how nurses get it ‘right’ by anticipating, detecting and bridging gaps.

1.2.5 Gaps

Gaps have been described as ‘discontinuities’ or ‘breakdowns’ in the continuity of care that appear as losses of information, momentum or interruptions in health care delivery (Cook, Render & Woods 2000). In health care, the combination of processes, technology and human interaction produce many gaps between providers, stages and processes. In hospital contexts, gaps are endemic (Nemeth, Cook & Woods 2004), spawned by the complex nature of patient care and the intricate network of individuals, professions, departments and shifts of work that provide care over a twenty four hour period (Krogstad, Hofoss & Hjortdahl 2002). Research has revealed that the complex nature of nursing work also contributes to gaps in patient care (Ebright et al. 2003). Furthermore, measures to improve safety through the addition of technology (i.e. bar code medication administration and electronic medication prescribing systems) and strengthening of system defences (i.e. the practice of pharmacists routinely screening medication orders for errors) may create new and unintended gaps and opportunities for error (Jeffs et al. 2012; Nemeth et al. 2008; Patterson et al. in press; Westbrook et al. 2013).

Gaps often occur at ‘fracture points’ in patient care such as change of shift or health care provider or when a patient transfers to another unit or organisation (Patterson et al. in press). Tools such as transfer forms, clinical handover and other forms of communication have been designed to forestall the adverse consequences of these types of gaps. While some gaps are readily identifiable, others that are less discernible may emerge within the processes of patient care and with single
practitioners (Cook, Render & Woods 2000). In critical care settings, for example, gaps may occur when patient care needs are perceived as being non-urgent (i.e. nutrition, interventions to prevent pressure ulcers) and receive less attention (Benner, Hooper-Kyriakidis & Stannard 1999). From the patient’s perspective, gaps result in loss of continuity, regularity and the normal sequence in their experience of health care.

While gaps increase the risk of preventable adverse events, they rarely lead to ‘overt failure’ relative to hospital admissions and increasing patient morbidity (Cook, Render & Woods 2000). A key reason for this is that providers, including nurses, are generally successful at anticipating, detecting and bridging gaps (Cook, Render & Woods 2000). To bridge a gap is to take some form of remedial action to span the gap and re-establish the continuity and sequence of patient care so that it can proceed smoothly. Although bridging a gap averts any harmful consequences for patients it does not eliminate the gap (Cook, Render & Woods 2000).

According to the ‘New Look’ approach to patient safety, accidents are the result of a breakdown in the methods normally used by health care providers to successfully manage complexity and gaps (Cook, Render & Woods 2000; Patterson et al. in press). Accordingly, Cook, Render and Woods (2000) argue that safety might be increased by understanding and reinforcing the ability of health care providers to manage gaps in patient care. Furthermore, the investigation of gaps and their management is a way of characterising complexity and how health care providers cope with complexity (Cook, Render & Woods 2000; Patterson et al. in press). Cook, Render and Woods (2000) suggest that effective management of gaps requires:

(i) knowledge of the conditions and situations that point to the presence of gaps;
(ii) awareness of the types of gaps that are likely to occur;
(iii) the ability to detect the existence or presence of gaps;
(iv) techniques to bridge gaps;
(v) the capacity to anticipate, foresee or realise beforehand, the gaps that may occur in the future (p. 793).

Integrating patient care to prevent gaps and bridging gaps when they do occur have been identified as key nursing roles that improve patient safety outcomes (Page 2004). Benner, Hooper-Kyriakidis and Stannard (1999, p. 430) suggest that nurses ‘piece together the continuity and tapestry of care’ and prevent patient harm by
‘bridging, filling in, and coordinating’ the efforts of other health care professionals. The detection and management of gaps is a hallmark of clinical leadership. As Benner and colleagues (1999) explain:

Clinical leaders commonly recognise gaps in patient care, manoeuvre within the system to affect a response, and additionally coach and teach others about how to bridge the gaps (p. 491).

An electronic search of the health care literature revealed that Cook, Render and Woods’ (2000) article Gaps in the continuity of care and progress on patient safety has been extensively cited and that numerous studies have focussed on health care gaps that increase the risk of adverse events (i.e. clinical handover, teamwork, communication, and failure-to-rescue). However, this search also revealed a dearth of exploratory research on identifying and describing the types of gaps that nurses encounter in clinical contexts and how they anticipate, detect and bridge gaps to keep patients safe. One notable exception to this is a study by Ross and colleagues (2012) who investigated how the care of hospitalised patients with diabetes was normally accomplished. The study identified many gaps in patient care, including the referral of patients for specialist diabetes care; hospital processes (i.e. the availability of meals for optimal glycaemic control); the availability of specialists; and the transfer of information between the hospital setting and providers in the community. Importantly, diabetes specialist nurses, amongst others, played a pivotal role in bridging gaps by anticipating and responding to problems; proactively monitoring patients; and supporting and educating staff and patients (Ross et al. 2012).

How nurses anticipate, detect and bridge gaps and ensure the safe passage of patients through an acute hospitalisation has not been comprehensively investigated in Australia. An important aim of this study is to redress this oversight. The investigation of how nurses successfully cope with gaps can deepen understanding of how front line care workers cope with complexity along with the system and individual characteristics that create safety.

1.2.6 The skilful safety work performed by nurses

The incidence of preventable adverse events in health care contexts is a complex problem for which there is no single solution (Kohn, Corrigan & Donaldson, M 2000). Safety emerges from the combined effect of many small changes, particularly solutions generated by ‘people on the ground’ (i.e. front line clinicians) in response
to problems they encounter in their environments (Agency for Healthcare Research and Quality 2012b; Kohn, Corrigan & Donaldson, M 2000).

While nurses are widely recognised as playing a key role in the protection of patients from harm, most of the skilful safety work undertaken by nurses, including the management of gaps, recovery of medical errors and prevention of adverse events, is intimately woven into other technical work and thus often difficult to recognise as a discrete and separate activity (Cook, Render & Woods 2000; Jeffs, Affonso & MacMillan 2008; Rothschild et al. 2006). This work is, in other words, ‘embedded’ in practice, considered routine, and lacking articulation and investigation (Benner, Hooper-Kyriakidis & Stannard 1999; Griffiths et al. 2008; Hurley et al. 2008; Jeffs, Affonso & MacMillan 2008; Rothschild et al. 2006). It is not consistently recognised or valued by nurses and non-nurses alike nor is it easily discerned from patient records. Furthermore, data collection efforts, incident reporting systems and root cause analyses are often focussed on ‘safety failure’ rather than instances where harm was averted and patient safety was preserved (Clarke 2004). Clarke (2004) contends that good patient outcomes are often attributed to medical care or the patient rather than the skills, knowledge and judgement of nurses. Accordingly, Groves, Finfgeld-Connett and Wakefield (2012, p. 2) argue that research is needed, firstly, to explicitly investigate the role of nurses in ‘creating safety’ and, secondly, to generate ‘bed-side level description’ of how this occurs.

A key aim of this study is to bridge this gap in knowledge of embedded nursing practice and develop a rich description of the skilful nursing work that is crucial to the management of gaps and creation of safety in hospital settings.

1.2.7 Key studies of how nurses protect patients from harm

Even though nurses are uniquely positioned to prevent adverse events, how they do this and contribute positively to patient safety outcomes is not well understood (Despins, Scott-Cawiezell & Rouder 2010; Groves, Finfgeld-Connett & Wakefield 2012; Henneman, EA & Gawlinski 2004). While the nursing management of gaps has been largely overlooked, a small emerging body of literature is capturing how nurses keep patients safe through the management of risk (Groves, Finfgeld-Connett & Wakefield 2012), recovery of medical errors (Henneman, EA & Gawlinski 2004; Henneman, EA et al. 2006; Henneman, EA et al. 2010; Hurley et al. 2008) and process of surveillance (Schmidt 2010). It should be noted that each of these studies
has been conducted in the cultural context of the U.S.A. and thus caution should be taken in applying the findings to other cultural contexts. Despite this limitation there are lessons to be learned that are applicable to other contexts, as this thesis will show.

Early work in this area proposed a model of the nurses’ role in error recovery and near-miss situations using hypothetical case studies (Henneman, EA & Gawlinski 2004). A key feature of the model developed by Henneman and Gawlinski (2004) is the concept of ‘human recovery’: the ability of humans to identify, interrupt and correct an error and in so doing prevent it from reaching and harming the patient. The model is an adaptation of the Eindhoven model (van der Schaaf 1992) developed for the investigation of near miss situations in the chemical process industry and later revised for application in transfusion therapy.

Further studies have investigated how nurses recover errors in emergency department (Henneman, EA et al. 2006), critical care (Henneman, EA et al. 2010) and coronary care settings (Hurley et al. 2008). Each of these studies included a sample of 18-20 nurses from a single clinical specialty (i.e. emergency, critical care or coronary care). Henneman and colleagues (2006; 2010) used focus group interviews to elicit information about how nurses identify, interrupt and recover errors while Hurley and colleagues (2008) conducted semi-structured interviews to explore nurses’ recent experience of protecting a patient from harm (i.e. thoughts, interpersonal processes and actions). The processes of error recovery identified in each of these studies are summarised in Table 1.1 (page 21 of this thesis). Surveillance, vigilance, double checking and knowledge (i.e. experiential and of the patient, the plan of care, other team members, policies and procedures, what needed to be done) are recurring themes in these studies.

Henneman and colleagues (2006; 2010) concluded that the findings of the ED and critical care studies provided empirical support for the Eindhoven model. Hurley and colleagues (2008) found, however, that the Eindhoven model did not adequately explain the experience of coronary care nurses in protecting a patient from harm. Hurley and colleagues (2008) proposed instead a three-stage model of error recovery that included the circumstances or events that preceded error recovery (antecedents); the recovery process itself; and, the outcome and nurses’ feelings about the process. The key antecedents of error recovery were the evolving clinical situation, the nurses’ knowledge of the patient and the nurses’ own clinical expertise. In a number of cases, the processes of identifying, interrupting and recovering errors ‘occurred so rapidly they were nearly indistinguishable’ (Hurley et al. 2008, p. 223).
Chapter 1. Introduction

A classical grounded theory study of how nurses ‘watch over’ their patients is one of the few studies to investigate the process of nursing surveillance and generate ‘bed-side’ data about this process (Schmidt 2010). Data were collected via semi-structured interviews with fifteen nurses who worked in medical surgical and critical care units. The study found that ‘making sure’ was the basic social process used by nurses to ‘watch over’ their patients. The key components of surveillance included knowing what was happening with each patient; being close to the bedside; watching patients through direct and close observation; remaining alert; and not taking anything for granted. Of note, the themes of knowing and vigilance, identified by Schmidt (2010), are also evident in the studies of error recovery summarised in Table 1.1 and a study of how nurses manage risk (Groves, Finfgeld-Connett & Wakefield 2012).

Groves, Finfgeld-Connett and Wakefield (2012) also used a grounded theory method to investigate the process by which nurses keep patients safe. The study was conducted in a single hospital setting with a sample of twelve registered nurses who worked in medical and surgical units. Strategies used by nurses to assess risk included ‘getting the big picture’, gathering and synthesising patient data from multiple sources and, as mentioned, ‘knowing the patient’, while ‘knowing normal’ and the ‘reluctance to normalise’ were the key to recognising risk (Groves, Finfgeld-Connett and Wakefield 2012. p. 9). Nurses also revealed that prioritising patient care was an important aspect of maintaining patient safety.

To date, key studies of how nurses keep patients safe have focused on the nursing management of risk, recovery of medical errors, and process of surveillance (Groves, Finfgeld-Connett & Wakefield 2012; Henneman, EA et al. 2006; Henneman, EA & Gawlinski 2004; Henneman, EA et al. 2010; Hurley et al. 2008; Schmidt 2010), while the nursing management of gaps has been largely overlooked. Furthermore, these studies have all been conducted in the cultural context of the U.S.A. and with small samples (i.e. between 12 and 20 participants), thereby limiting the transferability of the findings to other cultural contexts outside the U.S.A. In three studies the samples consisted of nurses from one clinical specialty (i.e. emergency department, critical care or coronary care) (Henneman, EA et al. 2006; Henneman, EA et al. 2010; Hurley et al. 2008), while in two the participants were recruited from a single hospital (Groves, Finfgeld-Connett & Wakefield 2012; Henneman, EA et al. 2006). These studies have included nurses from emergency, critical care, medical, surgical, and emergency contexts. Even so, little attention has
been given to how nurses keep patients safe in other domains (i.e. perioperative, neurosciences and rehabilitation and transition care) and across multiple hospital sites. These remain important areas for future inquiry.

Table 1.1 Summary of the processes used by nurses to identify, interrupt and correct errors in studies conducted by Henneman, EA et al. (2006), Hurley et al. (2008) & Henneman, EA et al. (2010)

**Emergency department (Henneman, EA et al. 2006)**

<table>
<thead>
<tr>
<th>Identification of error</th>
<th>Interruption of error</th>
<th>Correction of error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surveillance</td>
<td>Patient advocacy</td>
<td>Assemble the team</td>
</tr>
<tr>
<td>Anticipation</td>
<td>Offer of assistance</td>
<td>Involve leadership</td>
</tr>
<tr>
<td>Double checking</td>
<td>Clarification</td>
<td></td>
</tr>
<tr>
<td>Awareness of the ‘big picture’</td>
<td>Verbal interruption</td>
<td></td>
</tr>
<tr>
<td>Experiential ‘knowing’</td>
<td>Creation of delay</td>
<td></td>
</tr>
</tbody>
</table>

**Coronary care unit (Hurley et al. 2008)**

<table>
<thead>
<tr>
<th>Identification of error</th>
<th>Interruption of error</th>
<th>Correction of error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Critical thinking</td>
<td>Knowing how to intervene</td>
<td>Advocating</td>
</tr>
<tr>
<td>Being ‘at the ready’ and prepared</td>
<td>Being the patient’s voice</td>
<td>Attending the whole person</td>
</tr>
<tr>
<td>Surveillance-vigilance</td>
<td>Providing patient or family perspective</td>
<td>Protecting and safeguarding the patient</td>
</tr>
<tr>
<td>Anticipating outcomes and consequences</td>
<td>Nurse/physician communication</td>
<td></td>
</tr>
<tr>
<td>Apply clinical judgement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Be the clinical expert</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knows what should be done</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Critical care unit (Henneman, EA et al. 2010)**

<table>
<thead>
<tr>
<th>Identification of error</th>
<th>Interruption of error</th>
<th>Correction of error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowing the patient</td>
<td>Offering assistance</td>
<td>Persevering</td>
</tr>
<tr>
<td>Knowing the players (other team members)</td>
<td>Clarifying</td>
<td>Being physically present</td>
</tr>
<tr>
<td>Knowing the plan of care</td>
<td>Verbally interrupting</td>
<td>Reviewing or confirming the plan of care</td>
</tr>
<tr>
<td>Surveillance</td>
<td></td>
<td>Offering options</td>
</tr>
<tr>
<td>Knowing policies &amp; procedures</td>
<td></td>
<td>Referring to standards or experts</td>
</tr>
<tr>
<td>Double checking</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Using systematic processes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Questioning</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1.3 Origin of the project

As a neuroscience nurse with extensive experience in multiple clinical and cultural contexts I have been at the forefront of detecting changes in the neurological status
of patients and responding to protect them from harm. My experience as a clinical nurse specialist, nurse educator and case manager in acute neuroscience settings in Australia and the U.S.A. has long prompted my interest in the work done by nurses to prevent adverse events and keep patients safe. As a case manager I managed the gaps spawned by the complex needs of neuroscience patients and the involvement of many disciplines in their daily care. I also began to consider which care processes were most conducive to providing high quality and safe patient care, and how existing care processes might be redesigned to provide neuroscience patients and their families with integrated, seamless care across settings, clinicians and time. The focus of this present PhD inquiry fits with my strong interest in the relationship between nursing, safety and quality at the ‘sharp’ end of health care delivery.

1.4 Scope of the study

This study has as its focus the relationship between patient safety and the nursing management of gaps. As will be discussed in Chapter Three, the Methodology and Method chapter of this thesis, the study has been conducted as a naturalistic inquiry using the qualitative exploratory descriptive method. Nurses who worked in a variety of clinical settings were interviewed, including (i) rapidly changing, very acute and highly unpredictable settings such as emergency, critical care and perioperative units and (ii) less rapidly changing, less acute and more predictable settings such as neuroscience, rehabilitation and transitional care units.

1.5 Research aims

The key aims of this study are to:

- describe the patient care gaps that nurses commonly anticipate, detect and bridge;
- provide a comprehensive explanation of how nurses anticipate, detect and bridge:
  - familiar gaps;
  - new and unfamiliar gaps; and
  - familiar gaps whose characteristics have changed.
- describe the processes used by nurses to do so;
- propose a practice model of gap management by nurses;
• propose a hypothesis of possible linkages between gaps management and patient safety outcomes for further investigation.

The related objectives of the study are to:

• describe the gaps commonly anticipated, detected and bridged by nurses;
• describe how nurses anticipate, detect and bridge:
  - familiar gaps
  - new and unfamiliar gaps, and
  - familiar gaps whose characteristics have changed.
• describe how nurses bridge gaps once detected;
• describe the relationship between gaps management and patient safety outcomes;
• develop base-line data that may be used to inform:
  - improvements in patient safety education and nursing practice, and
  - a multidisciplinary study of patient safety and gaps management by other health care professionals.

1.6 Research questions

The research questions driving this study are:

• What are the gaps that are commonly anticipated, detected and bridged by nurses?
• How do nurses anticipate, detect and bridge gaps that are familiar to them?
• How do nurses anticipate, detect and bridge new and unfamiliar gaps?
• How do nurses anticipate, detect and bridge familiar gaps whose characteristics have changed?
• How do nurses bridge gaps once detected?

1.7 Synopsis of chapters

This thesis is comprised of six chapters. Chapter one is the introduction. Chapter two provides a review of the literature that informed the formulation of the aims, objectives and research questions guiding this inquiry. Chapter three provides an overview of the naturalistic inquiry paradigm and the qualitative exploratory descriptive (QED) research method selected for this study. In this chapter, attention is given to the philosophic assumptions underpinning naturalistic inquiry and the
Chapter 1. Introduction

QED method; the setting for the study; the steps taken to advance the study, including the sample; data collection and analysis; presentation and dissemination of the research findings; and the processes used for ensuring research rigour and the credibility of the research findings. The ethics approval process and the strengths and limitations of the study are also considered. Chapter four has as its focus the presentation and analysis of the data. In chapter five, the findings of the study are discussed in the light of presenting new insights with regard to participants’ experience of gaps, the management of these gaps and the implications for patient safety. In chapter six, the final chapter of this thesis, conclusions are drawn and recommendations are made in regard to the ‘practical action’ needed to enhance the role of nurses in managing gaps and creating safety.
CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter provides a review of the literature that informed the formulation of the aims, objectives and research questions guiding this inquiry. Attention is given to key studies of adverse events in hospital contexts, the role of human error in these events, and the evolution of the patient safety movement both in Australia and internationally. Consideration is given to the systems approach to human error management and the processes used by nurses to identify and respond to threats to patient safety. Similarly, studies of gaps are examined and the concepts of complexity, reliability and resilience are considered.

2.2 Method

Systematic methods were used to gather and evaluate relevant documentation for this literature review. A range of databases were searched for published articles on patient safety, continuity of care and nursing. The databases included Academic Search Complete, CINAHL, Health Business Elite, Health Policy Reference Centre, Health Source: Nursing Academic Edition and Medline. Specific key terms that were searched included ‘accident prevention’, ‘medical errors’, ‘treatment errors’, ‘health care errors’, ‘medication errors’ and ‘nursing errors’. Other terms that were used included ‘critical care’, ‘perioperative’, ‘emergency’, ‘neuroscience’ and ‘rehabilitation’. Parallel searches, using the same key terms, were conducted on the Internet to uncover any unpublished studies on these topics. A search was conducted using Google Scholar to identify publications that cited Cook, Render and Woods’ (2000) study of patient safety and gaps in the continuity of care. The reference lists of each article were reviewed to identify additional resources. Articles were selected on the basis of their thematic and content relevance to the inquiry.

2.3 Key studies of adverse events

Almost fifty years ago Schimmel (1964, p. 100) identified a ‘new type of clinical pathology’ in the form of ‘adverse reactions’ and ‘untoward effects’ arising from modern diagnostic procedures and treatments. Concerned by the emergence of this phenomenon, Schimmel (1964) was among the first to investigate the nature and
incidence of complications in hospitalised patients. Conducted in a single hospital site in the U.S.A. over a six month period, the study found that 20 percent of patients experienced one or more medical complications and that 20 percent of these complications were serious or fatal. These results might be considered conservative given the study’s exclusion of post-operative complications and those arising from human error.

2.3.1 The Harvard Medical Practice Study

Three decades later, two population based studies of iatrogenic injury (i.e. injury arising from medical care) were published in the literature (Brennan et al. 1991; Leape et al. 1991; Wilson et al. 1995). The first of these, the Harvard Medical Practice Study (HMPS), described the incidence and nature of in-hospital adverse events in the state of New York (Brennan et al. 1991; Leape et al. 1991). The drivers of this research were concerns about the increasing number of malpractice claims being brought against health care providers and a lack of epidemiological data regarding the incidence of iatrogenic injury. At that time, estimates of adverse events were based on non-random samples and a small number of patient records (Couch et al. 1981; Steel et al. 1981). The HMPS reviewed over 30,000 patient records, revealing that adverse events occurred in 3.7 percent of hospitalised patients while 27.6 percent of these events were due to negligence and 69 percent were associated with errors and potentially preventable. Extrapolation of these figures suggested that as many as 98,000 deaths and 1 million injuries occur annually in the U.S.A. alone, a problem described as ‘more profound, more ingrained, more pervasive, and more pernicious than anyone had previously thought possible’ (Cook et al. 2004, p. 19). In spite of these troubling statistics, when the study was published, there was ‘almost no public or professional outcry’ (Leape 2009, p. 394).

2.3.2 The Quality in Australian Health Care Study

A year later the Australian Institute of Health and Welfare examined the methods used in the HMPS and concluded they could be applied to a study of adverse events in Australian hospitals (Harvey & Cross 1992; Wilson et al. 1995). The Quality in Australian Health Care Study (QAHCS) was commissioned in 1994 and, with one important exception, modelled largely on the HMPS (Wilson et al. 1995). In contrast to the HMPS, the main focus of this Australian investigation was quality improvement and preventability. To that end, rather than determine negligence, the
Chapter 2. Literature Review

QAHCS measured the preventability of adverse events. The study estimated that adverse events occurred in 16 percent of hospitalised patients and 51 percent of these events were preventable. Extrapolation of these figures suggested that as many as 18,000 deaths and 17,000 permanent disabilities occur each year from admissions to Australian hospitals. The key findings of the QAHCS are summarised in Box 2.1, below.

Box 2.1 Summary of the key findings of the Quality in Australian Health Care Study (Wilson et al. 1995)

- 16.6% of admissions were associated with an adverse event;
- 51% of adverse events were considered preventable;
- 13.7% of adverse events resulted in permanent disability and 4.9% resulted in death;
- a higher proportion of adverse events were associated with digestive (23.2%), musculoskeletal (21.9%) and circulatory disorders (20.2%);
- errors of omission occurred in 52% of adverse events and were twice as common as errors of commission which occurred in 27% of adverse events;
- almost half of all adverse events (46.8%) occurred in the operating room;
- a quarter of adverse events occurred in the patient’s room;
- the preventability of adverse events in the emergency department was high at 82% while the preventability for most specialities was close to 50%; and
- adverse events account for 3.3 million bed days per year, of which 1.7 million (8% of all hospital bed days in Australia) are for adverse events with high preventability

A number of explanations have been proposed for the higher rate of adverse events in the QAHCS (16.6 percent) compared to the HMPS (3.7 percent) (Taskforce on Quality in Australian Health Care 1996; Thomas, Studdert, Runciman et al. 2000; Wilson et al. 1995) but, as noted by Weingart et al. (2000, p. 774), a ‘real difference in the rate of injuries to patients in the two populations could not be excluded’. These explanations are mostly methodological and include differences in the screening and medical review processes; differences in the way that the term adverse event was defined in each study; an increase in the complexity of care and/or improvement in the quality of medical records in the intervening years between the two studies; and the possibility that the focus on quality and improvement in the Australian study contributed to a higher number of records.
2.3.3 Further studies of adverse events in hospital settings

Further studies in Canada, the United Kingdom (U.K.), Latin America, New Zealand and the states of Utah and Colorado in the U.S.A. have confirmed that adverse events are a cause of patient harm globally and a major public health issue (Aranaz-Andrés et al. 2011; Baker, GR et al. 2004; Davis et al. 2002; Thomas, Studdert, Burstin et al. 2000; Vincent, Neale & Woloshynowycz 2001). A systematic review of the literature, based on studies of adverse events in five countries (i.e. U.S.A., Australia, U.K., New Zealand and Canada) and almost 75,000 records, found that nearly one in ten patients experienced an adverse event (De Vries et al. 2008). Almost half of the events identified were attributable to error and considered preventable (i.e. the median preventability was 43.5 percent). Although 53 percent of patients experienced no or minor disability, 7.4 percent of adverse events were lethal and most were operation or medication related.

As well as being a significant cause of human suffering, adverse events are a substantial drain on health care resources. The total cost of in-hospital adverse events over a one year period in the Australian State of Victoria alone, has been estimated at in excess of $450 million (Ehsani, Jackson & Duckett 2006).

2.4 Human error

The word error originates from the Latin errorem, meaning a wandering or straying and is defined as a mistake, inaccuracy or misjudgement, the act or state of being wrong (Collins Dictionary of the English Language 2010). Research has established that human error is a contributing factor in as many as half of all adverse events (Brennan et al. 1991; De Vries et al. 2008; Leape et al. 1991; Wilson et al. 1995). James Reason (1995), a human factors psychologist and acknowledged leader in the field of error theory, contends that some form of deviation is a feature of all errors. The following definition of error, developed by Reason (1990), has been widely adopted in the patient safety literature:

> Error will be taken as a generic term to encompass all those occasions in which a planned sequence of mental or physical activities fails to achieve its intended outcome, and when these failures cannot be attributed to the intervention of some chance agency (p. 9).

Reason (1995) describes two main types of errors: (i) slips, lapses, trips or fumbles, and (ii) mistakes. The first, slips, lapses, trips and fumbles are defined as
execution or performance failures where the plan selected is adequate for the particular goal but its execution does not proceed as intended. Slips and lapses often occur during routine tasks in familiar environments and are more easily observed than lapses, which result from the failure of internal cognitive processes such as attention. The second type of error, mistakes, are failures of intention or planning that result in selection of the incorrect plan for a particular goal. Knowledge based mistakes ‘occur in novel situations where the solution to a problem has to be worked out on the spot without the help of pre-programmed solutions’ (Reason 1995, p. 81). Rule based mistakes involve the ‘misapplication of a good rule (usually because of a failure to spot the contraindications), the application of a bad rule, or the non-application of a good rule’ (Reason 1995, p. 81).

2.5 The patient safety movement

Concerned by lack of progress on the problem of patient safety, the Institute of Medicine (IOM) published its report, *To Err is Human*, almost a decade after publication of the Harvard Study (Brennan et al. 1991; Kohn, Corrigan & Donaldson, M 2000; Leape et al. 1991). In the years following publication of the Harvard and Australian adverse event studies, it is claimed that insufficient knowledge and incentives (Wachter 2004) were factors in the ‘cycle of inaction’ on the problem of patient safety (Kohn, Corrigan & Donaldson, M 2000, p. 3). The IOM report is credited with redressing this problem by launching the patient safety movement (Leape 2009; Wachter 2004). Its use of the analogy that deaths in the United States from medical errors were equivalent to the downing of one jumbo jet each day was powerful, generating substantial public and media attention and raising global awareness that health care was not as safe as it should be.

*To Err is Human* has profoundly changed the ‘conversations’ and attitudes of health care professionals and organisations toward the problem of medical error and iatrogenic injury (Leape & Berwick 2005, p. 2385; Wachter 2004). In advancing a national agenda for improving patient safety outcomes the report put forward several key recommendations, including:

(i) Establishing a national focus to create leadership, research, tools and protocols to enhance the knowledge base about patient safety;
(ii) Identifying and learning from errors through immediate and strong mandatory reporting efforts, as well as the encouragement of voluntary efforts, both with the aim of making sure the system continues to be made safer for patients;
(iii) Raising standards and expectations for improvements in safety through the actions of oversight organisations, group purchasers, and professional groups; and
(iv) Creating safety systems inside health care organisations through the implementation of safe practices at the delivery level, the ultimate target of all the recommendations (Kohn, Corrigan & Donaldson, M 2000, p. 6).

In the United States, the Quality Interagency Coordination (QuIC) Taskforce, formed in 1998 to examine issues of health care quality, was asked to give priority to patient safety and health care related errors (Regenstein 2004). A report from the QuIC Taskforce not only supported the recommendations of the IOM report but also made key recommendations in regard to the reporting of adverse events. These included the establishment of a mandatory reporting system and the provision of legal protection to those reporting such events for the purposes of improving patient safety. Health care agencies were directed to implement the key recommendations of To Err is Human. Meanwhile, the Agency for Healthcare Research and Quality (AHRQ) coordinated efforts to assess the evidence supporting various safety practices and determine ‘best practice’ in the prevention of errors and adverse events. In 2000, health care professionals, consumers, regulators, accrediting agencies and safety-science experts gathered at the first national summit on medical errors and patient safety research. At this meeting, a detailed research program was developed with a focus on state-wide reporting of patient safety incidents, the improvement of medication safety and the translation of safety practices and lessons learned in the aviation industry into health care. And so the U.S. patient safety movement was launched.

As the problem of patient safety gained widespread acceptance, governments, health care services and health care professionals throughout the world mobilised and engaged in unprecedented efforts to improve systems and processes and the overall quality and safety of health care (Johnstone & Kanitsaki 2006c; Leape & Berwick 2005; Small & Barach 2002). The patient safety movement has thus evolved from these efforts (Leape, Berwick & Bates 2002).

2.5.1 The Australian patient safety movement

Publication of the Quality in Australian Health Care Study (Wilson et al. 1995) marked the beginning of the patient safety movement in Australia (Johnstone & Kanitsaki 2006c). In response to this study, the Taskforce on Quality in Australian Health Care (1996), established by the Australian government, made 56
recommendations in relation to research, consumer participation and funding as well as standards of patient care, monitoring and professional education. In 1998, the National Expert Advisory Group on Safety and Quality in Australian Health Care was established to consider the recommendations of the Taskforce and formulate a national approach to the improvement of safety and quality. A key recommendation of the Expert Group was the need for leadership and coordination of health care safety and quality initiatives. To this end, the Australian Council for Safety and Quality in Health Care (ACSQHC) was established in 2000.

In its final report, the National Expert Advisory Group set out ten national actions for the improvement of quality and safety in Australian health care (The National Expert Advisory Group on Safety and Quality in Australian Health Care 1999). These actions are outlined in Box 2.2, below:

**Box 2.2 National actions to support quality and safety improvement in Australian health care (The National Expert Advisory Group on Safety and Quality in Australian Health Care 1999, p. v)**

- Support methods to enable increased consumer participation in health care.
- Facilitate implementation of evidence based practice.
- Develop strategies and partnerships to improve information flows between all parties about areas for quality improvement, and to ensure that patients, their families and carers and health care agencies receive timely advice about incidents.
- Develop legislative changes that will allow the detailed, thorough investigation of adverse events or ‘near misses’ and the timely reporting of findings for the information of consumers and for action by organisations and health care providers in the system.
- Facilitate agreement on common systems for the collection and analysis of incidents, adverse events and complaints.
- Develop a national framework for health service performance measurement and reporting.
- Facilitate improvements in the quality of current accreditation mechanisms that address the safety and quality of the system in operation.
- Facilitate improvements to the design and management of the health system that promote smoother transitions for consumers across health service boundaries.
- Research and develop clinical and administrative information systems that have a system-wide focus and application.
- Agree on national requirements for education and training for all health care providers to support their involvement in quality management and collaborative approaches to health care delivery.
(a) The Australian Council for Safety and Quality in Health Care (ACSQHC)

In spite of its lack of statutory or regulatory authority, the ACSQHC introduced what has been described as ‘a significant platform of reforms’ and improved understanding and awareness of quality and safety matters amongst health care professionals (Barraclough & Birch 2006, p. S48). Its key achievements included progress on:

- the implementation of incident monitoring and management systems and patient safety risk management plans;
- the creation of a Centre of Research Excellence in Patient Safety (CREPS);
- the development of a common medication chart in all public hospitals;
- public reporting of sentinel events;
- the implementation of national standards for open disclosure when a patient is harmed and infection control; and,

(b) The Australian Commission for Safety and Quality in Health Care

In 2005, concerns about the governance arrangements for safety and quality in Australian health care led to a review of the Council by Paterson (2005). This review found that a limitation of the ACSQHC was its lack of formal links with all levels of the health care system and its narrow focus on safety in acute care settings (Paterson 2005; Smallwood 2006). It recommended the establishment of a new, smaller and more broadly focussed national body with closer ties to state and territory governments. To this end, the Australian Commission for Safety and Quality in Health Care (ACSQHC) was created by Health Ministers in 2006 to lead and coordinate health care safety and quality improvements. Its key functions, described by Paterson (2005), include:

(i) identifying issues and policy directions, recommending priorities for action, disseminating knowledge, and advocating for safety and quality;
(ii) reporting publicly on the state of safety and quality including performance against standards;
(iii) recommending national data sets for safety and quality, working within current multilateral governmental arrangements for data development, standards, collection and reporting;
(iv) providing strategic advice to Health Ministers on ‘best practice’ thinking to drive quality improvement, including implementation strategies; and
(v) recommending nationally agreed standards for safety and quality improvement (p. v).

In 2011, the *National Health Reform Act* was passed by the Federal Government, establishing the Australian Commission for Safety and Quality in Health Care as an independent statutory authority. The role of the Commission was expanded to include the formulation of standards, guidelines and indicators relating to matters of health care safety and quality. To that end, the Commission published National Safety and Quality Health Service Standards, designed to assist health care organisations in the delivery of safe and high quality care (Australian Commission on Safety and Quality in Health Care 2011). Importantly, these standards, listed in Box 2.3 below, are now a component of the accreditation process and the assessment of organisational performance.

**Box 2.3 National Safety and Quality Health Service Standards (Australian Commission on Safety and Quality in Health Care 2011)**

- Governance for Safety and Quality in Health Service Organisations
- Partnering with Consumers
- Preventing and Controlling Health care Associated Infections
- Medication Safety
- Patient Identification and Procedure Matching
- Clinical Handover
- Blood and Blood Products
- Preventing and Managing Pressure Injuries
- Recognising and Responding to Clinical Deterioration in Acute Health Care
- Preventing Falls and Harm from Falls

A key and ongoing role of the Commission is to promote, support, encourage and monitor the implementation of these service standards with a view to advising the Health Ministers about their suitability as national clinical standards.

**2.6 Responses to the problem of patient safety**

James Bagian, the Founding Director of the National Center for Patient Safety (NCPS) at the U.S. Department of Veterans Affairs (VA), has famously argued that
‘you can’t fix what you don’t know about’ (Bagian et al. 2001). To that end, much attention in health care has been given to the identification of system weaknesses and errors using techniques such as root cause and human reliability analysis.

2.6.1 Root cause analysis

Root cause analysis (RCA), a retrospective structured investigation process, is widely used in hospital settings worldwide to identify the latent conditions that contribute to preventable adverse events and ‘close calls’ (i.e. cases where harm was avoided) (Bagian et al. 2001; 2002; Iedema et al. 2006b; Nicolini, Waring & Mengis 2011; Wu, Lipshutz & Pronovost 2008). In Australia, RCA is mandated for critical incidents with a severity assessment coding (SAC) of one (i.e. deaths associated with clinical care). The RCA process includes gathering data about what happened; identifying, where possible, the various causal factors that contributed to the event; and developing recommendations and corrective actions that minimise the risk of future events (Bagian et al. 2000; Iedema et al. 2006b; Wu, Lipshutz & Pronovost 2008).

Valuable system changes resulting from RCA processes have included the removal of concentrated potassium chloride from nursing units (Pronovost et al. 2002). Nonetheless, the process of identifying and implementing organisation wide changes from the investigation of a situated clinical incident has been described as a challenging task (Iedema et al. 2006a). Furthermore, Iedema and colleagues (2006b, p. 1614) contend that, far from being a technically focussed investigation, RCA is an ‘emergent practice’ that encompasses the affective, critical and moral dimensions of clinical practice. They describe the RCA process as a ‘four-fold’ activity requiring clinicians to (i) address the technical aspects of patient care; (ii) adopt a non-punitive, systems approach; (iii) navigate the emotional landscape associated with critical incidents arising from human error; and (iv) consider their own moral position (Iedema et al. 2006b).

Concerns have been raised about the effectiveness of the RCA method and the considerable time and resources involved, estimated at between 20 and 90 person hours per investigation (Wu, Lipshutz & Pronovost 2008). Wu, Lipshutz and Pronovost (2008) contend that an important and largely unanswered question in many RCA investigations is whether the risk of an adverse event’s recurrence has actually been reduced. Accordingly, they argue for the evaluation of RCA
recommendations and corrective actions and further research to identify ‘best practice’ in the conduct of RCAs (Wu, Lipshutz & Pronovost 2008).

The utility of retrospective, ‘find and fix’ methods more generally in reducing failure rates in complex systems such as health care organisations has been challenged (Hollnagel 2012a; Cook & Woods 1994). Hollnagel (2012a) argues that a key limitation of these approaches is that learning is constrained by a focus on what went ‘wrong’, as this may be more evident and easily portrayed than what went ‘right’. Cook and Woods (1994) point out that identifying and correcting one sequence (or set) of system flaws in the aftermath of adverse event may lead to a belief that the problem has been ‘fixed’ when, in reality, this may not be the case. They note that further errors and failures may arise from as yet unidentified factors or a distinct and unanticipated sequence or combination of flaws.

2.6.2 Human reliability analysis

Efforts to improve patient safety have also focussed on prospective methods such as human reliability analysis (HRA). HRA encompasses a broad range of techniques including ‘health care failure mode effect analysis’ (HFMEA) developed by the U.S. Veteran’s Administration National Center for Patient Safety (DeRosier et al. 2002). The key purpose of HRA is to identify the weaknesses and vulnerabilities in work systems that create the potential for error and failure (Lyons et al. 2004). The process also seeks to determine the likely impact of potential errors and failures and the aspects of the work system that require modification to forestall such events (Institute for Healthcare Improvement 2004). This is achieved by examining the tasks, processes and structures within systems of work. The key steps in the HFMEA process include: (i) identifying a process (usually an area of vulnerability); (ii) gathering a multidisciplinary team of all people involved in the process; (iii) describing the steps in the process graphically; (iv) identifying all the possible ways that each step of the process can fail (i.e. failure modes) and the severity and probability of each potential failure (i.e. hazard analysis); and (v) determining the required actions and outcome measures (DeRosier et al. 2002). Failure modes and effects analysis may also be used to prospectively evaluate the impact of planned change on a work system (Institute for Healthcare Improvement 2004).
2.7 Near misses as an under recognised indicator of safety success

A key underpinning assumption of this study relates to the phenomenon of ‘near misses’ as an indicator of safety success. It is acknowledged that the term ‘near miss’ is a contested notion (Aspden et al. 2004; Barnard et al. 2006; Kaplan & Fastman 2003; Kessels-Habraken et al. 2010; Van der Schaaf, Lucas & Hale 1991). Nonetheless, there is agreement in the literature that it encompasses situations where patient harm was avoided or minimised.

2.7.1 Near miss reporting and analysis

Near miss reporting is ‘institutionalized’ in a range of high risk industries (i.e. aviation, nuclear power, petrochemical processing) all of which are renowned for their low accident rates (Barach & Small 2000). Even so, a lack of agreement on how near miss should be defined has been identified as an impediment to the utilisation of near miss data generally (Kessels-Habraken et al. 2010) and progress on patient safety in particular (Small & Barach 2002). In health care contexts, near miss reporting and analysis, as opposed to the reporting of incidents where patients have been seriously harmed, offers several benefits. These include the opportunity to identify system vulnerabilities and causal pathways before harm occurs; the improvement of systems and care processes through the study of recovery patterns (i.e. how harm was averted); and, the elimination of perceived legal and emotional barriers to reporting because the patient was not harmed (Barach & Small 2000; Barnard et al. 2006; Jeffs, Affonso & MacMillan 2008; Kessels-Habraken et al. 2010). Furthermore, analysis of near misses is freed from the influence of hindsight bias, where knowledge of the outcome inevitably influences perceptions about the processes and behaviours leading to that outcome (Barnard et al. 2006). In spite of the many benefits of near miss reporting and analysis and the prevalence of these events in health care contexts, many go undetected and hence valuable opportunities for individual and organisational learning are lost (Jeffs 2010).

2.7.2 Research of near misses

Kaplan and Fastman (2003) argue that near miss data yields valuable insights about how harm was averted and warrants attention. In particular, the investigation of health care related near misses can deepen understanding of the process of successful error recovery, the ability of humans to intercept an error and in so doing prevent it
from reaching and harming the patient (Kaplan & Fastman 2003; Kessels-Habraken et al. 2010). As previously discussed, a number of studies have specifically investigated the role of nurses in the recovery of medical errors (Henneman, EA et al. 2006; Henneman, EA & Gawlinski 2004; Henneman, EA et al. 2010; Hurley et al. 2008). Recently, the role of nurses in preventing adverse events such as pressure ulcers has also been characterised as a near miss intervention or recovery process (Jeffs, MacMillan & Maione 2009). Investigation of this process revealed that pressure ulcer prevention was achieved through the implementation of a surveillance tool which enhanced patient assessment and the identification of at risk patients.

Attention has also been given to identifying the factors that contribute to near misses and the means by which near misses are mitigated in clinical practice (Jeffs, Affonso & MacMillan 2008). Jeffs, Affonso and MacMillan (2008) investigated the phenomena of near misses from the perspective of nurses, pharmacists, patients and family members. The study identified numerous factors that contributed to near misses, including working conditions, inadequate care processes, a lack of patient-centred care and complacency and carelessness on the part of health care providers. Of note, ‘diligent and vigilant pattern recognition’ and efforts to create synergy in the delivery of health care were key strategies in the mitigation of near miss events (Jeffs, Affonso & MacMillan 2008).

2.8 The recognition and reporting of risk, error and system failure

The recognition and reporting of risk, error and system failure is a complex and challenging task. In health care contexts a key problem lies in the perception that many clinical incidents, such as near misses, are commonplace, routine and ‘part and parcel’ of the everyday work of health care practitioners (Jeffs 2010; Henneman, EA 2007). Henneman (2007, p. 30) contends that nurses in particular become so accustomed to ‘working around’ system failures that they fail to recognise and report them as such. Luther and Resar (2013) concur, noting that front line clinicians tend to ‘accept’ rather than ‘see’ defective processes and systems in their work environments. Nurses’ experience of poorly functioning supply systems, problems accessing resources, and delays in systems and processes (Ebright et al. 2003; Tucker & Spear 2006) may contribute to these perceptions. Henneman (2007) contends that in order to identify and capture these complex practice issues, a variety of methodologies are needed.
A related and largely unanswered question is how nurses identify that a patient is at increased risk of harm (Chipps et al. 2011; Despins, Scott-Cawiezell & Rouder 2010; Kelly 2009; Kelly & Vincent 2011). This is a salient issue given the important role of risk identification in effective nursing surveillance (Henneman, EA Gawlinski & Giuliano 2012). Although a recent study has explored how nurses manage risk (Groves, Fingfeld-Connett & Wakefield 2012), Chipps et al. (2011) note the lack of data explaining how nurses identify risk and use risk assessment data in decision making.

Previous studies point to a lack of consistency in nurses’ assessment and reporting of medication errors (Baker, HM 1997; Mayo & Duncan 2004). Indeed, a recent report by the U.S. Department of Health and Human Services Office of Inspector General found that as many as 86 percent of adverse events were not reported to organisational reporting systems because of a lack of clarity about what represents patient harm (U.S. Department of Health and Human Services cited in Luther & Resar 2013). A study by Chipps and colleagues (2011) concurs, identifying a lack of consistency in nurses’ judgements regarding the severity of an error, whether the error carried the risk of harm and the probability that the error might recur. Further analysis revealed that nurses’ judgement of these factors was unrelated to their level of education, years of experience, clinical specialty or current job role. The detection, interpretation and management of risk is a relevant issue given the complex nature of nurses’ work environments and global efforts to reduce the incidence of preventable health care harm.

2.9 The relationship between nurses and patient outcomes

Interest in patient outcomes can be traced back to the epidemiological research of Florence Nightingale during the Crimean War (Maas, Johnson & Moorhead 2007). Hailed as a ‘hero and martyr of quality and safety’, Nightingale collected and analysed the outcome data of patients in her care, demonstrating positive health outcomes from her sanitary reforms (Neuhauser 2003). More recently, the problem of patient safety and preventable adverse events has highlighted the importance of efforts to understand, measure and improve the quality and safety of health care (Kohn, Corrigan & Donaldson, M 2000; Savitz, Jones & Bernard 2005). As the main providers of inpatient care, important considerations for the nursing profession include accountability for patient outcomes and the development of performance measures that quantify the contribution and value of nursing care (Given 2005;
Kurtzman & Kizer 2005; Needleman, Kurtzman & Kizer 2007). To this end, attention has been given to the development of nursing-sensitive performance measures (National Quality Forum 2004), defined as:

processes and outcomes – and structural proxies for these processes and outcomes (i.e. skill mix, nurse staffing hours) – that are affected, provided, and/or influenced by nursing personnel – but for which nursing is not exclusively responsible. Nursing-sensitive measures must be quantifiably influenced by nursing personnel, but the relationship is not necessarily causal (Kurtzman & Kizer 2005, p. 15).

It has been noted that research efforts in the area of nursing performance have focussed almost entirely on adverse patient outcomes and events as measures of nursing quality and effectiveness (Lang et al. 2004; Savitz, Jones & Bernard 2005). Considerable attention has also been given to the relationship between nurse staffing levels and patient outcomes. Factors providing the impetus for this research have been quality and safety considerations, the introduction of minimum nurse-to-patient ratios and a shortage of hospital nurses (Burnes Bolton et al. 2007). These studies identified an association between increased registered nurse staffing and lower odds of hospital related mortality, failure-to-rescue, hospital acquired pneumonia, cardiopulmonary resuscitation, pulmonary failure, surgical wound infection, and nosocomial bloodstream infection (Aiken et al. 2002; Hickam et al. 2003; Kane et al. 2007; Lang et al. 2004; Needleman et al. 2002; Tourangeau et al. 2006; Twigg et al. 2011).

Burnes Bolton and colleagues (2007, p. 240) note that many studies of nurse staffing and patient outcomes have excluded patient falls and hospital acquired pressure ulcers from their analyses, regarded as two ‘stalwart measures of nurse staffing effectiveness and patient safety’. These two measures have been rigorously investigated and are among a group of standards to have been adopted by the National Quality Forum in the United States as nursing-sensitive indicators of the quality of hospital care (National Quality Forum 2004). Research to evaluate the impact of mandated nursing ratios in California, for example, indicated that variation in patient outcomes could not be explained solely by the nursing ‘dose’, the number of hours of nursing care or the skill mix of the nurses providing care (Brooten & Youngblut 2006; Burnes Bolton et al. 2007; Donaldson, N et al. 2005). While mandated nursing ratios significantly increased skill mix and registered nurse hours of care in medical surgical units in California, a significant decrease in the incidence
of patient falls and hospital acquired pressure ulcers was not detected. Mark (2006, p. 694) identifies a number of methodological issues that must be addressed before nurse staffing research can be considered ‘theoretically and empirically sufficient’. These include a lack of theory, the use of different data sources for nurse staffing, variation in risk adjustment methods and the problem of spuriousness when drawing conclusions from observational data.

A key argument advanced by Savitz, Jones and Barnard (2005, p. 383) is that further consideration should be given to the relationship between nursing care and positive patient outcomes, focussing on care at the unit level. A recent study by Middleton and colleagues (2011) is one of the first to demonstrate such a relationship. The study, a cluster randomised controlled trial, found that nurse initiated, evidence based management of fever, hyperglycaemia and swallowing dysfunction in patients with stroke resulted in significantly less mortality and dependency. At 90 days, patients that received the nursing intervention were 16 percent more likely to be alive and independent. The authors note that this effect is larger than for other established stroke treatments, including drug therapies.

2.10 Nursing surveillance

The Collins English Dictionary (2010) defines surveillance as the act of maintaining close observation or supervision over a person or group. The term originates from the French ‘surveiller’, to watch over, and has a long history in the fields of aviation, intelligence and public health. Effective surveillance of the patient and environment is one of the most fundamental safety activities undertaken by nurses (Clarke 2004; Dresser 2012; Page 2004) and an important strategy in the recovery of medical errors in emergency department, critical care and coronary care settings (Dykes, Rothschild & Hurley 2010a; Henneman, EA et al. 2006; Henneman, EA et al. 2010; Hurley et al. 2008) and prevention of harm in rural hospital settings (MacKinnon 2011). In the context of patient safety, surveillance is taken as the ‘purposeful and ongoing collection and analysis of information about the patient and the environment’ (McCloskey Dochterman & Bulechek 2004, p. 694). Henneman, Gawlinski and Giuliano (2012, p. e12) write that surveillance involves the ‘early identification of risk’ to protect patients from the harmful effects of health care errors:
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Surveillance is a systematic and goal-directed process focused on early identification of risk and the need for intervention. This process includes identifying at-risk patients, promptly identifying potential adverse events, as well as preventing and recovering (identifying, interrupting, and correcting) medical errors (Henneman, EA Gawlinski & Giuliano 2012, p. e12).

Dougherty (1999, p. 527) suggests that ‘the essence of successful surveillance involves the piecing together of minute amounts of information that, when evaluated separately, may appear unrelated and insignificant’. Surveillance has temporal and cumulative features as patients are often cared for by a team of nurses (Kutney-Lee, Lake & Aiken 2009). Surveillance is also a complex and systematic process with behavioural and cognitive components - the collection of data using a variety of methods from many different sources (i.e. patients, family members, health care professionals and clinical support systems) and the analysis, interpretation, evaluation and integration of this data (Dougherty 1999; Kelly & Vincent 2011). A recent conceptualisation of surveillance, describes six dimensions of nursing surveillance - actions, expertise, early recognition, intuition and decision making (Kelly 2009; Kelly & Vincent 2011). In this framework, key antecedents of nursing surveillance, defined as ‘prepossessed abilities, knowledge, or training that influences the concept’, included expertise, intuition and early recognition skills (Kelly 2009; Kelly & Vincent 2011, p. 656).

Inadequate nursing surveillance has been posited as a factor in occurrences of failure-to-rescue and related death from complications in hospitalised patients (Clarke & Aiken 2003). For example, a recent study by Shever (2011) used the number of nursing treatments documented in a nursing data-base as a measure of nursing surveillance and found a lower rate of failure-to-rescue in those patients with a higher number of documented treatments (i.e. 12 times a day or more). While Aiken and colleagues (2003) have hypothesised that enhanced surveillance may explain the relationship between higher levels of registered nurse staffing and superior patient outcomes, there is a paucity of research on the process of surveillance itself (Henneman, EA Gawlinski & Giuliano 2012; Kelly 2009; Kutney-Lee, Lake & Aiken 2009; Schmidt 2010). Schmidt (2010) contends that this gap is suggestive of a ‘precision paradox’, the phenomenon of predicting a particular outcome (i.e. higher levels of nurses staffing result in better surveillance and patient outcomes) without knowledge of the processes (i.e. surveillance) that are critical to that outcome being achieved (Mark 2006).
### 2.11 The recovery of errors by nurses

A study of adverse drug events by Leape and colleagues (1995) was among the first to identify the key role of nurses in the recovery of medical errors. The authors found that half of physician errors in ordering and administering medications and one third of transcription and dispensing errors were intercepted (i.e. prevented from reaching patients) and that nurses were responsible for 85 percent of these interceptions. Further research in critical care and emergency settings concurs with these findings, suggesting that nurses also protect patients from the errors of junior medical staff (Henneman, PL et al. 2005; Landrigan et al. 2004; Rothschild et al. 2005). Rothschild and colleagues (2009) comment that, but for the significant number of errors recovered by nurses and other professions, the incidence of adverse events could be much higher. Moreover, they observe that error recovery not only prevents patient harm and suffering but also results in significant cost savings (Rothschild et al. 2009).

Rothschild and colleagues (2006) coined the phrase the ‘nursing safety net’ to describe the role of nurses in recovering medical errors and protecting patients from harm. Instructive examples of the nature and extent of the ‘nursing safety net’ can be found in a small number of critical care and perioperative studies (Dykes, Rothschild & Hurley 2010a; Rogers et al. 2008; Rothschild et al. 2006; Yang et al. 2012). Research by Rothschild and colleagues (2006) to explore and quantify the contribution of critical care nurses to patient safety concurs with earlier research by Leape and colleagues (1995). Rothschild and colleagues (2006) found that a large proportion (73 percent) of the errors recovered were medication related, involving slips and lapses during the execution of tasks. Most errors (69 percent) were intercepted before reaching patients and of those errors that reached patients, 13 percent were mitigated before they resulted in harm, while 18 percent were ameliorated before severe harm occurred. Extrapolation of these findings suggests that the ‘critical care safety net’ may be an important system defence against preventable adverse events (Rothschild et al. 2006). As Rothschild and colleagues (2006) write:

> Extrapolating our findings to an eight hour day shift only, slightly more than two potentially harmful medical errors per patient are recovered daily by each CCU nurse, and for a ten-bed CCU, more than 7,300 medical errors are recovered annually (p. 67).
A further study by Dykes, Rothschild and Hurley (2010a) explored the error recovery efforts of critical care nurses (i.e. type, frequency and potential harm of recovered errors) over a one year period. Participants (N=345) completed the Recovered Medical Error Inventory, a 25 item web survey developed and tested by the authors (Dykes, Rothschild & Hurley 2010b) and reported the recovery of 18,578 medical errors. While almost a quarter of these errors were rated by the participants as potentially lethal, these findings need to be considered in light of two of the study’s limitations. Firstly, all errors were self reported, creating the potential for nurses to over or underestimate their occurrence and severity. Secondly, the severity of the errors was judged by the participants themselves rather than independently classified, introducing the potential for bias. The most frequently recovered, potentially lethal error was the category ‘unsafe transfer decision’ which the authors note may be a quality of care issue. Even so, these findings are instructive, given that gaps often occur at ‘fracture points’ in patient care such as when a patient transfers to another unit (Patterson et al. in press).

A study of error recovery in perioperative settings identified an average of 11.11 errors or potential errors per cardiovascular procedure (i.e. coronary artery bypass graft, valve replacement) (Yang et al. 2012). Commonly, these incidents related to aseptic technique, infection prevention, the surgical count and skin management. Of the errors that were thought to have occurred, circulating nurses effectively intercepted 77 percent before they reached the patient while the remaining 23 percent were mitigated or ameliorated such that the patient was not severely harmed (Yang et al. 2012).

Research suggests that the nursing safety net also protects patients from errors made by nurses themselves (Balas, Scott & Rogers 2004; Rogers et al. 2008). Rogers and colleagues (2008) found that the most frequently reported errors in a critical care setting were those made by nurses themselves (40.6 percent). Balas, Scott and Rogers (2004) studied almost 400 hospital nurses and found that 30 percent of nurses reported making at least one error or near error, ranging from minor slips to life threatening events, while 45 of these nurses reported making multiple errors (i.e. between 2 and 5). Eighty nurses reported intercepting at least one of their own errors while 37 percent of nurses reported stopping themselves from making multiple errors. Most errors were medication related, the most common being administration of the incorrect dose of medication. Research of error recovery in dialysis nursing found that experience was a factor in the ability of nurses to recover procedurally
based errors, while this was not the case with knowledge based errors (Wilkinson, Cauble & Patel 2011).

2.12 Hospitals as complex systems

A system has been defined as ‘a set of interdependent elements (human and non-human) interacting to achieve a common goal’ (Kohn, Corrigan & Donaldson, M 2000, p. 52). Health care systems, such as hospitals, are regarded as complex, adaptive systems capable of self-organising, emerging and evolving (Barach & Johnson 2006; McDaniel & Driebe 2001; Rijpma 1997; 2003). Their complexity and ability to deal with new situations stem, in part, from the presence of a large number of diverse agents (i.e. patients, health care providers, administrators, processes) (McDaniel & Driebe 2001). What these agents all share in common is their ability to process information and respond to changes in that information in ways that are not always predictable (Barach & Johnson 2006; McDaniel & Driebe 2001).

Barach and Johnson (2006, p. i10) point out that in complex, adaptive systems ‘the actions of individuals are interconnected so that the actions of one change the context for all the others’. In addition to being complex and adaptive, hospital systems are also tightly coupled such that each component of the system interacts with and is dependent upon numerous others components, many of which are highly specialised (Kohn, Corrigan & Donaldson, M 2000). In tightly coupled systems, changes to one component have a ‘ripple effect’, forcing changes in other components that can be difficult to foresee and detect.

Cook and Woods (1994) argue that in large, complex systems such as hospital contexts, failure has many components, is difficult to foresee, and often catastrophic because the system is generally well defended from smaller failures through various systems and safeguards. Dekker and colleagues (2008) note that while these systems and safe guards increase reliability they inevitably increase complexity. Perrow’s (1984) Normal Accident Theory holds that accidents are inevitable in complex and tightly coupled systems. Reason (1990, p. 183) contends that it is in their nature to ‘spring nasty surprises’. Cook and colleagues (2004, p. 22) concur, arguing that the potential for catastrophic failure is ‘always just around the corner’ and cannot be eliminated from complex systems.
2.12.1 The complexity of nursing work

Adding to the intricacy of health care systems is the inherently complex nature of nursing itself. Sources of complexity in the work of nurses include the acute and unpredictable nature of many clinical conditions for which patients are hospitalised (Benner, Hooper-Kyriakidis & Stannard 1999) and the key role of nurses in integrating patient care to prevent gaps and bridging gaps when they occur (Page 2004). In hospital settings, this role demands that nurses interact with a vast array of departments from within the broader system (i.e. radiology, pathology, administration, catering, allied health). Research by Ebright and colleagues (2003) has revealed that nurses’ work is further complicated by their need to balance competing goals in relation to patient safety; not falling behind with work; minimising further complexity; maintaining competency and efficiency; and preserving patient and family satisfaction. In hospital systems, additional and potentially avoidable sources of complexity include poorly functioning supply systems, interruptions, inconsistencies and breakdowns in communication, and problems accessing resources (i.e. supplies, equipment, medications, information) (Ebright et al. 2003; Tucker & Spear 2006). As well as adding to the complexity of nurses’ work, these factors increase the risk of operational failure (Tucker & Spear 2006) and create additional gaps in care by reducing the time and attention available for higher order thinking such as clinical reasoning (Ebright 2003).

2.13 Reliability

In the search for ways to improve patient safety in health care domains, attention has turned to models of error management in high reliability organisations (HROs) such as nuclear power plants, air traffic control centres and missile launch facilities. While involved in inherently high risk activities, HROs are renowned for their ability to ‘operate continuously under trying conditions and have fewer than their fair share of major accidents’ (Weick & Sutcliffe 2007, p. 1). The reliability at the core of these organisations has been defined as the ‘unusual capacity to produce collective outcomes of a certain minimum quality repeatedly’ (Hannan & Freeman 1984, p. 153). HROs are preoccupied with failure and while they experience errors, their resilience ensures they are not disabled by them. As Reason (2000) writes:
They expect to make errors and train their workforce to recognise and recover them. They continually rehearse familiar scenarios of failure and strive hard to imagine novel ones. Instead of isolating failures, they generalise them. Instead of making local repairs, they look for system reforms (p. 770).

The ability of HROs to carry out complex and demanding tasks in hazardous conditions and without catastrophic failure has been the subject of research by social scientists (Reason 2000; Weick 1987; Weick, Sutcliffe & Obstfeld 2008). These researchers argue that a key feature of reliable systems is their consistent performance in the face of unknown and unpredictable working conditions and their ability to ‘handle unforeseen situations in ways that forestall unintended consequences’ (Weick, Sutcliffe & Obstfeld 2008, p. 35). Reliability is achieved through the standardisation and simplification of processes; the reporting and close analysis of all safety failures (including near misses and small incidents) using a systems approach; and redundancy in equipment, personnel and safety measures (Beyea 2005; Nemeth & Cook 2007). Other important attributes of HROs include the reluctance to simplify interpretations; sensitivity to operations; the commitment to resilience; and deference to expertise (Reason 2000; Weick & Sutcliffe 2007; Weick, Sutcliffe & Obstfeld 2008).

Some of the key elements of high reliability theory overlap with the resilience engineering approach to safety. Nonetheless, concerns have been raised about the application of high reliability theory to health care domains (Nemeth & Cook 2007). Nemeth and Cook (2007) have argued, for example, that measures such as redundancy, standardisation, and extensive training during routine operations may be impractical and impede performance in hospital settings. Reasons for this include the high level of complexity and variability that characterise health care delivery, the presence of resource constraints, and the predominance of human-to-human interaction (Nemeth & Cook 2007).

2.14 Studies of gaps

Studies of gaps have tended to have as their focus four interrelated processes: communication, clinical handover, teamwork, and the phenomenon of failure-to-rescue.
2.14.1 Communication

Health care has been described as an ‘inherently interdisciplinary [...] communicative and team-based activity’ (Manser 2009, p. 143). Effective teamwork and communication are crucial to the achievement of patient safety outcomes with research establishing that communication and teamwork failures are among the most frequent contributors to gaps in patient care and preventable adverse events (El-Dawlatly et al. 2004; Kohn, Corrigan & Donaldson, M 2000; Leonard, Graham & Bonacum 2004; Lingard, Espin, Whyte et al. 2004; Meurier 2000; Page 2004; Pronovost, Thompson, Holzmueller et al. 2006; Suresh et al. 2004). The QAHCS study revealed that breakdowns in communication contributed to 11 percent of adverse events (Wilson et al. 1995). Data from the Joint Commission’s Sentinel Event Database concurs, attributing more than half of some 3,800 sentinel events (65 percent) to communication failures (The Joint Commission 2008). Of note, 73 percent of these breakdowns contributed to the patient’s death. The recognition that patient safety is primarily a systems problem underscores the importance of effective co-ordination, interaction and communication among members of health care teams (Baker, DP et al. 2003).

Leonard, Graham and Bonacum (2004) contend that effective communication is dependent upon (i) standardised communication tools; (ii) a culture where people feel they can ‘speak up’; and (iii) a common language. Measures to prevent communication gaps have included the introduction of the SBAR (Situation, Background, Assessment, and Recommendation) communication tool, originally developed by the U.S. Navy to facilitate the communication of critical information (Haig, Sutton & Whittington 2006; Hohenhaus, Powell & Hohenhaus 2006). The SBAR method has been used to standardise communication during clinical handover and the reporting of patient problems and deterioration between health care providers.

2.14.2 Clinical handover

Clinical handover, an integral part of health care and a method of managing discontinuity (Vidyarthi et al. 2006), also represents a ‘fracture’ point in patient care (Patterson et al. in press) and an opportunity for the emergence of ‘vulnerable gaps’ in the form of errors and adverse events (Johnson & Barach 2009, p. S110). Clinical handover has been defined as:
The transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis (British Medical Association 2004).

Research has identified many shortcomings in clinical handover, including a lack of structure; incidences of inaccurate, incomplete handover or no handover at all; and high variability in the handover process (Bomba & Prakash 2005; Lingard et al. 2004; Manser & Foster 2011; Pezzelesi et al. 2010; Riesenber, Leitzsch & Cunningham 2010; Vidyarthi et al. 2006). Barriers to effective clinical handover include poor communication; a lack of standardisation of the handover process; environmental and equipment issues; insufficient training, education and time; and human factors (Botti et al. 2009; Riesenber, Leitzsch & Cunningham 2010).

Measures to improve clinical handover have included the development of clinical handover standards (Australian Commission on Safety and Quality in Health Care 2011) and guidelines to improve handover practices (Australian Medical Association 2006; British Medical Association 2004). Other measures include standardisation of the process and content of clinical handover and a focus on the education and training of health care providers (Bost et al. 2010; Botti et al. 2009; Catchpole et al. 2007; Jenkin, Abelson-Mitchell & Cooper 2007).

2.14.3 Teamwork

The importance of teamwork in the achievement of patient safety outcomes was highlighted in the IOM’s report, To Err is Human (Kohn, Corrigan & Donaldson, M 2000). Teamwork has been defined as:

A dynamic process involving two or more health care professionals with complementary background and skills, sharing common health goals and exercising concerted physical and mental effort in assessing, planning, or evaluating patient care’ (Xyrichis & Ream 2008, p. 232).

Unlike teams in other industries and settings, health care teams have a number of defining characteristics. As Manser (2009) has identified, health care teams:

...work under conditions that change frequently, may be assembled ad hoc, have a dynamically changing team membership […] and have to integrate different professional cultures’ (p. 143).
Key elements of effective teamwork include interdependent collaboration based on mutual respect and trust; shared mental models with regard to mutual goals, the perception of a situation and team structure (i.e. tasks and roles); open communication and the ability to resolve differences; shared decision making; cross monitoring of the performance of other team members; and, leadership that values contributions from staff, encourages participation in decision making and adapts by reallocating functions in critical situations (Baker, DP et al. 2003; Baker, DP, Day & Salas 2006; Manser 2009; Xyrichis & Ream 2008). Furthermore, research has identified significant differences in perceptions of teamwork with doctors expressing greater satisfaction with the quality of teamwork than nurses (Flin et al. 2006; Huang et al. 2007; Makary et al. 2006; Miller 2001).

Efforts to improve teamwork have focussed on the implementation of formal teamwork training methods such as crew resource management (CRM) and simulation team training (Awad et al. 2005; Baker, DP et al. 2003; Barrett et al. 2001; Gaba 2000; Leonard, Graham and Bonacum 2004; Pizzi, Goldfarb & Nash 2001; Wachter 2004). Lessons learned from the widespread use of CRM in the aviation industry have been incorporated into health care to standardise and improve teamwork and communication. Typically, CRM training programs encompass team training, simulation, group debriefings, and the measurement and improvement of team performance (Pizzi, Goldfarb & Nash 2001). Issues addressed in these programs include conflict resolution, decision making and peer monitoring.

2.14.4 Failure-to-rescue

The term ‘failure-to-rescue’ was first coined by Silber and colleagues (1992) to describe death from complications as distinct from death per se (i.e. the number of deaths per number of patients). Key studies by Silber and colleagues (1995; 1992) revealed that occurrences of failure-to-rescue were associated more with hospital characteristics (i.e. availability of technology, physician staffing levels, average daily census, nurse-patient ratio) than the severity of the patient’s illness. Over the last two decades interest in failure-to-rescue has grown such that it has evolved into a significant patient safety issue, an important measure of hospital performance and quality of care, and a nursing sensitive outcome measure (Clarke & Aiken 2003; Mackintosh & Sandall 2008; Needleman & Buerhaus 2007; Silber et al. 2007). In hospital contexts, it is considered a gauge of an organisation’s ‘rescue capability’, its
ability to recognise patient complications and clinical deterioration and respond with appropriate clinical management (Hravnak et al. 2011; Mackintosh & Sandall 2008).

Research studies have investigated the relationship between failure-to-rescue and a range of hospital characteristics. These studies identified inverse relationships between rates of failure-to-rescue and patient-nurse ratios, levels of nurse education, total nursing hours and nursing skill mix, and superior patient care environments (Aiken et al. 2003; Aiken et al. 2008; Aiken et al. 2002; Kendall-Gallagher et al. 2011; Lang et al. 2004; Needleman et al. 2002). Nonetheless, failure-to-rescue is a multifaceted problem, characterised by the complex interplay between numerous patient and system factors (Hravnak et al. 2011; Mackintosh & Sandall 2008; National Patient Safety Agency 2007). Relevant patient factors include severity of illness, demographics, co-morbidities and individual variation in the physiologic signs of deterioration. Some of the system factors identified in a yearlong study by the National Patient Safety Agency in the United Kingdom (2007, pp. 14-23) include: communication; working conditions and the environment; patient care tasks; education and training; teamwork; organisational factors; equipment and resources; and human factors.

Initiatives to address the problem of failure-to-rescue have included system responses such as the introduction of medical emergency teams; standardised communication tools; ‘track and trigger methods’ to identify out of range physiologic parameters; and the use of simulation techniques to educate nurses in recognising patient deterioration (Buykx et al. 2011; Mackintosh & Sandall 2008; National Patient Safety Agency 2007). Furthermore, recognising and responding to clinical deterioration has been incorporated into recent standards developed by the Australian Commission for Safety and Quality in Health care (Australian Commission on Safety and Quality in Health Care 2012).

2.15 Nurses and safety success

Efforts to address the pressing global challenge of preventable harm in health care have tended to have as their focus what went ‘wrong’. The Resilience Engineering paradigm represents a move away from traditional, retrospective approaches to safety management. Instead, the Resilience Engineering approach holds that human persons actively create safety and are vital to the successful functioning of complex systems such as hospital settings. Thus, important safety lessons can be learnt from the investigation of everyday performance and what goes ‘right’.
To date, key studies of how nurses create safety have focussed on the management of risk, recovery of medical errors, and process of surveillance. While gaps are frequently cited as a contributing factor in preventable adverse events, the role and expertise of nurses in anticipating, detecting, and bridging gaps to prevent harm from reaching the patient is an under-investigated perspective in patient safety research. A key objective of this study is to redress this oversight by focussing on safety success, namely, how nurses ‘get it right’.

2.16 Conclusion

This chapter has provided a review of the literature that informed the formulation of the aims, objectives and research questions guiding this inquiry. Attention has been given to key studies of adverse events in hospital contexts, the role of human error in these events, the systems approach to human error management, and the evolution of the patient safety movement both internationally and in Australia. Attention has also been given to the processes widely used to address systems problems in health care, the role of nurses in the recovery of medical errors and the notion of nursing surveillance. Similarly, studies of gaps have been examined along with the concepts of complexity and reliability.
CHAPTER 3

METHODOLOGY AND METHOD

3.1 Introduction

This chapter has as its focus a discussion of the methodology (naturalistic inquiry) and method (qualitative exploratory descriptive research) selected for this study. In advancing this discussion attention is given firstly to a brief examination of the philosophic assumptions underpinning naturalistic inquiry and the qualitative exploratory descriptive (QED) research method. Attention is then given to the setting and the steps taken to advance the study, including: the sample (its type and size, the processes used for recruiting and accessing the sample selected, and the demographic details of the participants recruited); data collection and analysis; presentation and dissemination of the research findings; and the processes used for ensuring research rigour and the credibility of these findings. Finally, attention is given to the ethics approval process and the strengths and limitations of the study.

3.2 The naturalistic inquiry paradigm

The naturalistic inquiry paradigm, as described by Lincoln and Guba (1985), is based on two important principles. Firstly, it implies minimal manipulation or control of the variables on the part of the inquirer. Secondly the inquirer poses no prior constraints on the outcomes of the inquiry (Jacobs 1985; Lincoln & Guba 1985; Patton 2002). The inquirer allows the phenomenon of interest to ‘unfold naturally’, endeavouring to ‘understand and document the day-to-day reality’ with an ‘openness

---

7 The term ‘naturalistic inquiry’ arose from the seminal work of Lincoln and Guba (1985) and was defined at the level of paradigm. While naturalistic inquiry relies heavily on the human as instrument, Lincoln and Guba (1985) point out that it is not essential that naturalistic inquiry be carried out using qualitative methods exclusively. Subsequently and confusingly, the term naturalistic inquiry has been presented in the literature as a paradigm, a philosophic stance and a research method in qualitative research. Jacobs (1985, p. 4) suggests that wide use of the term ‘naturalistic’ is due to its logical consistency with ‘one of the basic tenets of the alternate paradigm – the inquiry is conducted in the natural setting, not in an artificial or laboratory setting’. For the purposes of this inquiry, the term ‘naturalistic inquiry’ is defined as a paradigm.
to whatever emerges’ (Patton 2002, pp. 39-40). Naturalistic inquiry is a respected paradigm in the social and behavioural sciences (Lincoln & Guba 1985). It enhances knowledge, understanding and explanation by producing ‘detailed, thick description’ of a phenomenon under investigation (Patton 2002, p. 40). Naturalistic inquiry was chosen for this inquiry because it was the most appropriate approach for generating the data needed to answer the research questions driving the inquiry.

3.2.1 Philosophic assumptions

This inquiry was guided by certain philosophic assumptions regarding the nature of reality (ontology), the relationship between the researcher and that being researched (epistemology), the role of values in an inquiry (axiology), and the possibility of naturalistic generalisation and casual linkages as described by Lincoln and Guba (1985). The axioms of the naturalistic inquiry paradigm are outlined in Box 3.1, below.

Box 3.1 The five axioms of the naturalistic inquiry paradigm (Erlandson et al. 1993; Lincoln & Guba 1985, pp. 37-8)

<table>
<thead>
<tr>
<th>The nature of reality (ontology)</th>
<th>There is not one, single, objective reality but multiple, constructed, and holistic realities that cannot be understood in isolation from their contexts.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The relationship of the knower to the known (epistemology)</td>
<td>The knower and known are inseparable, the inquirer and the object of inquiry interact and influence each other.</td>
</tr>
<tr>
<td>The role of values in inquiry (axiology)</td>
<td>Inquiry is value-laden.</td>
</tr>
<tr>
<td>The possibility of naturalistic generalisation</td>
<td>Naturalistic inquiry produces time- and context-bound working hypotheses that describe the individual case.</td>
</tr>
<tr>
<td>The possibility of causal linkages</td>
<td>All entities are in a state of mutual simultaneous shaping so that it is impossible to distinguish causes from effects.</td>
</tr>
</tbody>
</table>

Naturalistic inquiry favours qualitative methods and the use of human individuals as the ‘primary data-gathering instrument’ (Lincoln & Guba 1985, p. 39). This dependence on human persons is due to their almost ‘infinite adaptability’ and capacity to develop and refine as an inquiry progresses (Lincoln & Guba 1985, p.
Lincoln and Guba (1985) contend that the ‘human as instrument’ is inclined toward qualitative methods (i.e. interviewing, observing and document review) because they are extensions of common human activities (i.e. looking, listening, speaking and reading). They propose a set of presumptions for an inquiry to be considered ‘naturalistic’ that call for the inquirer to:

(i) adopt the axioms of the naturalistic inquiry paradigm;
(ii) rely predominantly on humans for the collection of the data;
(iii) develop the necessary skills to effectively collect the data;
(iv) avoid ‘undisciplined and haphazard poking around’ by developing an initial design for the inquiry; and
(v) become familiar with the setting for the inquiry (Lincoln & Guba 1985, p. 250).

The initial design of this study included consideration of: a focus for the inquiry, the fit of the naturalistic inquiry paradigm to the focus, where and from whom data would be collected, the method of collecting and recording the data, and the data analysis procedures (Lincoln & Guba 1985). These will be discussed under separate subheadings below.

3.2.2 Rationale for adopting the naturalistic inquiry paradigm

Naturalistic inquiry is the paradigm of choice when the focus of an inquiry is socio-behavioural (Lincoln & Guba 1985). The naturalistic inquiry paradigm was adopted for this study because its ontological assumptions about the nature of reality were consistent with the process of the inquiry. In this paradigm, realities are ‘wholes that cannot be understood in isolation from their contexts, nor can they be fragmented for separate study of the parts’ (Lincoln & Guba 1985, p. 39). In this inquiry participants were interviewed in natural settings, not created for research purposes (i.e. laboratories). The researcher as the primary data gathering instrument adjusted to the many realities encountered during the inquiry process. The emergent nature of the research design permitted flexibility throughout the inquiry and the ‘opportunity for the unexpected to arise’ (Green 2002, p. 6). Furthermore, the naturalistic inquiry
paradigm permitted an exploration of the phenomenon of gaps management without the obligation to locate the study within a grand theory.\textsuperscript{8}

3.3 The qualitative exploratory descriptive research method

This inquiry was undertaken using a qualitative exploratory descriptive (QED) method informed by the works of Sandelowski (2000), Patton (2002), and Ramprogus (2002). QED research is one of the most frequently used research methods in the practice disciplines and the method of choice when the researcher seeks description of a phenomenon about which there is little scientific knowledge and where the data are too complex to be gathered utilising a survey method (Sandelowski 2000). QED research produces a low inference description of events and is ‘especially amenable to obtaining straight and largely unadorned (i.e., minimally theorised or otherwise transformed or spun) answers to questions of special relevance to practitioners and policy makers’ (Sandelowski 2000, p. 337). The researcher achieves this by capturing all elements of an event, ‘staying close’ to the data and to the ‘surface of words and events’, and communicating the facts in ‘everyday language’ (Sandelowski 2000, p. 334). Sandelowski (2000) explains that, unlike other qualitative approaches:

\begin{quote}
There is no mandate to produce anything other than a descriptive summary of an event, organised in a way that best contains the data collected and will be most relevant to the audience for whom it was written (p. 339).
\end{quote}

QED research yields ‘a comprehensive summary of events in […] everyday terms’ (Sandelowski 2000, p. 334). Its purpose is to describe, not explain, and allow ‘an understanding of the empirical foundations of theory’ (Johnstone & Kanitsaki 2005, p. 94). To this end, QED research does not ‘go against the grain of theoretical sociological models’ but ‘permits them to exist under more propitious conditions’ (Hamel, Dufour & Fortin 1993, p. 34). In contrast to other qualitative research

\textsuperscript{8} Patton (2002, p. 136) advocates a pragmatic approach to qualitative inquiry, arguing that ‘methods can be separated from the epistemology out of which they have emerged’ and that ‘allegiance to any single epistemological perspective’ is unnecessary. Furthermore, Patton (2002, pp. 137-45) believes that ‘methods of qualitative inquiry now stand on their own as reasonable ways to find out what is happening in programs and other human settings’ without being ‘attached to or derived from a theoretical tradition’. This notion will be explored in the next section, ‘The Qualitative exploratory descriptive research method’. 
approaches such as phenomenology, ethnography, and grounded theory, language is a vehicle of communication and not an interpretive structure used to re-present events in other terms (Sandelowski 2000). The pragmatism, characteristic of QED research, is advocated by Patton (2002, pp. 136-7) who argues that ‘allegiance to any single epistemological perspective’ is unnecessary and that ‘methods of qualitative inquiry now stand on their own as reasonable ways to find out what is happening in programs and other human settings’. As Patton (2002) explains:

Not all questions are theory based. Indeed, the quite concrete and practical questions of people working to make the world a better place (and wondering if what they’re doing is working) can be addressed without placing the study in one of the theoretical frameworks (p. 136).

The QED method was eminently suited to the investigation of gaps and patient safety in complex and dynamic hospital settings. This method allowed the researcher to explore nurse’s knowledge, understanding, experiences and feelings about gaps in patient care. In so doing, the study has ‘elicit[ed] nursing knowledge from practice without fragmenting or dissociating it from its contextual reality’ (Ramprogus 2002, p. 63) and revealed how nurses contribute positively to patient safety outcomes.

3.4 Qualitative research and patient safety
Hoff and Sutcliffe (2006) have argued that patient safety research should encompass diverse methodological approaches. While Hoff and Sutcliffe (2006) write for a medical audience, the stance they adopt holds easily for nursing. Quantitative designs may control or ignore the complexity of health care, oversimplify its delivery and produce recommendations with limited application (Hoff & Sutcliffe 2006; Runciman 2002). Qualitative methods, on the other hand, accommodate the contextual realities of health care, enabling the researcher to achieve a rich description of ‘how things work in the ‘trenches’ of patient care’ (Hoff & Sutcliffe 2006, pp. 7-8). These perspectives may deepen understanding of the organisational processes around error, safety and the delivery of patient care (Hoff & Sutcliffe 2006).

3.5 Setting
The participants in this study were nurses employed in emergency, critical care, perioperative, neuroscience, and rehabilitation and transitional care settings. The selection of these clinical settings was based, in part, on data obtained from the
HMPS (Leape et al. 1991) and the QAHCS (Wilson et al. 1995) - two studies exceptional in their rigour and scope and regarded internationally as the benchmark for estimating the extent of iatrogenic injuries (Weingart et al. 2000). Emergency, critical care and perioperative settings are very acute, rapidly changing and highly unpredictable environments that experience high patient throughput. In contrast, neuroscience, rehabilitation and transitional care settings are less acute, more predictable and less rapidly changing environments. The purpose of recruiting nurses from these contrasting contexts with regard to acuity, predictability and propensity to change was to examine the phenomena of gaps from multiple perspectives and enable triangulation of the data. This approach allowed for meaningful comparisons to be made to help answer the question ‘what is going on here’?

3.5.1 Perioperative

A salient feature of the results from the HMPS and the QAHCS is the high proportion of adverse events in the operating room, 41 percent and 46.8 percent respectively (Leape et al. 1991; Wilson et al. 1995). These results are summarised in Table 3.1, below.

<table>
<thead>
<tr>
<th>Sites of care that resulted in adverse events</th>
<th>Proportion of adverse events</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>HMPS</td>
</tr>
<tr>
<td>Operating room</td>
<td>41%</td>
</tr>
<tr>
<td>Patient’s room</td>
<td>26.5%</td>
</tr>
<tr>
<td>Emergency department</td>
<td>2.9%</td>
</tr>
<tr>
<td>Intensive care unit</td>
<td>2.7%</td>
</tr>
</tbody>
</table>

Perioperative settings provide multidisciplinary care and treatment through the pre-operative, intra-operative and post-operative phases of surgery. In recent years the term ‘perioperative’ has replaced ‘operating room’ to more accurately reflect the specialised roles within this setting and the focus on temporal considerations rather than the geographical boundaries of the operation room (Riley & Peters 2000). The perioperative setting is a complex, pressured and ‘accident-rich’ health care environment (Christian et al. 2006; Smith et al. 2010). This complexity and risk arise from the interplay of many factors, including a heavy reliance on technology, the
surgery itself, patient co-morbidities, anaesthesia, scheduling considerations and the need for effective teamwork and communication across many disciplines (Wiegmann et al. 2007; Willis et al. 2005). Specialist perioperative nursing roles include anaesthetic nurse, circulating nurse (scout), instrument nurse (scrub) and post anaesthetic care nurse (recovery). Sixteen participants were recruited from perioperative settings.

3.5.2 Emergency

The incidence of adverse events in the emergency department (ED) (2.9 percent in the HMPS and 1.5 percent in the QAHCS) was found to be considerably lower than for other sites such as the operating room and patient room’s but comparable to the intensive care unit (Leape et al. 1991; Wilson et al. 1995). Significantly, however, the preventability of adverse events in the ED was high, 70.4 percent in the HMPS and 82 percent in the QAHCS. While recent studies have identified errors in all facets of emergency care (i.e. triage, diagnostic studies, administrative procedures, medication administration, therapeutic intervention and patient assessment), only a small number (2 to 4 adverse events for every 100 reported errors) resulted in adverse events (Fordyce et al. 2003; Henneman, PL et al. 2005). In contrast to the life threatening nature of many errors in critical care settings, errors in the ED resulted mostly in delays in treatment and a prolonged stay.

It is acknowledged that EDs are also ‘high risk, high stress environments fraught with opportunities for error’ (Institute of Medicine 2007, p. 23). ED care encompasses a broad case mix of patients from diverse racial, ethno-cultural, language and socio-economic backgrounds (Johnstone 2007; Nemeth, Cook & Wears 2007). The complex and ‘high-tempo’ nature of the ED requires that staff act and think quickly and make decisions, often on the basis of incomplete information (i.e. medical history, results from diagnostic tests, medications) (Croskerry & Sinclair 2001). The contributors to error are multi-factorial and include the presence of interruptions, distractions and overcrowding; high noise levels; a heavy reliance on technology; the need for effective teamwork and communication; and the high demand for emergency care. Nineteen participants were recruited from emergency settings.
3.5.3 Critical care

Recent studies in critical care settings have suggested that adverse events and serious medical errors are common and occur in between 14 percent and 20 percent of patients (Bracco et al. 2001; Donchin et al. 1995; Graf et al. 2005; Rothschild et al. 2005). Furthermore, between 11 percent and 29 percent of these errors and adverse events have been described as severe, potentially life threatening or fatal, with the majority occurring during routine care. Consistent with earlier analysis by De Vries et al. (2008), almost half (45 percent) were preventable. Rothschild et al. (2005) have provided an estimate of the extent of serious errors in critical care settings in the U.S.A:

Assuming that the rates we found are representative of critical care in teaching hospitals, we estimate that 148,000 life threatening intercepted and non-intercepted serious errors occur annually in teaching hospitals (p. 1698).

Critical care settings are ‘intricately designed, technologically laden’ and ‘intrinsically hazardous’ environments (Benner, Hooper-Kyriakidis & Stannard 1999, p. 347). A number of factors place patients in these settings at greater risk of harm from an adverse event. These include the seriousness of the patient’s illness, sophisticated equipment and technology, the use of instantaneous therapies and medications with a low threshold of error, the need for decision-making on the basis of incomplete information (Benner, Hooper-Kyriakidis & Stannard 1999; Rothschild et al. 2005). Furthermore, care is provided by a ‘constantly changing network of providers’ with varying levels of critical care training and experience (Sherwood et al. 2002). Twenty participants were recruited from critical care settings.

3.5.4 Neurosciences

Results from the HMPS suggest that the rate of adverse events in neurosurgery (9.9 percent) may be higher than for many other clinical specialties but comparable to vascular (16.1 percent), thoracic and cardiac surgery (10.8 percent) (Brennan et al. 1991). A significant finding of the QAHCS was that more adverse events for the nervous system (37.1 percent) resulted in permanent disability (Wilson et al. 1995). The study design included neuroscience units as distinct from neuroscience critical care settings that care for critically ill patients needing invasive monitoring, mechanical ventilation and intensive therapies. Neuroscience units care for medical
and surgical patients with a variety of neurological problems, including neuromuscular and cerebrovascular disorders, stroke, neurologic infections, epilepsy, tumours and head trauma. Two participants were recruited from neuroscience settings.

3.5.5 Rehabilitation and transitional care

A review of the literature failed to locate any adverse event data for rehabilitation and transitional care settings. Rehabilitation settings provide specialised health care to patients with disabilities and impairment resulting from illness, injury, trauma or surgery. Rehabilitation care seeks to maximise the patient’s physical strength, cognition, mobility, life skills and independence. Transitional care ‘encompasses a broad range of services and environments designed to promote the safe and timely passage of patients between levels of health care and across care settings’ (Naylor & Keating 2008, p. 58). Transitional care focuses on logistical considerations, education and coordination of the care of older adults with chronic and complex medical conditions (Coleman 2003). Transitional care units and services may be located within hospitals, sub-acute nursing facilities or long term care facilities. Fourteen participants were recruited from rehabilitation and transitional care settings.

The actual number of participants recruited and interviewed from each clinical context is summarised in Table 3.2, below.

<table>
<thead>
<tr>
<th>Clinical Setting</th>
<th>Number of Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>19</td>
</tr>
<tr>
<td>Critical care</td>
<td>20</td>
</tr>
<tr>
<td>Perioperative</td>
<td>16</td>
</tr>
<tr>
<td>Rehabilitation &amp; transitional care</td>
<td>14</td>
</tr>
<tr>
<td>Neurosciences</td>
<td>2</td>
</tr>
<tr>
<td>TOTAL INTERVIEWS</td>
<td>71</td>
</tr>
</tbody>
</table>

3.6 Method

This study was advanced using the following steps:

- Sample selection
- Data collection
- Data analysis
- Data presentation and dissemination of the research findings
Chapter 3. Methodology & Method

Each of these steps will be considered under separate subheadings below.

3.6.1 Sample selection

In the discussion to follow, attention is given to describing the sample type and size, the processes used for recruiting and accessing participants, and the demographic details of the participants recruited.

(a) Sample type and size

A purposeful sample of 71 participants was recruited to the study. As previously stated, the participants were nurses employed in emergency, critical care, perioperative, neuroscience, rehabilitation and transitional care settings. Nurses who participated in the study met the following inclusionary criteria:

(i) current registration as a Registered Nurse in a state or territory of Australia; and
(ii) current employment in a clinical setting relevant to the study.

Each participant’s registration and employment were verified prior to their recruitment. A sample size of 80-100 participants was the target for the study, based upon the inclusion of five clinical settings. The recruitment of only two neuroscience nurses effectively reduced the number of clinical settings of interest from five to four, although the neuroscience data has been included in the analysis. In keeping with the major tenets of naturalistic inquiry, informational considerations guided the determination of the final number of participants interviewed and the decision to stop recruitment (Lincoln & Guba 1985). On this point, Patton (2002, p. 245) states that ‘the validity, meaningfulness, and insights generated from qualitative inquiry have more to do with the information richness of the cases selected’ rather than the number of cases per se. Sampling was stopped when it was evident that no new information was emerging from the participant interviews and the sample size was judged to be ‘adequate’ - neither ‘too large’ such that it precluded ‘the deep, case-oriented analysis that is a hallmark of all qualitative inquiry’ nor ‘too small’ that it hindered ‘a new and richly textured understanding of experience’ (Sandelowski 1995, p. 183).
(b) Sample recruitment

Purposeful sampling, a crucial element of naturalistic inquiry, guided the recruitment of participants in the study (Erlandson et al. 1993; Lincoln & Guba 1985; Patton 2002). The aim of this sampling technique is to locate participants with an intense and salient experience of the phenomenon of interest and from which data can be collected and a thick description of the phenomenon under investigation composed. The examination of ‘information-rich’ cases yielded rich, descriptive data and maximised the range of information obtained about gaps and their management (Erlandson et al. 1993; Patton 2002).

Participants were recruited using snowballing and open recruitment, two widely accepted recruitment strategies in qualitative research. Snowballing is a technique whereby a participant that has already been recruited to a study informs others with the same salient experience of the phenomena about the study (Patton 2002; Silverman & Marvasti 2008). Snowballing allowed the researcher to access participants who may otherwise have been unreachable. Open recruitment was conducted by advertising the study in key nursing publications and presenting at meetings of relevant professional nursing groups. These professional nursing groups also agreed to circulate information about the study to their members.

(c) Sample description

A demographic questionnaire was used to gather data about the participant’s age, gender, current role and qualifications for the purposes of analysis and comparison (See Appendix 4).

(i) Gender

Of the 71 participants, 62 (87 percent) were female and 9 (13 percent) were male. The predominance of women in the sample is reflective of the predominance of women in the nursing profession generally.

(ii) Geographical location

Participants were located in metropolitan or regional and rural settings in all States and Territories of mainland Australia. Two participants were living and working outside Australia. See Table 3.3, below.
Table 3.3 Geographical location of participants

<table>
<thead>
<tr>
<th></th>
<th>VIC</th>
<th>QLD</th>
<th>SA</th>
<th>NSW</th>
<th>WA</th>
<th>NT</th>
<th>ACT</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metropolitan</td>
<td>21</td>
<td>9</td>
<td>4</td>
<td>7</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>46</td>
</tr>
<tr>
<td>Regional/rural</td>
<td>9</td>
<td>6</td>
<td>1</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>23</td>
</tr>
</tbody>
</table>

(VIC - Victoria; QLD - Queensland; SA - South Australia; NSW - New South Wales; WA - Western Australia; NT - Northern Territory; ACT - Australian Capital Territory)

(iii) Current role

The roles of the participants are listed in Table 3.4, below.

Table 3.4 Roles of the participants

<table>
<thead>
<tr>
<th>Role</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nurse educator</td>
<td>14</td>
</tr>
<tr>
<td>Staff nurse</td>
<td>13</td>
</tr>
<tr>
<td>Clinical nurse specialist/clinical nurse</td>
<td>13</td>
</tr>
<tr>
<td>Clinical nurse consultant</td>
<td>13</td>
</tr>
<tr>
<td>Nursing unit manager/clinical manager</td>
<td>8</td>
</tr>
<tr>
<td>Assistant nursing unit manager/charge nurse</td>
<td>3</td>
</tr>
<tr>
<td>Assistant director of nursing</td>
<td>2</td>
</tr>
<tr>
<td>Nurse practitioner</td>
<td>2</td>
</tr>
<tr>
<td>Quality coordinator</td>
<td>1</td>
</tr>
</tbody>
</table>

(iv) Age

Of the 71 nurses recruited, 69 provided details of their age. Two (2) participants declined to provide details of their age. With the available data, the following demographic profile emerged:

- 2 participants were aged between 20-25 years (2.9 percent)
- 5 participants were aged between 26-30 years (7.2 percent)
- 4 participants were aged between 31-35 years (5.8 percent)
- 9 participants were aged between 36-40 years (13 percent)
- 16 participants were aged between 41-45 years (23.2 percent)
- 18 participants were aged between 46-50 years (26.1 percent)
3.6.2 Data Collection

Data were collected via in depth, semi structured interviews using three internationally accepted methods: (i) face-to-face interviewing, (ii) telephone interviewing, and (iii) e-mail interviewing (Hodgson 2004; Karchmer 2001; Kennedy 2000; Kim et al. 2003; Lehu 2004; Meho & Tibbo 2003; Murray, CD 2004; Murray, CD & Harrison 2004; Olivero & Lunt 2004). Participants nominated their preferred interview method although financial constraints limited face-to-face interviews to those participants living in the same city as the researcher. The questions that guided each interview are contained in Appendix 1. Of the seventy one interviews conducted, 15 were face-to-face, 46 were by telephone, four were by email and six were joint email and telephone interviews (See Table 3.5 below). These six participants were interviewed initially by email and then over the telephone. Consistent with the principles of ‘auditability’ (discussed under the heading ‘consistency - auditability’ in this chapter), a full record of the data collected and analysed has been preserved.

<table>
<thead>
<tr>
<th>INTERVIEW METHOD</th>
<th>Face-to-face</th>
<th>Telephone</th>
<th>E-mail</th>
<th>E-mail &amp; telephone</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency</td>
<td>5</td>
<td>11</td>
<td>0</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td>Critical care</td>
<td>5</td>
<td>12</td>
<td>2</td>
<td>1</td>
<td>20</td>
</tr>
<tr>
<td>Perioperative</td>
<td>3</td>
<td>10</td>
<td>1</td>
<td>2</td>
<td>16</td>
</tr>
<tr>
<td>Rehabilitation/transitional care</td>
<td>1</td>
<td>12</td>
<td>1</td>
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<td>14</td>
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<td>0</td>
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<td>15</td>
<td>46</td>
<td>4</td>
<td>6</td>
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</tr>
</tbody>
</table>
(a) Face-to-face and telephone interviews

All face-to-face and telephone interviews were conducted at a time and, where applicable, place that was mutually convenient to the participant and researcher. At the commencement of each interview participants were advised that the interview was to be audio-recorded. The interview guide was used to stimulate discussion and the interviews were conversational in style. The interviews commenced with a broad initial enquiry to which respondents provided extensive reflective responses in a narrative. The length of each interview ranged from 45 minutes to 120 minutes. Verbatim transcription of audio-recorded interviews was undertaken to ensure accuracy of the data collection. It was incumbent on the researcher to exercise great care during the transcription process to ensure that a faithful record of the interview was captured. In addition to the interview and demographic data, data were also obtained from the following sources:

- Researcher field notes;
- Notes from meetings with the researcher’s supervisory team; and
- Documents and other literature sources relevant to the inquiry (i.e. scholarly literature on the topic of patient safety and the role of nurses in preserving patient safety, reports and policy documents of government and special committees, and publicly available documents and reports of health service organisations).

(b) E-mail interviews

In this section, attention is given to the evolution of e-mail interviewing as a data collection method, the use of e-mail interviewing in the current study, and the challenges posed by the use of this method.

(i) Background

E-mail interviewing is a data collection method that falls within the field of computer mediated communication (CMC) - the direct use of computers and text for the purposes of communication (Mann & Stewart 2000). The reach, accessibility and convenience of the internet have created the opportunity for qualitative researchers to apply ‘long-standing principles of recruitment and interviewing to this new setting’ (Hamilton & Bowers 2006, p. 821). Over the last twenty years, e-mail has emerged
as an alternative to traditional face-to-face and ‘naturalistic’ data collection methods (Murray, CD & Sixsmith 1998).

The suitability of e-mail interviewing as a data collection method has been the focus of many methodological studies (Foster 1994; Karchmer 2001; Kennedy 2000; Meho & Tibbo 2003; Murray, PJ 1995; Young, Persichitte & Tharp 1998). These early studies identified a number of benefits subsequently confirmed by further research (Curasi 2001; Hamilton & Bowers 2006; Hodgson 2004; Kim et al. 2003; Lehu 2004; Mann & Stewart 2000; Meho 2006; Murray, CD 2004; Murray, CD & Harrison 2004; Olivero & Lunt 2004). Consistent with these studies, e-mail interviewing offered a number of practical advantages, including access to participants from diverse geographic locations and significant cost and time savings by eliminating the need for telephone calls, travelling, scheduling of appointments, hiring of venues and equipment, and transcription of audio-recorded interviews. The potential for transcription bias was eliminated as a digitally generated, verbatim and complete account of the whole interview was immediately available for analysis (Mann & Stewart 2000). From the participant’s perspective, questions could be answered at their convenience and in an environment of their choice.

Other forms of CMC such as e-mail surveys (an electronic version of a standardised paper survey) and web-based surveys were considered inappropriate due to the complexity of the phenomenon underpinning this inquiry. Unlike virtual focus groups, the contents of the e-mail interviews were not shared with or influenced by other participants (Schneider et al. 2002). The asynchronous nature of e-mail interviewing allowed the researcher the opportunity to reflect on the interview data and revise subsequent questions before responding to the participant. It is suggested that this process may produce a ‘closer fit between ideas/emotions and their expression in writing’ (Levinson 1990, p. 5). Further benefits of this method included the avoidance of interviewer effects and the potential for shy participants or those who spoke English as a second language to feel somewhat protected and more willing to disclose. Mann and Stewart (2000) contend that participants are less likely to feel embarrassed in an on-line environment.

(ii) The e-mail interviewing process

Each e-mail interview involved many exchanges between the researcher and participant over a period of weeks to months. In keeping with the findings and recommendations of other studies (Curasi 2001; Hamilton & Bowers 2006; Meho
2006), a number of measures were taken to ensure the interviewing process was
effective. Participants were advised that interview responses could be sent in the
body of the e-mail or as an attached document. They were asked to write in a
conversational style, including as much detail as possible, and were reassured there
were no incorrect responses nor was it necessary to correct spelling and grammatical
errors. Symbols could be used to communicate emotions and feelings. Participants
were e-mailed two to three questions at a time and interviews were conducted
concurrently by sending a short list of interview questions to several participants.
Breaks between cycles of questions allowed the researcher a period of ‘thoughtful
follow-up’ (Hamilton & Bowers 2006, p. 830).

Unlike previous studies (Dommeyer & Moriarty 2000; Oppermann 1995) this
inquiry did not encounter a high number of undeliverable e-mails or low response
rate. This is not surprising given the relatively small number of participants that
selected e-mail as an interviewing method. There are, however, two possible
explanations for this finding. Firstly, electronic methods such as listservs, servers,
message boards and discussion groups were not used for the purposes of
recruitment and, secondly, the researcher personally contacted each participant prior
to their recruitment to verify their contact details.

(iii) Challenges with e-mail interviewing

While e-mail interviewing had many practical advantages, it also posed a number of
challenges. Consistent with previous research (Curasi 2001; Hamilton & Bowers
2006; Meho 2006), the process lacked spontaneity and the time taken to complete
each interview was highly variable. Similarly, the number of exchanges that occurred
between the researcher and the participant also varied greatly. While some
participants responded to a set of questions within days, others took weeks or months
and did so only in response to probing and reminding. While Curasi (2001) has
argued that the use of follow-up probes can elicit as much detail in e-mail interviews
as with face-to-face methods, this was not the case. There was less information
available in the e-mail interview transcripts than in transcripts of face-to-face and

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9 A listserv is a type of electronic mailing list whereby messages are distributed to subscribers to the
list.
10 A server is a computer that handles requests for data, email and other network services from other
computers.
11 A message board is an online discussion site.
telephone interviews. The participants' level of commitment to the study and the amount of time they were able to give to the interview process may have been contributing factors. It is also possible that e-mail interviewing, while convenient, is a medium that did not suit people who rely more on facial expression and body language and prefer to ‘tell’ a story (Mann & Stewart 2000). Poor computer and key boarding skills may have been a factor, although this is unlikely given the widespread use of computer technology in health care domains.

When the e-mail interviewing process extended over some months, with periods of several weeks elapsing between responses, participants were offered the opportunity to complete the interview over the telephone. Six participants accepted this offer.

3.6.3 Data Analysis

In keeping with the tenets of the naturalistic inquiry paradigm, collection and processing of the data was ‘continuous and simultaneous’ throughout the inquiry (Lincoln & Guba 1985, p. 335). Data were analysed using content and thematic analysis strategies and the constant comparisons method (Braun & Clarke 2006; Glaser & Strauss 1967; Lincoln & Guba 1985; Patton 2002). Thematic analysis was used to identify, analyse and report ‘patterns’ or ‘themes’ in the data that encapsulated ‘something important about the data in relation to the research question’ and represented ‘some level of patterned response or meaning within the dataset’ (Braun & Clarke 2006, pp. 79-82).

The specific steps taken to analyse the data were as follows: the verbatim transcription of the audio-recorded interviews; drafting summaries of the researcher’s field notes and memos; active reading of the data; annotating data and recording comments in the margins of the transcripts and summaries; developing tables and matrices; creating categories; sorting the material into categories; noting the variables and relationships between categories and the ‘negative case’; and, relating the analytic framework and findings to the literature (Creswell 2007; Lincoln & Guba 1985; Patton 2002).

The study generated 1595 pages of interview transcript. Page-by-page and line-by-line analysis of the data in the transcripts reduced the volume of the data to 238 pages. Further analysis reduced to the data to just 74 pages, as contained in Chapter 4 of this thesis. The collection of data from nurses working in a variety of clinical settings enabled the researcher to use the constant comparison method during the
processing of the data. While the constant comparison method is associated with
grounded theory its application is not limited to this approach. This method involved
comparing recent data with previous data in the search for consistencies, differences,
variations, and negative cases within and between the data set for each clinical
setting (Erlandson et al. 1993; Glaser & Strauss 1967; Lincoln & Guba 1985).

3.6.4 Presentation and dissemination of research findings

The findings of this study are presented in Chapter 4 of this report. During the course
of the inquiry, preliminary findings were presented at three seminars sponsored by
Deakin University. It is anticipated that the research findings will be further
disseminated via the following processes:

- provision of a final copy of the report to each of the participants;
- provision of a final copy of the report to the specialist nursing groups
  representing nurses from each of the clinical settings of interest;
- face-to-face report or presentation of the study’s findings to interested
  staff;
- availability of a pdf version of the final thesis on the internet;
- professional seminar and conference presentations; and
- publication in professional peer-reviewed journals.

3.7 Research rigour

Four factors are critical to demonstrating ‘trustworthiness’ or rigour in a naturalistic
inquiry (Lincoln & Guba 1985). The inquiry must (i) demonstrate its truth value, (ii)
provide the basis for application in other contexts, and (iii) permit external
judgements about the consistency of its procedures, and (iv) the neutrality of its
findings (Erlandson et al. 1993; Lincoln & Guba 1985). Trustworthiness is
established through techniques that provide truth value through credibility;
applicability through transferability; consistency through dependability and neutrality
through confirmability (Erlandson et al. 1993; Lincoln & Guba 1985).

3.7.1 Truth value - credibility

The truth value or credibility of a naturalistic inquiry ‘generally resides in the
discovery of human phenomena or experiences as they are lived and perceived by
subjects, rather than in the verification of a priori conceptions of those experiences’
(Sandelowski 1986, p. 30). An inquiry is credible when the researcher’s descriptions or interpretations of a human experience are immediately recognised by the participants as being their own (Erlandson et al. 1993). Credibility is enhanced when others recognise the particular experience or phenomena, having read about it.

In keeping with the recommendations of Lincoln and Guba (1985), Patton (2002) and Sandelowski (1986), a number of measures were taken to preserve the credibility of the inquiry. Firstly, the researcher maintained a stance of ‘empathic neutrality’ in regard to the phenomenon being examined, demonstrating interest in the participants while remaining neutral about their interview responses so as not to become ‘too involved, which can cloud judgement’ nor ‘too distant which can reduce understanding’ (Patton 2002, p. 50). Secondly, the data was not manipulated to fit a priori conceptions of how nurses manage gaps nor were constraints imposed on the outcome of the inquiry. Thirdly, the steps of the methodology (i.e. maintaining an audit trail, using constant comparison, looking for the negative case) were rigorously followed. The researcher remained immersed in the data, revisiting it ‘over and over again to see if the constructs, categories, explanations, and interpretations make sense, if they really reflect the nature of the phenomena’ (Patton 2002, p. 570).

Specific techniques used to establish credibility were triangulation of the data source and method, referential adequacy materials, peer debriefing, and a reflexive journal. These are outlined briefly below.

(a) **Triangulation**

Triangulation involves the collection of information from different points of view. Triangulation of the data source was achieved by recruiting nurses from a variety of clinical settings in metropolitan, regional and rural hospitals throughout mainland Australia. These nurses performed a wide range of roles. As mentioned, three of these settings (emergency, critical care and perioperative) were rapidly changing, very acute and highly unpredictable environments while the other two (neurosciences, rehabilitation and transitional care) were more predictable, less acute and less rapidly changing. Triangulation was also achieved through the use of three methods of data collection (i.e. face-to-face, telephone and e-mail interviewing). It is argued that the triangulation of e-mail interviewing with other data collection methods can strengthen the credibility of a study’s findings (Curasi 2001). Finally, the involvement of the researcher’s supervisors in the data analysis contributed to researcher or analyst triangulation.
(b) Referential adequacy materials

Referential adequacy materials are ‘context rich, holistic materials that provide background meaning to support data analysis, interpretations, and audits’ (Erlandson et al. 1993, p. 139). A range of annual and departmental reports, staff bulletins, patient safety bulletins, and publications relating to the issue of patient safety were reviewed in the course of this study. While they were not part of the analysis these materials assisted the inquirer in understanding the problem of patient safety and efforts to reduce the incidence of preventable adverse events in hospital contexts.

(c) Peer debriefing

Throughout the course of the inquiry the researcher met with a supervisory team on a regular basis to test working hypotheses and discuss methodological issues. This peer debriefing process also kept the researcher ‘honest’ by providing an opportunity for a professional peer to probe biases, explore meanings and clarify interpretations (Lincoln & Guba 1985). A written reflective paper summarising the issues discussed and the researcher’s reflections was developed.

3.7.2 Applicability - transferability

A study’s transferability refers to the extent to which its findings have application and ‘fit’ in other contexts (Lincoln & Guba 1985). While research within the conventional paradigm permits generalisability of a study’s findings to a broad population, this study sought to achieve ‘naturalistic generalisability’ (Erlandson et al. 1993; Lincoln & Guba 1985; Patton 2002). Stake (1978) argues that there is a natural basis for generalisation when the method of research is epistemologically in harmony with the reader’s experience. Lincoln and Guba (1985) concur, suggesting that ‘naturalistic generalisation’ is an intuitive type of generalisation. Those in the receiving context must interpret a study’s findings, make the necessary comparisons and arrive at a judgement about their ‘fit’ (Erlandson et al. 1993; Lincoln & Guba 1985). A degree of ‘fit’ and ‘transferability’ exist between one context and another when the data parallel the reader’s actual experience and have direct relevance, meaning and application in their environment (Lincoln & Guba 1985).

The study’s applicability and transferability were ascertained by presenting the preliminary results and findings at seminars and conferences within Deakin University, where the researcher is a PhD candidate. This allowed the researcher to track the transferability of the analysis and findings while the inquiry was in
progress. Colleagues at these events confirmed the resonance of the research findings.

3.7.3 Consistency - auditability

Lincoln and Guba (1985) propose that auditability be the measure of an inquiry’s consistency. An audit trail has been maintained such that an auditor could examine the process and product of the inquiry and determine if the conclusions, interpretations, and recommendations are supported and anyone following these steps would likely arrive at similar findings (Lincoln & Guba 1985).

3.7.4 Neutrality - confirmability

Confirmability refers to the degree to which the research findings are the product of the focus of the inquiry and not the biases of the researcher (Lincoln & Guba, 1985). It is achieved through truth value, applicability and consistency and confirmed through an audit process or the steps taken and described in this chapter.

3.8 Ethical considerations

In keeping with the ethical standards of research required by the National Health and Medical Research Council (NHMRC) approval for this study was obtained from the Deakin University Human Research Ethics Committee. A formal ethics application, required by a participating metropolitan health service, was also approved. Nurses were invited to participate in the study either in person, by telephone or via e-mail communication. At this time, the purpose of the study and method of data collection were explained and the participants’ questions or concerns were addressed. Each participant’s registration and employment status were verified and those that qualified for inclusion received by mail or e-mail a plain language statement, consent form and demographic questionnaire (See Appendices 2, 3 and 4). Following receipt of a completed consent form, arrangements were made for a face-to-face, telephone or e-mail interview.

3.8.1 Privacy and confidentiality

Every effort was made to protect the privacy of the participants and their employing hospitals and the confidentiality of the data. The demographic questionnaires and envelopes were numerically coded and did not contain any personally identifying
codes or markings. The professional transcriber employed to transcribe the audio interviews signed a confidentiality contract regarding the subject matter. Any identifying information contained in the interview transcripts was seen only by the researcher and once noted was removed. A numerical code was assigned to each interview transcript and these codes are used to quote from the transcripts throughout this thesis. The researcher maintained confidentiality while keeping a reflexive journal throughout the inquiry.

In addition, a number of measures were taken to protect the privacy of participants in the e-mail interviews and the confidentiality of the e-mail responses. A password protected e-mail address was used to conduct all e-mail interviews and guard against the risk of loss, unauthorised access, modification or disclosure of the e-mail interviewing data (Mann & Stewart 2000). Participants were advised to take the same precaution and to delete their responses and empty their recycle bin once the information had been sent to the researcher. It is acknowledged, however, that participants retained ownership of their e-mail responses and may have decided to keep this information. All identifiers were removed from the e-mail responses and the text was cut and pasted into a word processing program which contained identifying codes known only to the researcher. Printing of the responses occurred only after this process was complete so that names and email addresses were not contained in hard copies. All e-mail responses were deleted once the text had been received and copied. These measures minimised the risk of identifying information being inadvertently disclosed while stored on a computer connected to the internet (Meho 2006). As with all electronic communication, transit confidentiality could not be guaranteed.

3.8.2 Security of the data

A high quality anti-virus program was used to preserve the integrity of all data throughout the study. Data were stored on the network systems of the University at which the researcher was a post graduate student. These systems provide high levels of manageable security and data integrity, remote access, and disaster recovery processes should a large scale incident occur. Data were backed up on a regular basis and portable devices and memory sticks were used for archiving, data transport and works in progress.

12 While the researcher’s supervisors read the interview transcripts, these were de-identified.
3.8.3 Risk assessment and management

Participants in this study were not exposed to any physical, psychological or social risk above the everyday norm. They were asked to discuss their experience of managing gaps, a common feature of everyday clinical practice. Nonetheless, the study's design included consideration of the appropriate response should any participant be unduly concerned about their answers to any of the interview questions or find participation in the project distressing. There were no participant withdrawals from the study nor did any of the participants find the interviewing process distressing. To the contrary, participants described the interview as a positive, cathartic, stimulating and empowering experience through which they developed a richer and deeper understanding of the problem of patient safety. Consistent with the tenets of the naturalistic inquiry paradigm, involvement in the study was not a neutral experience for the participants (Erlandson et al. 1993). One participant commented that the study provided a valuable opportunity to ‘prove that nurses contribute positively to the health care system because they do’ (57:26). Others thought that investigating and articulating the ‘behind the scenes’ work of nurses was an interesting and novel approach to patient safety research.

3.9 Strengths and limitations of the study

The key strength of this study was the naturalistic inquiry paradigm and the step-by-step process followed, which enabled the researcher to capture a rich description of the phenomenon under investigation and answer the research questions posed. Nonetheless, consideration must be given to the limitations of the study and its findings.

The first limitation relates to the data collection. An issue with any research relying on memory is that the recall of events may be inaccurate or incomplete and personal bias and emotions (i.e. anger, anxiety) might distort the participant’s responses.

A second limitation concerns the finding that the processes of anticipating, identifying and bridging gaps occurred in a rapid sequence such that they were indistinguishable. Consequently, it was not possible to assign clearly delineated strategies to each facet of gaps management (i.e. anticipation, detection and bridging).

A third limitation (although this could also be seen as a strength) is the considerable amount of interview data that was generated (i.e. 1595 of transcript as
well as field notes). As indicated in Section 3.6.3, a page-by-page and line-by-line analysis of the interview transcripts reduced the volume of the data to 238 pages. Further analysis of the findings across the clinical settings reduced the data to just 74 pages, as contained in Chapter 4 of this thesis. During this process, decisions about what to include and what to exclude were based on the following considerations, as described by Johnstone and Kanitsaki (2005, p. 108):

- the consistency of findings across clinical settings;
- the consistency of the findings with other studies;
- the identification of issues not raised or considered in the literature review for the study;
- the identification of issues that added a different dimension or perspective to those identified in the literature review;
- the identification of issues relevant to the improvement of patient safety outcomes.

While some data was unavoidably ‘lost’ during this process, the findings presented in this thesis contain a ‘thick’ and faithful description of the participant’s knowledge, understandings and experiences (Johnstone & Kanitsaki 2005).

The initial design for the study included nurses from orthopaedic settings. A fourth limitation relates to the unsuccessful recruitment of orthopaedic nurses and the recruitment of only two neuroscience nurses. In keeping with the emergent nature of qualitative research inquiry, the study design was amended to include nurses employed in rehabilitation and transitional care settings. These settings were selected because the nature of patient care (i.e. acuity, predictability and propensity to change) was considered comparable to neurosciences and orthopaedics.

3.10 Conclusion

This chapter has had as its focus a discussion of the naturalistic inquiry paradigm and the qualitative exploratory descriptive (QED) research method selected for this study. In advancing this discussion attention has been given firstly to a brief examination of the philosophic assumptions underpinning naturalistic inquiry and the QED research method. Attention has also been given to the steps taken to advance the study, including: sample selection (its type and size, the processes used for recruiting and accessing the sample selected, and the demographic details of the participants recruited); data collection and analysis; presentation and dissemination of the
research findings; and the processes used for ensuring research rigour and the credibility of the research findings. The processes followed for ensuring compliance with research ethics standards have also been considered along with the strengths and limitations of the study. Attention will now turn to the presentation and analysis of the data.
CHAPTER FOUR
DATA PRESENTATION AND ANALYSIS

Yet, many patients safely move through complex acute and critical care settings without complication or difficulty. Their safe passage is due, in part, to the skilful, but largely invisible safety work routinely performed by nurses (Benner 1999, p.347).

It’s interesting you can always remember the bad things because you learn from them. The good ones they tend to be just part of everyday (56:04).

4.1 Introduction

In this chapter an aggregate summary of the data obtained from interviewing 71 participants is presented. The purpose of conducting the interviews was to obtain information about nurses’ knowledge, understandings, insights and experiences regarding:

- patient safety and adverse events in a variety of clinical settings;
- gaps in patient care;
- how nurses anticipate, detect and bridge gaps;
- the relationship between gaps, patient safety and nursing; and
- the processes that are best suited to promoting safety and quality in health care.

As previously discussed in Chapter Three, the Methodology and Method, data were analysed using qualitative methods of analysis, including content and thematic analysis and by making constant comparisons. In this chapter presentation of the data is organised around the four key research questions driving this study:

- What are the gaps that are commonly anticipated, detected and bridged by nurses?
- How do nurses anticipate, detect and bridge gaps that are (i) familiar to them (ii) new and unfamiliar and (iii) familiar but whose characteristics have changed?
Chapter 4. Data Presentation & Analysis

- What is the relationship between gaps management and patient safety outcomes?
- What do nurses know and understand by adverse events?

A summary of the findings made from analysis of the data is presented under separate subheadings, keyed to the above research questions.

4.2 Gaps

Nurses who succeeded in preventing adverse events had an acute awareness of what gaps were, which they described in the following key terms:

- loss of the natural flow of events; and
- the lack of a continuous and seamless approach to patient care from one carer to the next.

Gaps occurred when:

- things were overlooked or omitted;
- there was a lack of follow through;
- processes were not linked properly; and
- procedures did not happen the way they should because nurses did things their own way and not in line with evidence-based guidelines.

When gaps were present, patient care was disjointed, stilted, broken and lacking organisation such that the normal, expected or planned sequence of events was interrupted, delayed, disrupted or did not occur as it should:

Discontinuity is, I suppose, the line of patient care that is interrupted, doesn’t flow, something’s missing. So instead of going on one continuous treatment plan it sort of becomes interrupted, that the line is broken (48:03).

I believe the term 'discontinuities' to define a disjointed or stilted process where there is logic and organisation lacking. Almost as if there is a broken process. I think this term also implies that the broken process has taken on an unrelated path for its completion (75:02).
To me, discontinuity means the abandonment of medical or nursing care for the patient, or the loss of information regarding patient care. When there are gaps regarding patient care, this is the break, disruption, delay or holdup of patient care (36:02).

Well, when you say discontinuities, I would do discontinuities of care. So where there would be a lack of follow through, where processes aren't linked properly, procedures don't happen the way they should, that sort of thing. Gaps could be gaps in knowledge or they could be gaps in processes, so that's about not knowing (57:07).

Participants described gaps in terms of their size. Some gaps, such as clinical deterioration, caught nurses unawares and were described as ‘big’ and difficult to foresee (73:06). Others were described as small but with the potential to ‘grow like topsy’ and ‘snow ball’, conveying a sense that if things are not picked up early they can gain momentum and evolve into something bigger that may be difficult to remedy and catastrophic for the patient (03:07; 47:23). The following case illustrates this point. In this case, a nurse set out to administer an intravenous antibiotic, left this task to attend to a more pressing need (i.e. the alarm on a monitor) and was called away again. Consequently, the initial task to administer the medication was overlooked and not completed:

Yeah, I think it sort of snowballs. I think people start out you know, with the intentions of everything lining up and going - doing it appropriately. But you know, they may have just started an antibiotic in this bedspace and the alarm goes off on the bed next door. So they just pull the curtain back, start fixing the alarm, something else happens. I think you know there's so much going on that you kind of have to check those things immediately if an alarm goes off, for example, and so things get missed and then you've forgotten to sign that drug or I don't think, you know anybody thinks that it should be acceptable to leave things like that unsigned or undone. Because when they're on the receiving end it's equally as frustrating for them (45:11).

Gaps were created by shortcomings in processes, procedures, education and communication and when hospital systems were ignored. Gaps were described as points in the patient’s journey where there was an opportunity created for an error, adverse event or something to go wrong:
I think a gap is a point in a patient's journey that where there is room for something to go wrong, you know? It doesn’t necessarily always go wrong but it’s a gap in either the transfer of information or communication. Something happening where you open the window for anything to happen - that's the way I see it (73:04).

Well we’re aiming for seamless continuity of care so if there is a gap I guess there’s an opportunity for an adverse event so that’s I guess how I would view it (06:05).

Processes, procedures or education, for example, have shortcomings or are incomplete so that errors or adverse events can occur (11:04)

The bad ones really to me are probably system issues at the moment. The gaps in care where you have got a system put in place and people just ignore it and then that may lead to an adverse event for a patient (60:20).

While most participants used the terms ‘gaps’ and ‘discontinuities’ interchangeably, two described these terms quite differently. In their view, a gap was an omission or oversight or something that did not occur, while discontinuity was the fragmentation that ensued when patient care did not follow the expected path:

I do see a bit of a difference between the two terms. I guess the gaps would be identified things that don’t occur, and the discontinuity for me would be a fragmentation of how that occurs (63:08).

Discontinuity is something that doesn’t necessarily follow the usual path or continuum, the usual procedure that you would expect. Gap, to me, suggests something that is almost omitted or overlooked (25:04).

One of the key research questions driving this study is how nurses anticipate, detect and bridge gaps that are (i) familiar to them, (ii) new and unfamiliar, and (iii) familiar but whose characteristics had changed. Analysis of the data was undertaken to determine whether the gaps described by participants were familiar, new and unfamiliar, or familiar but whose characteristics had changed. The participants’ responses are presented under the following sub headings:

- Which gaps were familiar to nurses?
- Which gaps were new and unfamiliar to nurses?
- Which gaps were familiar to nurses but their characteristics had changed?
4.2.1 Which gaps were familiar to nurses?

Analysis of the data revealed that nurses were familiar with most of the gaps described in the context of this study. These familiar gaps are listed in Table 4.1 below.

Table 4.1 Gaps that were familiar to nurses

<table>
<thead>
<tr>
<th>Failure to recognise and respond to a deteriorating patient</th>
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<tbody>
<tr>
<td>Examples included:</td>
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<tr>
<td>• Nurses failing to recognise and act upon patient observations that were outside normal limits and indicative of clinical deterioration</td>
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</table>

<table>
<thead>
<tr>
<th>Failure of nurses to attend to the ‘simple’ or ‘little’ things</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples included:</td>
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<tr>
<td>• Turning off the continuous blood pressure monitor and forgetting to turn it back on, so that the blood pressure was not checked for an extended period</td>
</tr>
<tr>
<td>• Increasing the rate of an intravenous infusion to flush a drug through and forgetting to turn the rate back down</td>
</tr>
<tr>
<td>• Incorrect positioning (e.g. hyperextension) or securing of limbs causing displacement and injury during anaesthesia</td>
</tr>
<tr>
<td>• Misplaced filters and tubing causing eye injury and blindness during anaesthesia</td>
</tr>
<tr>
<td>• Failure to check the pre-operative blood results</td>
</tr>
<tr>
<td>• Failure to check a patient’s temperature prior to their transfer from the post anaesthesia care unit to the ward</td>
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<tr>
<td>• Inappropriate disposal of soiled linen</td>
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<tr>
<td>• An insecure connection on a central venous catheter</td>
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<tr>
<td>• Failure to clamp the intravenous line of an inotropic infusion prior to removing it from the infusion pump</td>
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</table>

<table>
<thead>
<tr>
<th>Failure to follow correct procedure</th>
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<tbody>
<tr>
<td>Examples included:</td>
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<tr>
<td>• Failure to complete the pre-operative checklist and identify the patient’s allergies</td>
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<tr>
<td>• Failure to x-ray a patient for a retained item when the surgical count was incorrect</td>
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<tr>
<td>• Failure to apply evidence based guidelines to the nursing management of central venous catheters</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Failure to communicate the information required to plan and deliver care safely</th>
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<tbody>
<tr>
<td>Deficiencies in clinical handover included:</td>
</tr>
<tr>
<td>• The lack of a systematic approach to handover such that the oncoming shift did not understand the care required and why this care was important</td>
</tr>
<tr>
<td>• A lack of priority accorded to clinical handover</td>
</tr>
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<td>• The allocation of insufficient time such that handover was rushed</td>
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<td>• The omission of handover because of time constraints</td>
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</table>
• The perception that handover was an opportunity to socialise and not an important part of patient care
• A flippant approach to handover when a procedure was perceived to be routine
• The handing over of patients through an intermediary such as a team leader rather than directly from one nurse to the next

The loss of important information or contextual details because:
• Staff forgot, played down or very slightly altered the story or perceived that certain parts were not important
• Hand over was taped or given by staff who spoke English as a second language
• Staff were reluctant to volunteer information for fear of being humiliated by colleagues

Gaps in patient information when the care of patients transferred to another service or facility included:
• A lack of clarity and detail regarding the patient’s previous or current medical history, recent treatment, medications, and care needs
• The use of standard post-operative instructions and care plans that failed to address individual patient needs
• Failure to communicate the information required to provide safe care to the staff at the bedside

Lapses in communication included:
• Failure to communicate changes to a consent form to staff in the operating theatre

Lapses in critical thinking

Examples included:
• Failure of nurses to think about what the patient needed, the care they were providing and the impact of their actions
• Failure to question or challenge assumptions and the opinions of others

Nurses cutting corners....taking short cuts

Examples included:
• Nurses not following established protocols and processes
• Nurses using medical devices as the dominant assessment tool rather than an adjunct
• Nurses performing ‘radar observations’, described as looking at a monitor and recording vital signs without assessing and physically interacting with the patient
• Nurses not doing a full or thorough assessment and ‘filling in’ observations when they were busy to avoid the perception they were incompetent or not coping
• Nurses not checking medications at the bedside and the patient’s identity
• Nurses not taking the time to familiarise themselves with the medications they administered
• Failure to provide essential care - mouth care, repositioning and sitting patients out of bed, maintaining and changing dressings
• Failure to prevent pressure ulcers from endotracheal tubes, naso-gastric tubes and thromboembolic deterrent stockings
4.2.2 Which gaps were new and unfamiliar to nurses?

Analysis of the data revealed that new and unfamiliar gaps of which nurses had no knowledge or direct experience were rare. These gaps are listed in Box 4.1 below:

Box 4.1 Gaps that were new and unfamiliar to nurses

- An equipment problem where the oxygen hose of the ventilator was not correctly attached to the boom of the oxygen supply. The ventilator did not have an inbuilt analyser to alert the staff to this problem. The patient developed respiratory distress from breathing room air.
- A life support machine fell off the trolley and to the floor. The patient could not be resuscitated and died.
- A life support machine reached the end of its battery life and shut down as it was plugged into the power supply. The patient was resuscitated and survived.

4.2.3 Which gaps were familiar to nurses but their characteristics had changed?

The study sought to identify gaps that were familiar to nurses but their characteristics had changed, however, careful examination of the data failed to identify any gaps with these attributes.

4.3 How did nurses manage gaps?

It emerged from analysis of the data that nurses used the same processes to anticipate, detect and bridge gaps, irrespective of whether the gaps were familiar or new and unfamiliar. The study also revealed that chance or serendipity played a role in the management of gaps and prevention of adverse events. Participants described how coincidence or happenstance placed them in a situation where they detected that something was wrong. As participants responded:

It’s probably just coincidence. I’ve happened to come along or somebody’s happened to come along and see it (58:08).

But that was just happenstance. I just happened to be walking past at the time and overheard that conversation (66:18-19).
It was one of those once in a blue [moon] situations, but they happen. I hadn’t met the patient before. I didn’t know why we were doing this; it was pure chance that I had walked in and yet it had a really good outcome for that mother and that child (64:14).

Well I thought thank goodness for that. I would have preferred it if I didn’t have to pick it up but I just happened to notice it, and it was just the fact that I walked into the theatre at that time (09:17).

The processes used by nurses to anticipate, detect and bridge gaps are presented here under the following sub headings:

- Knowledge and experience
- Nursing surveillance
- Communication
- Teamwork
- Serendipity or chance

4.3.1 Knowledge and experience

A key finding of this study is that nurses who succeeded in managing gaps and preventing adverse events had acquired necessary knowledge and learned from experience. This study has captured many examples where nurses anticipated gaps by watching out and checking for specific things that, based on experience, were commonly missed or overlooked. Nurses also made the necessary preparations and adjustments to minimise the impact of these oversights on patients. The ability of nurses to anticipate gaps and prevent adverse events was also a result of their direct and previous experience of such events as well as the things that happened or went wrong in patient care:

I have seen adverse events happen, I have the foresight to see what might happen from my experience but how do you show that to the younger junior staff. That is the challenge (18:20).

Experience enabled nurses to develop foresight, an awareness of all the possibilities and situations where something might go wrong (18:20). Through experience, nurses also gained knowledge of their environment, the equipment used in their clinical context and the resources available for solving problems (72:13; 70:18-19). The experience gained from working in a clinical setting for a long time enabled nurses to predict certain events or things that might go wrong and put
measures in place to minimise the impact on patients (47:19). An example was knowledge of the correct procedures and pointing this out to a colleague. Participants suggested that while learning on the job was not ideal, nurses never forgot these lessons. As participants responded:

> I think a lot of anticipation in nursing comes down to experience and whether that can be changed or not I’m not sure. I think like anything, with time comes experience and you’re able to, in nursing, anticipate a lot more. Sometimes it is because of adverse events and outcomes that you learn, you know, on the job; but certainly that’s not the best way to learn, but it’s not something that you ever forget (25:14-15).

But if you can be really diligent about the detail and always looking out for what could go wrong, which I think comes with experience, and when you’ve seen things go wrong you don’t forget them (70:11).

> I think trying to foresee things, it’s really helpful when you have worked in an area for a long time, you can predict some of the stuff that is going to happen and if you can predict or foresee that this could be a problem, you can start putting things into place to prevent it becoming a problem (47:19).

> Often it is not really intervening but potentially you can stop some things from happening, really simple things like knowing what the correct procedures are and if you see that it doesn’t look right pointing it out to someone (07:15).

Experience informed nurses of the practices that were incorrect, overlooked or forgotten. Many of these omitted or flawed practices were described as ‘simple’ but fundamental. The diagnosis and reason for admission guided one participant as to specific areas of patient care that might be overlooked. Examples included out of range blood sugar levels that increased the risk of wound infection; monitoring of weight and fluid status; recommencement of diuretics post-operatively; incorrectly identified arrhythmias; and chest drains that had the inappropriate amount of suction. As a result the drainage was minimal and there was a risk the drains might have been prematurely removed (20:12).

Based on their experience, nurses left nothing to chance (69:02-04). One participant described how she stayed late from the morning shift to source a patient’s anti-epileptic medication, aware of a recent situation where a patient had a seizure and was harmed because their medication had not been given. In that case the staff
noted the medication was out of stock but did not follow-up and obtain it from the pharmacy (70:19-20).

Through experience, nurses developed the ability to detect gaps by skilfully questioning patients. This involved knowing what questions to ask and how to phrase questions in such a way that patients revealed their story (40:12). Nurses described themselves as the people that actually talk to patients and their family, capture how they are, and find out important details about their background and history (52:17). While the medical staff asked standard questions (i.e. Have you got any heart problems? Are you a diabetic?), nurses framed questions slightly differently (i.e. Have you ever felt this before?) and in a way that encouraged patients to disclose important information (i.e. I had this tightening in the chest). One participant described an occasion where a patient revealed crucial details of her medical history (50:14-15). The patient described an experience of being ‘in the corner of the ceiling’, watching people ‘pound her chest’. The nurse thought this an odd story and investigated further. It emerged that the patient had experienced four cardiac arrests during a previous anaesthetic. While this information was in the chart, it had not been picked up by the other staff. The participant commented that experience enabled nurses to pick up on all the little things that were required to safely care for patients:

That’s where it comes in again, the experience of the nurse to be able to pick up all the little things. Like taking a pulse without thinking, you just say oh that’s not quite right and sometimes you get the patients to elaborate more on something. Instead of just […] doctors […] the anaesthetists will go up to the patient and go standard questions, you got any heart problems, are you a diabetic, have you had epilepsy, you got respiratory, and the patient will go no, no, no because I’m sick of all these stupid questions. But if the nurse goes up and says the questions in just a little different way, have you ever felt this or have you ever had that, and oh well last year I had this tightening in the chest and whatever, and you go okay right. And you can dig up more, and you can find more bells to be aware of. And you’ve got to talk about it and just say well by the way, we need to know this (09:20).

(a) Expert nursing knowledge prevented adverse events

This study has captured a number of instances where the expert knowledge and experience of nurses was critical to identifying and bridging gaps in patient care and preventing adverse events of a potentially catastrophic nature. A cogent example of this can be found in the response of one perioperative participant to a situation where
a patient became dangerously hypertensive (i.e. blood pressure 260mmHg) each time the surgeon touched the adrenal gland with the diathermy probe\textsuperscript{13} (06:07). Based on her knowledge of the available equipment and other diathermy systems, the nurse recommended an alternative system commonly used in neurosurgery. This was tolerated by the patient and the blood pressure stabilised, minimising the risk of perioperative stroke and death, and allowing the surgeon to close the wound.

On another occasion, an emergency nurse’s prior experience of oculogyric crisis along with her knowledge of the patient’s medical history, current medications and side effects, gave her the ability to recognise this complication and initiate the appropriate treatment. The patient’s doctor, an intern, had not heard of the condition, failed to recognise there was anything wrong and did not know how to treat it:

I realised that she was having an oculogyric crisis from the Stemetil and her doctor was an intern. I said to him ‘Look she needs some cogentin’. It turned out that he had never heard of it and didn’t know how to treat it. I said ‘well you know I’m going to get some and give it to her’. By this time she couldn’t swallow because her mouth was over her ear, so I gave it intramuscularly. I’m certainly not blowing my own trumpet but I think that somebody with less experience nursing wise and an intern who had no idea what to do, and by this time was panicking, would not have been a good situation for the patient. And after one dose of cogentin she was fine and she went home (03:03).

\textit{(b) The knowledge and experience of critical care nurses}

An experienced critical care nurse revealed that he routinely checked twenty or so practices that, in his experience, were almost always wrong or overlooked. They included the tracing on the monitors, the presence of pressure areas, ventilator and alarm settings, abdominal and central venous pressure readings and, the placement of intravenous lines and endotracheal tubes:

\textsuperscript{13} A medical instrument where heat generated by electricity is used to cut tissue or seal bleeding vessels.
I now make it a routine practice that when I go and mind someone's patient while they go to tea, I quickly go through the ventilator and I know things that are almost always wrong. So that the flow trigger for example is often set too high and it just makes it unnecessarily difficult for the person to initiate respiration. The alarms may be set inappropriately, which puts a person at risk. The central venous pressures will be generally inaccurate. The lines aren't secured terribly well and just at risk of falling out […] the endotracheal tube just often isn't rotated or isn't secured at times […] So there's twenty or so things I check routinely […] and I pick those things because I know that they will be routinely wrong or not looked at or something. Abdominal pressures will always be wrong. If I ever hear someone's abdominal pressure's more than twenty, I'll go and recheck it and I usually find it's 10. So it's way out (23:21-22).

This same participant acknowledged that his many years of critical care experience had contributed to his scepticism and lack of trust in his colleagues. He constantly questioned and checked, making sure that all the ‘i’s were dotted and the ‘t’s were crossed:

I just don't trust anyone any more. I don't. I'm annoying. It's just something that's developed over the years. I'm just very sceptical and I think that's a fairly good characteristic in intensive care. I think you have to be that thorough and get down to it and find out exactly what's going on. So I think that constant questioning and checking to make sure all the i's are dotted and the t's are crossed is important (23:13).

The wealth of experience of a critical care nurse was a factor in her ability to identify that an endotracheal tube was misplaced in the right main bronchus. The nurse recognised this error during a routine assessment of the patient, when she was unable to detect air entry above the patient’s clavicle. She commented that her medical and nursing colleagues were unaware that the absence of air entry above the clavicle was indicative of this problem. The medical staff waited for an x-ray to confirm that the tube was misplaced, but the nurse was in no doubt, based on her assessment of the patient’s breath sounds and her observation that the patient’s ventilation was slightly asynchronous:
She didn't have any air entry above her left clavicle. Intubated patient sitting upright. You've got to have air above [...] the clavicle [...] it was so easy. But no one other nurse or medical staff on that shift knew that. Now, that was gobsmacking, you know, but that's the wealth of experience. Because you could listen to the chest and you could see that the ventilation was just nearly right. It was a slight rise and fall. It was asynchronous, though, and they said, ‘oh no, she's been asynchronous before’. I said, ‘No’. I just did a normal assessment and said, ‘oh, she's got a right main’ (57:13).

(c) The knowledge and experience of emergency nurses

Prior experience of patients being unsafely discharged from the emergency department, informed nurses of the things that were commonly overlooked and increased the risk of adverse events. Once again, participants used the term ‘simple’ to describe many of these oversights. One example was the checking of blood results, especially when the oncoming shift incorrectly assumed this had been done by the previous shift. Participants described their experiences of being informed that patients were safe to be discharged home only to discover serious problems such as dangerously high serum potassium levels and evidence of acute renal failure (04:15; 05:13). One participant commented that initially she was unsure whether it was her role to follow-up results, but she soon realized that this required her attention because it was frequently overlooked and increased the risk of an unsafe discharge. Another participant stressed the importance of not taking anyone’s word for granted and checking and rechecking everything from blood work to x-rays and computerised tomography (CT) scans. He acknowledged the constant potential for things to get forgotten in acute, unpredictable and rapidly changing hospital environments (05:14).

(d) The knowledge and experience of perioperative nurses

In perioperative contexts, prior proper planning and knowledge of where gaps occurred were key to preventing adverse events. Prior proper planning involved consideration of the surgery to be performed, the skill mix of the available staff and the individual needs of each patient. It also involved trying to foresee all the possibilities in a surgical context and any problems that might arise such as difficulties with intubation if the patient had a short neck and a large chest (77:05-06; 56:20):
Currently, where I’m working I actually go anticipating because I’m working with inexperienced people [...] I’m thinking okay, what things could happen today. I’ve got to be prepared for all of that. I really try hard to get everything set up so that whoever is working with me, those things can be avoided, to the point where I’ve said to them beforehand, right this case we’ll do this, this and this, this is a potential area where something might happen. This is how we may handle it or I want these extra things in the theatre (77:05-06).

One participant made a routine practice of discussing the outcomes of coronial investigations with staff in her department. She acknowledged the importance of perioperative nurses being aware of the potential for rare accidents such as a patient catching fire on the operating table (56:02). She suggested that the medical staff would not know what to do in such a situation because they did not have the same level of training. Another participant described the importance of preserving the integrity of the instrument count in a complicated bowel surgery case. On this occasion, the nurse refused to go home, staying to complete the final surgical count because she knew from experience that she was the only person that could resolve any issues:

A recent very fragile major bowel surgery that had a difficult to control bleeder and the patient’s life in the balance, I refused to go home and change staff over for the future counts for that case at the end of the day; even though I was due to go home. I felt that as the scout nurse I had counted in and I needed to count out, to ensure integrity for a case that had a lot of equipment and disposable items used. It’s just not worth not being there when I am the only one who can clarify the count for the scrub nurse when she may be tired and stressed (09:05).

Through experience, recovery room nurses developed an awareness of variables outside their department that increased the risk of an adverse event. One participant described the need for patients to be ‘really stable’ before they transferred back to the ward (56:22). She was aware of the risk associated with sending a ‘barely stable’ patient back to a busy ward environment where the staff were not expecting signs of haemodynamic instability or clinical deterioration (56:24):
So the patients that leave here have to be really stable, not just stable, if that makes sense? If you have been waiting for a blood pressure to go and suddenly it hits that magical number that you know is twenty percent of where it was, I always keep them for another couple of sets of observations to make sure it’s going to stay there. Because you think they will go back to the ward and good grief its dinner time now and you know? You have got to be thinking of the variables down the line for the patient (56:22).

(e) The knowledge and experience of rehabilitation and transitional care nurses

In rehabilitation and transitional care contexts, experience was a factor in the ability of nurses to detect that a patient was unwell and needed close monitoring. Experience also equipped nurses to anticipate and respond to the needs of patients during high risk periods, such as when their diet was advanced to thin fluids or their insulin regimen was changed. Nurses responded by observing patients closely at these times, taking extra observations and performing an overnight blood sugar level:

You anticipate the need before it happens and that’s the game. Then you go okay this person’s a higher risk for the next three days when they’re changing from a thick fluid to a thinner fluid, let’s do a few extra observations on this lady so she’s not aspirating. When someone’s changing from Lantus to a NovoRapid let’s do a 2.00am blood sugar level just to make sure that we’re not going off and they’re getting hypoglycaemic in the middle of the night (49:23).

It was just the advantage of someone with different eyes, with those experienced eyes. I think as an experienced nurse you can actually walk into a room, into a four bed bay of clients, and you know immediately, just by looking at them, I think, who you need to go to (66:07).

(f) Knowledge and experience of gaps and adverse events

In spite of their knowledge and experience of gaps and adverse events, most participants had not undertaken any formal instruction in the principles and theory of patient safety and human error management. Nonetheless, they were unanimous in their view that adverse events encompassed unforeseen, unintended and unplanned events which had undesirable or negative consequences for patients. It was acknowledged by participants that adverse events complicated the patient’s hospitalisation, were not in the patient’s best interest, and contributed to poor, 14 People with dysphagia may aspirate ‘thin’ liquids (i.e. fluids with a low viscosity such as water, milk, tea and coffee). Thickened fluids may be used to prevent aspiration pneumonia.
Chapter 4. Data Presentation & Analysis

detrimental and unfavourable patient outcomes. Participants’ experiences lead them to be aware that an adverse event was something going wrong or awry and not according to plan - an incident outside the expected that should not have happened. Participants recognised that adverse events varied in their scale and gravity, ranging from major or huge catastrophic incidents to events of a more minor nature. Adverse events were seen as interrupting the normal course of care and treatment and in many instances were preventable. Participants responded:

An adverse event is something that shouldn’t have happened and wasn’t foreseen and isn’t desired. So something went wrong and – but not necessarily, you know, it doesn’t have to be huge. There would be grades of it, I suppose (70:03).

An adverse event is an unwanted, undesirable, unintended, and unanticipated occurrence during or after the treatment for the patient. It can be preventable (36:01).

An adverse event is something that's not in the general planned sequence I guess for that patient […] so something that goes awry in the plan that doesn't fit you know what we hoped for the patient (45:02).

Most participants acknowledged that adverse events increased the risk of harm to patients and that harm was a frequent and unintended consequence of adverse events:

Adverse event is a potentially harmful event to a patient which is potentially preventable. So if you go by the book and everything is right it shouldn't have happened (39:06).

Adverse event is obviously a poor outcome of some sort of intervention, generally a health care or clinical intervention. So usually unexpected […] an adverse event is anything that could harm, or has harmed (50:02).

Participants identified numerous adverse events, a summary of which is presented in Box 4.2 (page 94 of this thesis).

(i) The emotionality associated with gaps and adverse events

All but two of the participants had a direct experience of an adverse event. A major theme to emerge from the analysis was that participants were deeply affected emotionally by the constant potential for gaps and the occurrence of adverse events, especially those they believed could and should have been prevented. The range of
emotions described by participants included: ‘feeling sick’, ‘physically ill’, ‘awful’, ‘bad’, ‘horrified’, ‘scared’, ‘stressed’, ‘tense’, ‘disappointed’, ‘powerless’, ‘helpless’, ‘angry’, ‘frustrated’, and ‘sorry’. The experience of adverse events left an indelible imprint on the memory of those directly involved and on others they worked with. Participants remarked on their ability to recall these adverse events and associated emotions quickly and in vivid detail, in spite of the passage of time, describing them as tragic and memorable. The cases that people talked about included:

I felt sorry for the staff [...] in a lot of incidents [...] I often think oh thank god that wasn’t me because when you hear the whole scenario [...] I think gee I bet I could have made that mistake myself, you know I think gee given all of the same variables I could have done that (56:04).

Look I felt really sick because as a parent you put yourself in that parent’s shoes and for me the frustrating part was, I think initially some responses that I heard were, well there’s no cosmetic defect, therefore really what are we fussing about? We were really fortunate that it was an internal procedure so you can’t actually see the difference. But as I tried to explain to people, we could have removed a digit, removed a limb, cut the wrong level in a spine, the principle where the error’s occurred is transferable to any procedure (67:06).

Pretty bad because, you know, the patients expect that we always do the right thing by them. Or they trust us, that’s the whole thing I think that sometimes gets me; that you come into hospital and you trust people (44:07).

I don’t know what my blood pressure was but [...] certainly [...] tachycardic at that point in time and I was very scared for that patient; and could see that the nurse was terrified, absolutely terrified [...] The what ifs always get you, but at the time, when you’re dealing with it, they’re not really at the fore. Like at the time you’re just dealing with what it is that you need to deal with. It’s afterwards where you stop and think and my God (17:14).

One participant suggested that it was a case of ‘when, and not if’ these harmful events occurred and used the analogy of waiting for a train to crash to describe the feeling (66:20). Another revealed that gaps created the potential for a catastrophe to occur in small community hospitals where the patients involved were inevitably family and friends. Of note was the considerable and continuing emotional impact of adverse events that were preventable or fatal. Participants described these as
distressing and tragic events that caused lasting and significant psychological harm, affecting the clinicians involved for the rest of their lives (31:02; 63:03).

**Box 4.2 Adverse events described by participants**

- Implantation of the incorrect intraocular lens
- Incomplete sterilisation of surgical equipment (i.e. colonoscope) between cases
- Displacement and injury to a patient’s arm because it was inadequately positioned and secured during surgery
- Retention of a surgical item (i.e. diathermy pad)
- Dropping a patient on the floor during transfer from the operating table to the bed
- Patient falls from beds, chairs and trolleys
- Anaphylaxis and cardiac arrest from contact with Chlorhexidine, an antiseptic agent impregnated in a central venous catheter
- Anaphylactic response to an anaesthetic agent
- Patient death from untreated inspiratory stridor following thyroidectomy
- Surgery to the wrong side of the body (i.e. the incorrect knee or ear)
- Intra-operative trauma to adjacent organs (i.e. the aorta)
- Post-partum haemorrhage following caesarean section
- Incorrect surgery (i.e. removal of the patient’s tonsils)
- A patient catching fire on the operating table
- Pressure areas from ill fitting thrombo embolic deterrent (TED) stockings
- Skin tears from the use of manual razors to shave patients before procedures
- Leg ulcers and lacerations from broken footplates on wheelchairs
- Incorrect placement of a naso-gastric tube and failure to correctly check tube position
- Cardiac arrest following failure of an extra corporeal membrane oxygenation (ECMO) machine
- Massive haematemesis following administration of a thrombolytic agent in a patient with a recent history of an endoscopic procedure
- Failure to diagnose spinal cord injury and acute myocardial infarction
- Massive blood loss from an ECMO cannular that had migrated out of the patient’s neck
- Respiratory distress because the oxygen hose of the ventilator was not properly screwed into the boom of the oxygen supply
- Bradycardia, hypotension and hypoxia during restrapping of an endotracheal tube
- Death of a child from an undiagnosed blockage of a ventricular-peritoneal shunt

**Medication errors:**

- Cardiac arrest from administration of the wrong dose during anaesthesia
- Cardiac arrest from the rapid infusion of potassium chloride
- Patient death from administration of the incorrect concentration of heparin
- Patient death from administration of a chemotherapy drug via the wrong route (i.e. intrathecal instead of intravenous)
- Rapid infusion of heparin (i.e. intravenous pump set at incorrect rate)
- Patient death from the intra-arterial administration of drugs (the position of the catheter was not checked and the nurses believed the line was venous)
The emotional impact of one adverse event was such that one nurse left nursing altogether, even though the patient survived:

The saddest thing was that that nurse just became totally beside herself [...] We had to get her family to come in and pick her up. She thought she’d killed the patient, or that she could have so [...] from what I understood, she left nursing because of that (17:15).

Two nurses were shattered by the death of a young man in the Emergency Department, one had not returned to work some three months after the event:

It’s one of those things that is probably not preventable but those two nurses involved at the very start have belted themselves up for weeks over it [...] The triage nurse and the nurse in the cubicles were absolutely devastated; one of them hasn’t been back to work since though it’s about three months ago now (07:12-13)

A third participant described having very unpleasant memories and feeling upset and sad some months after the preventable death of a child:

It was, you know, just a tragic outcome. And I was incredibly upset about it, and I’m still upset about it because you don’t come to work to do any harm to your patients, and I really feel that we missed something for this patient because we didn’t have all the facts [...] and it leaves a really nasty taste in your mouth and I feel incredibly sad for the parents because they lost a child that they loved and was beautifully cared for and [...] that child’s died and [...] that’s tragic (22:20).

In perioperative contexts, participants described the added emotional burden when anaesthesia was a causative factor in an adverse event. They were acutely aware of the potential for things to go catastrophically wrong because of ‘something we’ve done’:

It was an awful sinking feeling of oh no [...] Well I mean it could be a really poor outcome for a patient. Also with anaesthetics [...] it’s the biggest nightmare of someone who is well and breathing and then not well and not breathing or not having an output. It’s one of the big things of anaesthetics is that most of what we do, or a lot of what we do, is elective at that point in time. To actually have an outcome which could be death or disability [...] it’s not like they presented to you in cardiac arrest because of something that’s happened to them. It’s something that we’ve done that’s caused this, so it’s a pretty huge thing (50:04).
Participants described feeling troubled and frustrated by adverse events that resulted from the failure of nurses to take that little bit of extra care. The preventable and unnecessary nature of these events was particularly disturbing. An example of this can be found in a case where the dressings on the back of a patient’s head and over a cannular site in the neck were overlooked. Oral secretions contaminated the cannular site and the patient developed candida sepsis that was almost fatal. This patient’s care was further complicated by surgery to repair an extensive pressure area under the head dressing. As participants responded:

I was so disgusted, absolutely disgusted it frustrates me and it makes me feel terrible [...] I realise that there is only so much that I can do but I walk away pulling my hair out just thinking can't you use some common sense and have some initiative and can't you just see what you're doing? [...] Just everything about it, the area on the back of his head, the oral secretions [...] just disgusted in the sense that it had been let go for such a long period of time and no one had had the initiative to call anyone and say I don't know how to change it, can you show me how to change it? (35:19-20).

I know we're supposed to be working in a no blame environment when it comes to incidents and errors but it's very frustrating when you know that that could have been prevented just because somebody just didn’t take that little bit of extra care or didn't have that knowledge base. So it's very frustrating when those things happen because they are preventable incidents (62:02).

(ii) Learning from adverse events

In spite of the emotional distress associated with adverse events, analysis of the data suggested that these incidents provided valuable opportunities for nurses to learn. Participants described how nurses remembered the disasters and learnt from other people’s mistakes and the bad things that happened, while the good experiences became part of their everyday (21:12; 58:13). The experience of an adverse event motivated nurses to find ways to prevent its recurrence and provided the opportunity to change practice. One participant’s experience of an adverse event was the catalyst for significant personal and professional growth. Upon reflecting on the event she realised that she needed to know and understand more and so she undertook further post-graduate education in emergency nursing. As participants responded:
It’s the reason why I started – I did my graduate diploma of clinical practice in emergency nursing ten years ago. Now, I reflect often on that, that was the catalyst, that was one of the major events that made me realise that as a sole nurse practitioner in a department like that I had to be more assertive and I had to be able to argue my case to the doctor and not be as subordinate and submissive, you know, as nursing roles sometimes structurally place us in (52:03).

It's interesting you can always remember the bad things because you learn from them. The good ones they tend to be just be part of everyday (08:11).

I guess it was very disappointing that it happened, but at the same time […] I hadn’t actually come across this as an issue before […] we had just been fortunate I guess, so it was like, what are we going to do? We need to think of ways of preventing this (47:04).

(iii) Positive experiences of gaps

Participants also described their positive experience of gaps, feeling good and pleased about taking initiative, making a difference, detecting an early and subtle sign, and doing something to improve the patient’s wellbeing. An example of this can be found in a nurse’s decision to call the medical emergency team to assess a patient in severe pain with unstable vital signs. She revealed that while this was an unusual reason to call the team, she felt justified in doing so and ‘good’ for the patient:

It was when a patient […] was screaming and crying in pain and the covering doctor couldn’t make it up […] the registrar couldn’t make it up. The anaesthetist on call, for some reason, was busy too, so we ended up just calling a MET call for pain management. The patient was starting to become tachycardic, you know, and the blood pressure was increasing and they were in a lot of pain and we just had nowhere to go. Usually, you know, if you call a MET call and the team don’t think it’s for the right reasons they’ll sort of scoff at you and walk off, but they actually were okay. I said ‘We’ve got nowhere to go, we just needed a doctor, we need someone here to get this patient comfortable’ and they agreed and they wrote up all the charts […] So it made me feel good for the patient (34:16).
I suppose you probably feel a bit good that you actually made a difference, that you picked it up, and that you actually pushed for it. I think we picked it up really early and with a very subtle sign, so [...] I felt good about that [...] I think we sort of jumped up and down enough to get attention quick enough (15:07).

4.3.2 Nursing surveillance

Nurses anticipated, detected and bridged gaps in patient care and prevented adverse events through surveillance of patients and their environments. Analysis of the data revealed that there were many components of nursing surveillance. These included:

- A systematic, comprehensive, head-to-toe and ‘hands on’ approach to patient assessment;
- Nursing vigilance;
- Looking at and observing the whole patient;
- Checking; and
- Making sure.

(a) A systematic, comprehensive, head-to-toe and ‘hands on’ approach to patient assessment

This study has captured many instances where a systematic, comprehensive, head-to-toe and ‘hands on’ approach to patient assessment was key to managing gaps and preventing adverse events. In one notable case, the diligence of a nurse in following the same systematic assessment process at the beginning of each shift was critical to identifying that the radial pulse was absent and the patient was at risk of losing their arm. Further investigation revealed that a large embolus was occluding the radial artery and surgery was performed urgently to remove the embolus and save the arm. The participant suggested that a systematic, head-to-toe assessment process enabled nurses to identify things that were wrong, eliminating reliance on memory:
That was a nurse being very diligent about checking everything on her patients every time she came in and when I asked her I said some nurses would have failed to see that; she said I follow the same systematic process every time I come on and I go from head to toe I never deviate from my systematic process of how I evaluate patients [...] I think that was the big 'ah ha' for me [...] when nurses do that they will pick up everything that could possibly be wrong with the patient that is kind of obvious and when nurses fail to do that then we have patients who might have lost their arm through an emboli. I think that if nurses follow a standardised process [...] it won't eliminate everything but it will eliminate the human factor where people forget (31:11-12).

In another case, routine nursing assessment of the patient’s heart sounds (while the Cardiologist was also at the bedside) revealed a ‘murmur’\textsuperscript{15}. The murmur was judged by the nurse to be indicative of an arterial dissection and she reported it to the Cardiologist who listened to the patient’s heart and concurred. This finding necessitated an immediate change to the patient’s treatment plan to avert the risk of catastrophic bleeding from thrombolytic medication (14:06).

Systematic and thorough assessment was key to the detection of two missed injuries in a trauma patient (60:17). The first injury, a pneumothorax, was evident when the nurse assessed the patient’s chest and could not detect any air entry. Upon hearing this, the anaesthetist at the bedside accused her of being silly, telling her she could not be right. However, he assessed the patient and concurred and another intercostal catheter was inserted. The second injury, a fracture of the forearm, was detected by the participant as she was washing the patient the next day. Interestingly, she described these pick-ups as the ‘little things that you do’.

Participants disclosed that patient assessment was their first priority at the beginning of a shift and whenever care transferred to another nurse. The assessment process was a critical first step in the planning of nursing care and provided nurses with the opportunity to identify patient problems. Nurses used assessment data to identify and respond to changes in the patient’s condition and establish a baseline of the patient’s status, against which subsequent data could be compared. One participant acknowledged that while she had many years of experience in patient assessment prior to commencing her nursing career she felt ill prepared for this important aspect of practice (13:27). Participants suggested that patient assessment, both formal and informal, was undervalued, poorly understood and not widely

\textsuperscript{15} A sound heard via a stethoscope that may indicate disease or structural problems in the heart.
implemented. They were deeply concerned that, in the absence of thorough patient assessment, something might be missed resulting in an adverse event:

I just can’t get them to understand the significance of doing a systematic review on a patient. So I think that’s probably the gap if we could class that as a gap. It’s not that the patients aren’t being assessed, but they are not being assessed properly. That probably makes me feel the most distressed […] it’s absolutely necessary (60:22).

We’re always looking to the patient, to the family, what’s going on? We’re looking at them – assessment, whether it’s a formal assessment or a visual assessment, we’re constantly assessing the patients on their journey through our department. I think that the importance of the nursing assessment goes unrecognised, the value of the nursing assessment in terms of patient journey through the department goes unrecognised… there’s no recognition anywhere in the system that those are the critical areas that prevent a patient from getting worse (52:20).

Systematic and comprehensive patient assessment uncovered major problems and gaps in care. Examples given included misplaced endotracheal breathing tubes (i.e. not visible on x-ray) and pressure areas. In many instances the nurses at the bedside were experienced and everything appeared to be in order, but thorough physical assessment revealed many problems, often of a serious nature:

We teach quite a comprehensive physical assessment [...] for patients. So I occasionally will go and do that with some of the nurses [...] and as we do that we’re just amazed because every time we do it we find huge gaps in care. So we find always, almost always one of those people will have an endotracheal tube on x-ray that's not visible because it's almost out. We find that someone's got a pressure area that wasn't noticed, we find multiple things [...] the educator and myself talk about how amazing it is that when we [...] sit down, everything seems to be good. You've got very good experienced nurses. But every single time you do a proper physical assessment you pick up some major problem that no one's just picked up on (23:09).

The following case is an instructive example of an adverse event that resulted from the failure of nurses to perform a comprehensive patient assessment. On this occasion a diabetic patient with peripheral vascular disease developed stage two pressure areas and gangrenous toes. The participant described how anti-embolic stockings, contraindicated in a patient with these co-morbidities, had not been removed for several days and had damaged the patient’s skin. This participant was
especially bothered by the preventability of this unnecessary complication which was completely unrelated to the reason for the patient’s hospitalisation:

You know doesn’t anyone look down and look at the feet? They put them in the chair and that’s it, they just concentrate on everything from the hips up. It’s just observation. What was bad about that particular case was that no one else picked it up. I had to walk in as an agency nurse and as soon as I walked in I did my assessment, which is a nose to toe one... looking for your peripheral pulses, and as soon as I went down to her feet, bang, oh my god (26:03).

(b) Nursing vigilance

Participants described many instances where nursing vigilance was critical to detecting and bridging gaps and preventing adverse events, often of a catastrophic nature. Nurses kept patients safe by paying attention to cues or signals; maintaining a sustained and watchful state of attention; being ready to detect events that occurred unpredictably; keeping careful watch for possible danger or difficulties; and performing tasks at a constant level of efficiency and effectiveness.

Perioperative participants described the importance of never taking anything for granted and maintaining a sustained and watchful state of attention, ready to detect unpredictable events such as a patient that could not tolerate the drugs suxamethonium or propofol. This state of vigilance was required for every single patient, even seemingly young and healthy patients where the surgical procedure appeared straightforward. Being vigilant involved attending to the patient’s body and verbal language and appearance because patients were ‘too scared, drugged and incapacitated’ to think for themselves or give a comprehensive medication and medical history (09:03):

There’s a certain percentage of people that we know cannot tolerate propofol or suxamethonium and if we give it to them then [...] they’re not going to have an airway for at least five minutes until the suxamethonium wears off, and you give them propofol well you’re really in trouble [...] I don’t like to see blase-ness and people’s laziness, and yes we’re all imperfect humans and infallible and we may miss things, but by god in this situation in this career you have to be trying to be focused on these issues for every patient that comes through [...] Just because you’ve got a healthy forty five year old man come in with a nice ECG and it’s a very simple operation, still things could go wrong if his anatomy is wrong and once they get in there and they hit a bleeder and they can’t stop it. So I never take anything for granted in this game (09:22-23).
The vigilance of a perioperative nurse was critical to detecting that a gold coloured clip (whose mechanical and technical characteristics are only for temporary applications) had been placed over a cerebral aneurysm rather than a long term, permanent clip (10:15-16). The cue to the problem was her fortuitous sighting of the gold coloured clip on the monitor as the surgeon informed the team that he was about to begin closing the wound. On advising the surgeon, the temporary clip was immediately removed and replaced with a long term clip. The nurse explained that temporary clips are not as strong and carry a risk of opening or slipping when the blood pressure returns to normal.

Analysis of the data also revealed that being ‘on the ball’, alert, attentive and ready to detect and respond to clinical deterioration was a crucial defence against adverse events. This involved identifying alterations in vital signs, circulation and respiration (i.e. low blood pressure, low heart rate, poor peripheral return, respiratory complications and insufficiency) in their early phase and acting swiftly to prevent further clinical deterioration. When clinical deterioration occurred, nurses engaged in problem-solving, planning for all possibilities and thinking ahead about a range of issues - what else could be done for the patient, what else might be needed, why had the blood pressure dropped, and would another operating theatre be required (56:09):

We look at alterations in vital signs [...] we act on low blood pressures and respiratory complications and respiratory inefficiency all the time [...] I talk to the staff a lot about [...] actually checking their peripheral return of their fingers so that you can see if they have actually been peripherally shut down [...] if they are starting to peripherally shut down then we would be running a hell of lot faster. If you don’t pick up those things as they trending down in that early phase, that is when it will go pear shaped. You have to act upon those things really swiftly (56:07-09).

I was standing on the right hand side of the patient. Generally the anaesthetic nurse stands there, so you have a better line of sight to the monitor. Because this person is on just three or five minutes cycles for their blood pressure, you didn’t pick that up straight away, but you all of a sudden notice that their heart rate has dropped down. That was what alerted me to it, at which point I let the anaesthetist know and then, at which point they had no output very shortly after that (50:03).

When concerned about a patient’s heart rate in light of his history of ischaemic heart disease a nurse responded by placing the patient in a monitored bed in a resuscitation bay and advising her colleagues to remain vigilant by being ‘on the ball’, ‘sticking’ with the patient and continuing with their assessments:
So [...] his rate was about 140. Got a known history of ischaemic heart disease so [...] that rate was not going to be ever good for his cardiac muscle [...] I said ‘Look, I don’t know what to do. I’ve already been and suggested that we try and reduce the heart rate and he’s said ‘No’. So there’s nothing we can do. Let’s put him in resuscitation, monitor him just in case he has a cardiac arrest, and we’ll deal with it from there. So we’ve just got to be on the ball and keep going with our assessments and stick with him and we’ll deal with whatever happens after’ (52:14).

(i) Responding to signs

Responding to a variety of cues or signs was a key component of nursing vigilance and a means by which nurses’ detected gaps and prevented adverse events. In many instances the cue was nurses knowing or feeling that there was something not quite right, that things did not add up or fit the picture. Many participants described a sixth sense of knowing, an instinct or profound clinical sense that there was something going on, the patient was about to ‘crash’ or not ‘travelling well’, even when the observations, test results and the data on the monitors all appeared to be normal. Participants disclosed that, at times, they did not feel they had a solid basis for these alarm bells (52:04) and found it difficult to pinpoint their concerns and articulate them effectively to other members of the team (66:04). As participants responded:

I think a lot of it is because we are experienced, you have just got this sixth sense of knowing that something is not quite right. You've got the ability to look at someone and think hey they're not travelling really well but you can't really put your finger on what's going on. You might get someone and their observations are absolutely fine but you just know that they're not right and that is that, I don't know it is a sense I suppose (61:04).

Like you become accustomed to having clinical senses about [...] you can look at someone and say that person is not well. You don't know why because their monitor might look all right and not be dinging and stuff. You get that very profound clinical sense that something is not quite right here (13:05).

It might just trigger something in my head that oh this doesn’t seem right to me, I had better just go and check and see what is going on (60:10).

In a number of instances a gut feeling or intuition, gained from years of experience and accumulated knowledge, alerted nurses to the presence of gaps in patient care. These internal responses indicated that something was not right (09:06);
that the patient might not follow the usual trajectory for a particular procedure; or that clinical standards were being breached. As participants responded:

Sometimes you’ve just got this intuition [...] that this patient is not going to follow that [...] trajectory they’re going to go [...] on a different path, yeah, they’re not going to go on the path that they’re meant to, and there’s just the intuition of that. And that’s just those years of that experience and knowledge (55:18).

Sometimes it’s hard to put your finger on it, but sometimes they just don’t look quite right and it’s a gut reaction (22:14).

Other examples included a situation where the nurse felt that the medication chart did not fit the picture of the patient’s illness. On investigating further, she found the medications had been ordered on the incorrect chart (12:01). Other signals to the presence of gaps included the way in which a doctor observed a patient and the skill mix of nurses at the bedside:

Just knowing from the way the anaesthetist is observing - is looking - is taking a little bit more time than what you anticipate to have an outcome then you know get the gloves on, get ready to step in and assist, that kind of thing (55:16).

There were probably [...] two or three nurses there, but they were all only junior and [...] you just pop by because things don’t seem quite right. The patient was dyspnoeic, I wouldn’t have walked past without sticking my nose in (17:04).

Participants also revealed that the ability of nurses to prevent adverse events was a function of them knowing the patient very well and knowing when they were not ‘right’. In one notable case, over a period of time, ward nurses developed the ability to astutely recognise subtle changes in a patient with multiple, complex medical problems. These slight changes, while outside pre-advanced life support criteria, were indicative of clinical deterioration. When these occurred, a swift response was required to prevent the patient’s readmission to the intensive care unit. The ability of the nurses to recognise and act on these signs proved to be a key factor in the patient’s recovery and eventual discharge (20:20).

Participants acknowledged that ignoring their intuitive responses was a contributing factor in adverse patient outcomes. One participant revealed that she was too concerned about completing tasks that, in hindsight, were not that important,
while another was deterred from asking a doctor to review a child for fear of overstepping clinical boundaries (11:12). She described feeling terrible when the child was admitted to the intensive care unit with airway difficulties and acknowledged the importance of listening and responding to her instincts:

I was coordinating in the paediatric intensive care unit at the time and this wasn't an intensive care unit (ICU) patient [...] I quickly considered asking the [...] consultant to listen to her but was concerned I would be involving another opinion and overstepping the boundaries. Six days later the child was in ICU and rushed to operating theatre with airway granulation covering nearly all of her trachea [...] I felt really terrible as I had a strong feeling that things didn't add up but didn't have the time to spend as my role that day was to ICU not technology dependent children [...] We make mistakes as humans but we need to listen to our instincts even if sometimes it means you might step on toes (get into trouble) to respond to them (24:07).

(ii) The prevention of medication errors

Nursing vigilance was critical to the detection of medication errors and prevention of adverse events. Nurses maintained a watchful state of attention and responded when they suspected something might be amiss. A powerful example of this can be found in a case where the vigilance and swift action of a perioperative nurse prevented a patient from receiving an injection of local anaesthetic with adrenaline into his penis. Adrenaline is contraindicated in these circumstances because of its vasoconstrictor effects and the risk of necrosis. Red labelling on the vial alerted the nurse to the adrenaline and she immediately placed her arm in front of the surgeon, contaminating the sterile field and preventing the surgeon from injecting the drug. The participant commented that she remembered the case well because it is the only time in her professional life that she has deliberately contaminated a sterile field. Initially the surgeon was angry but he later expressed his gratitude (06:11).

On another occasion, an emergency nurse checked on a patient receiving an iron infusion, aware that adverse reactions are common and that the staff in her department were inexperienced with this type of infusion. On checking, she discovered that the post-infusion observations had not been taken and that the patient had indeed suffered a severe reaction (bright red face, swollen hands and legs) for which urgent treatment was required (37:16).

In another case, the vigilance and prompt response of a critical care nurse averted a cardiac arrest. The nurse was baffled that a junior colleague had been able
to titrate a patient’s inotropic medication to zero in a very short period of time. Aware that the patient’s blood pressure was very sensitive to even minor changes in the infusion rate she felt compelled to investigate. On checking, she found that the patient had an extremely low blood pressure and the transducer reading the patient’s arterial pressure was incorrectly positioned:

Knowing that he’d been on five micrograms when I came on I’m wondering how she’s got down to zero when I was titrating it just by small amounts. So I whizzed in and [...] the transducer’s hanging halfway to the floor; his mean arterial pressure was 54. If I hadn’t intervened at that point with that low blood pressure and obviously urosepsis and an underlying heart condition and all the rest of it, it wouldn’t have been very long before he coded (26:05).

(c) Looking at and observing the whole patient

Further analysis of the data revealed that observing and looking at the whole patient was a component of surveillance and inextricably linked to patient assessment and vigilance. This entailed searching, examining, watching and directing one’s attention toward the patient while remaining open to what might emerge. In critical care settings, the inability of novice nurses to ‘see the big picture’ contributed to gaps that increased the risk of adverse events:

They might be so focussed on, perhaps, their inotrope therapy and looking at what the appropriate outcomes for that are that they miss changes in their cardiac rhythms, or perhaps they are not keeping a close eye on their chest drain losses and so therefore your child is actively bleeding from that chest drain and they’re not looking at that. People that are junior within their area; they do, they get tunnel vision on particular issues, and they can’t see the big picture and they lose focus on that. And some of that’s related to their knowledge deficit, but also some of it is because they’re not used to doing that multi-skilled care at a more complex level (22:13-14).

In rehabilitation and transitional care settings, observing the patient closely and looking for symptoms were key to identifying that something was not right (48:15). Rehabilitation nurses described themselves as the quiet achievers in health care for their ability to identify a deteriorating patient in the absence of much of the equipment and medical input that is customary in acute care settings (49:22). They achieved this by being ‘in tune’ with everything about the patient (73:06). This involved watching the patient closely, paying attention to their body language,
colour, demeanour, cognition, balance, gait and underlying chronic conditions. As patients recovered and began to mobilise issues with cognition, communication and mobility created risk:

We have to use our skills and we watch the body language, we watch the patient, we watch their colour, we watch more of that stuff and their demeanour. Then we say something is not right and that’s how we pick up on it (49:23).

But as the recovery starts and the patient starts to mobilise and the patient starts to interact with the hospital environment they [nurses] need to understand mobility, they need to understand gait, they need to understand balance, cognition, communication, insight. Because it’s the patient with poor insight that’s most likely going to get up and try and walk without assistance; it’s the patient with urinary retention that’s going to want the toilet all the time. And if you add urinary retention to poor insight you’ve got a patient who wants to go to the toilet five or six times in six hours, they’re the ones that are at risk. Even though they might be well, even though that acute phase may be over and they’re stable and the blood results are fine and the temperature and blood pressure is fine, you know, these other issues; cognition, communication, mobility, they’re the things that become risks (48:14).

Two cases from ED contexts illustrate the importance of observation and looking carefully and critically at the whole patient (not just the physical aspects) and the bigger picture to determine what the patient needs (66:16-17; 73:19). On each occasion the patient’s treatment altered quite dramatically. The first case concerns a patient that presented to the ED with constipation. It emerged, during a discussion with the nurse, that the patient was unable to get out of bed because of back pain and that the constipation was a consequence of immobility. When probed further, however, the patient revealed that the back pain was a result of crush fractures in her spine. This information dramatically changed the care of the patient to treatment of these fractures. The participant commented that the gap in this case was the tendency for people to look at ‘one thing’ when there was a need to look beyond the presenting complaint to the bigger picture of what was happening to the patient (60:08).

In the second case, a thorough assessment revealed clinical information which was critical to reaching an accurate diagnosis. While the team was focussed on the patient’s presenting complaint of back pain, the nurse was curious about why the patient was in pain. She observed that the patient’s knee was swollen (interestingly none of her colleagues had looked at the patient’s knees). It emerged that the
presenting complaint of back pain was secondary to the patient’s immobility from a collection of fluid in her knee (04:08). This participant stressed the importance of preventing adverse events by looking at the whole patient:

Look the problem I find is that people want to know what’s wrong and isn’t that common sense that people want to know what’s wrong. But often it’s like, there’s nothing on the bloods, there’s nothing on x-ray, therefore there’s nothing wrong, it’s all in their heads and I can’t tell you how many times that’s happened either that doctors have tried to say ‘look we can’t find anything wrong, you go and see them because they’re stressed, or you go and see them because they’re not coping’ and what you find is no there is something wrong clinically. It’s just that you haven’t found it yet [...] You know you can’t just be dismissive, you’ve got to look [...] but I find personally that a lot of the issues are just dismissed as being minor (04:12-14).

(i) Failure to observe and look at the whole patient in the ED

In ED contexts, the failure of nurses to look carefully and critically at the whole patient was a key factor in the emergence of gaps. Participants described the importance of ‘getting it right’ at triage, aware that this process ‘sets the scene’ for the patient’s journey through the ED, determining where the patient is placed within the department and the perceived complexity and urgency of their needs. Of equal importance, was the assessment conducted by the triage nurse. Participants conveyed a sense that triage nurses should conduct their own assessment (i.e. see for themselves) and not be overly influenced or guided by the ambulance staff. Furthermore, this assessment should not be too suggestive of the problem or diagnosis such that it might influence or constrain the thinking of the medical staff. As participants responded:
So it’s that, not accepting what you’re told and actually looking. That’s one of the things we try to get into our triage nurses heads [...] don’t take the patient for granted. Yep, listen to the ambos story but actually do your own assessment and don’t be guided by what they say or don’t be influenced by what they actually say [...] If there’s a poor decision made at triage then that can quite often progress through the department. That sets the scene for the patient’s journey through the ED [...] Our elderly patients with abdominal pain if they’re poorly triaged and end-up in our cubicle area, we’ve had a few near misses [...] So I think it all comes down to the placement of the patient in the emergency department [...] triage sort of sets the scene for their urgency. So if you’re in the cubicles and they’ve run things - well they can’t be sick, someone’s put them in there, but they actually can be (43:03)

I keep saying to the triage nurses, you need to understand that what you do and say at triage influences the patient’s journey through the department because the doctors will just see what you’ve written. They think the theme that you are writing is this so they won’t look for anything else necessarily. So when you do your triage assessment just make it really general and subjective and don’t be saying that this is what the problem is. Just say what the symptoms are so that we don’t get them thinking that, oh yeah this is just something simple so I don’t really need to worry too much about this [...] You have to make sure that you get it pretty right up here because it [...] influences what everybody thinks and unless somebody else challenges what you are thinking, then sometimes things can and do get missed (60:30).

The following case is instructive of the types of gaps that may emerge in ED settings when the triage nurse fails to look carefully and critically at the whole patient and challenge the opinion of others. On this occasion the triage nurse accepted the view of the ambulance staff that the patient had a soft tissue injury and her leg was not broken. As a result, the patient was triaged to the waiting room, in spite of the fact that she was unable to walk and in pain. Concerned by the patient’s clinical presentation, the participant arranged for an x-ray to be taken. It revealed the patient had a fractured neck of femur:
I think of many instances where we miss something, initially, so classically people that are sent home. I had one lady waiting in the waiting room [...] the daughter [...] said ‘look I’m really concerned because she’s in a lot of pain and they seem to think she’s soft tissue and we’re still here in the waiting room, nothing’s been done’, she hadn’t even had an x-ray [...] she’s been here for 5 hours. Well turned out she had a fractured neck of femur and she’d been sitting in the waiting room [...] because the ambulance people had said to the triage people ‘oh we don’t think it’s broken’ (04:10).

Another situation, described as a case of gaps ‘all over the place’ underscores the importance of the triage process and illustrates how it sets the scene for the patient’s journey through the ED and beyond (60:28). The key gaps in this case are summarised here. In the first instance, the patient was triaged to a low acuity area of the ED rather than a resuscitation bay, in spite of her involvement in a high speed motor vehicle accident. While staff attended to a laceration to the patient’s arm, there was a lack of concern about the patient’s hypotension and the fact that every time she sat up she fainted. A systematic head-to-toe assessment to look for other injuries was not undertaken and the nurse assigned to the patient did not seek medical review in regard to the patient’s fainting. Later in the evening the patient was discharged.

The patient represented to the ED the next day with abdominal and back pain and urinary retention. A series of further investigations confirmed a fractured pelvis and the patient was admitted to a medical ward. Over the next two weeks, however, she continued to feel unwell, nauseous and dizzy and was unable to mobilise. While an earlier CT scan had not imaged the patient’s entire abdomen, a second scan revealed that the patient had ruptured her spleen two weeks earlier in the motor vehicle accident. The participant considered this case a ‘complete miss by everybody the whole way through’ and was concerned by the failure of nurses and doctors to ask important questions - ‘Don’t we think we should go head to toe over this lady again? We found this injury, did we miss anything else?’ She used this case to teach nurses about gaps in care:
Chapter 4. Data Presentation & Analysis

So that’s one of my teaching stories where I teach the nurses about gaps in care and why questions weren’t asked and why did you send somebody home that was fainting and why didn’t you advocate more? That lady was just mismanaged from way to go and it wasn’t just ED it was also upstairs in the ward. So that’s one of my very, very bad case scenarios that makes me feel uncomfortable [...] So there were just gaps all over the place there and it was probably due to inexperience, probably due to an attitude problem of the triage nurse. I would say a knowledge deficit. Then everybody just went with, nobody asked the question, don’t we think we should go head to toe over this lady again? We found this injury, did we miss anything else? Nobody asked that question. So it was a just a complete miss by everybody all the way through (60:28).

(d) Checking and making sure

Careful and diligent checking and ‘making sure’ were closely linked to nursing vigilance and crucial to medication and equipment safety. Nurses described checking backwards and forwards; forever double and triple checking everything about a patient; acknowledging to colleagues the things that were being checked; checking again, no matter who had checked previously; and making sure that every piece of equipment was working and available and that everything was as it should be. While many of these activities were described as simple and straightforward, they were nonetheless extremely effective in preventing adverse events and keeping patient’s safe. Participants acknowledged that pressure to act quickly contributed to mistakes because nurses did not take the time to double check and think about what they were doing (07:19). One participant believed there was nothing so important that nurses could not take ten seconds making sure their intended actions were safe.

Examples of the medication safety work undertaken by nurses included a stock-take at the beginning of each shift to cross reference all medications and infusions against the medication chart; making sure that all intravenous lines were labelled; making sure that medications were being given at the correct frequency, times and dosage; tracking of intravenous lines from the bags to the patient to ensure that each line was correctly labelled; and the supervision of junior or rotating medical staff as they wrote up medication charts. One participant cautioned against assuming that the label on the intravenous line is accurate, commenting that lines often get swapped around and that it is easy for someone who is tired to apply the wrong label to the wrong bag (26:24). Another participant checked medication charts thoroughly, paying careful attention to the administration times, remarking that in spite of the double checking process, things ‘still fell through the cracks’ (60:03-04).
I think there is a fair level of expectation there because of the frequency that it occurs with, yes. We're always looking out for the doctors and making sure that someone is there with them while they are writing it up just to, because otherwise if you have to chase them or chase someone else you are just wasting your time. Yes and it's something that shouldn’t really need to happen but just out of practical experience we always do and nine out of 10 times it pays off because you are picking up on mistakes that they make (51:18).

Careful and diligent checking enabled nurses to detect gaps in the prescribing and administration of medications. Examples of these gaps are listed in Box 4.3 (page 113 of this thesis).

One participant worked in an emergency setting that treated both children and adults and was acutely aware of the potential for a child to receive an adult dose of a medication (07:08). Nurses bridged this gap by always looking up and checking the recommended paediatric dosage of the medication, no matter what, and attending to simple things such as looking for the child’s weight and, if necessary, weighing the child. This process exposed prescribing errors on a daily basis. On another occasion, the process of checking with the patient, listening carefully, explaining the medication to be given and taking the time to ‘make sure’ averted a potentially catastrophic event. In the course of this process, nurses identified that the patient had previously received the drug (Streptokinase). The participant described this as a critical pick-up as a second dose of this drug carries the risk of a fatal anaphylactic reaction:

Yeah but if he had the Streptokinase they have huge anaphylactic reactions that basically would kill you quicker than the infarction that he has had, you just can’t have it twice. So potentially they [nurses] have stopped a catastrophic event happening just by listening to what the patient says; explaining it to them and making sure. It is just that pick up - he already said he had it once before and they know that they’re only meant to have it once, how come it’s up there now? Something so simple as that that’s probably […] that sort of thing (07:14)
Box 4.3 Gaps in the prescribing and administration of medications

- Drugs prescribed in the wrong form
- Drugs being administered at the incorrect frequency and time
- The incorrect dosage (i.e. too high) of medication ordered for a child
- Medication charts labelled with the incorrect patient
- Failure to review the Warfarin (an oral anticoagulant) dosage daily and prescribe based on the result of an INR (international normalized ratio) blood test
- Failure to order Gentamicin levels and adjust the dosage accordingly
- Failure to order aperients for patients receiving opioid analgesics
- Failure to review anticoagulant medications (i.e. Clexane, heparin) and change to an oral anticoagulant (i.e. Warfarin) when appropriate
- Patients prescribed two anti-platelet drugs (i.e. Clopidogrel and aspirin)
- Failure to review and reduce post operative pain medication

In perioperative settings, the checking of equipment exposed gaps that placed patients at risk of harm (i.e. missing equipment on emergency trolleys and anaesthetic machines). Nursing surveillance involved making sure that medical devices were connected, running and cycling as they should be; bringing the anaesthetist’s attention back to the rate of drugs, vaporisers and intravenous fluids and checking these were correct (i.e. ‘The intravenous is running full, do you want it running at that rate?’); monitoring the surgeon’s position in relation to the patient’s body; monitoring the length of time the patient’s legs were elevated in a lithotomy position; maintaining an awareness of the patient’s heart rate and oxygen level by tuning in to the pulse oxymeter probe even when engaged in other tasks and when the patient was out of the nurse’s line of sight; noting how the patient looked after the lines were in and the drugs had been given; and observing the heart rate, rhythm, blood pressure and oxygen level:.
I can tell you basically what their heart rate is and what their oxygen level is, just by the noise of the saturations probe [...] I’ll be at the other end of the theatre and I can tell if the patient’s had an ectopic [...] You’re not paying any attention, you’re doing something else, but you’re really just tuned in to it. So you do [...] have a look at what the patient’s like to start with [...] what do they generally look like and do they still generally look like that after you’ve done all these, given them a whole bunch of drugs and done a whole bunch of things to them? Do they still look in that sort of way? What’s their heart rate, what’s their heart rhythm? Is it in [...] the range of [...] before they went off to sleep? Has their blood pressure dropped too much? Is their oxygen level still high? It’s just that quick glance, getting that information and going, just checking on it that way (50:08).

4.3.3 Effective and constant communication

Participants disclosed that patient safety was dependent on effective and constant communication, particularly between medical and nursing staff. Prior to surgery, communication between the nurse and the surgeon focused on the likely trajectory of the case so that nurses could plan accordingly. Speaking up and seeking confirmation that all was flowing correctly was important to preventing gaps in perioperative settings. As participants responded:

Taking action to cover a gap immediately is vital, speaking up to avoid a near miss, seeking confirmation that all is flowing correctly within our clinical practice is required to avoid these gaps (09:06).

Trying to plan ahead and identify what the needs are. So, you know, finding out more about the patient, what exactly the surgeon wants for that procedure and asking the surgeon - so it’s all communication. Saying to the surgeon ‘Now, are you going to need that and this?’ (55:15-16).

One participant described how she communicated widely with different members of the team (i.e. nurse in charge, junior and senior medical staff), especially when she was concerned about a patient. Even though much of the information discussed was also documented in the patient’s notes, this form of communication kept channels open and ensured that the issue was at the forefront of everyone’s thinking:
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I suppose communicating to who was in charge to make sure they’re aware, and [...] the junior neurosurgical staff tend to be on our ward so you sort of keep sort of chatting to them and just sort of tell them our concerns so although they’ve said there’s no further orders, or no change, you’d say ‘I know, but it is bothering us’ or, you know ‘What do you think it is?’ So then they will then go to the registrar or whatever when they come around. So, you know, everyone’s constantly aware, keeping those channels of communication not just what we’re writing down because they don’t often read the nursing notes (15:10).

A rehabilitation nurse revealed that most of her time was spent promoting communication within the team and setting up processes and strategies to prevent gaps in patient care and things not being picked up. She attributed the significant decrease in readmissions to her unit (from 10 percent to one percent) to the successful implementation of many of these strategies, most notably a ‘daily scrum’\(^{16}\) that was used to foster interdisciplinary communication and discussion about the needs of individual patients:

I think the best experience is having that daily scrum, just setting that process up and they really were resistant to it the allied health and the nurses. At that daily scrum we can talk about the patient and talk about if there were any immediate changes, because what used to happen was it used to only be once a week we talk about the patients, and then things would get missed before the next meeting and the goals would change. But now we can talk about patients [...] that daily scrum really has changed our whole unit (49:09).

Nurses were frustrated by poor communication with medical colleagues and expected to be told when medication or treatment orders were written up:

And I just say ‘Look, you have to tell us. We don’t know. We can’t give it if you don’t tell us.’ You know, fair enough we do look but, you know, when you go to do a set of observations you’ll see ‘Oh, the patient’s actually for a litre of fluid’ or ‘they’re for some Lasix’ or whatever; some Panadeine and a Nurofen. They don’t come and tell you, that’s what I find completely frustrating. So I think, you know [...] safety [...] is dependent also on good communication (44:21).

\(^{16}\) A scrum refers to a formation in the sport of rugby where players from each side form a tight pack in a contest for the ball. In health care contexts, a scrum is a brief and informal meeting between health care providers to review and discuss the care of individual patients. Typically, the meeting occurs within the clinical setting rather than in an office environment.
(a) Assertive communication

Nurses that were successful in managing gaps revealed that assertive communication was key to positive patient safety outcomes. Participants described the importance of being confident; not following orders when they believed something was not right; being willing to question ‘absolutely everything’; challenging the things that needed to be challenged; and taking a firm stance, confidently speaking up and saying no when it was unsafe to proceed. Age and experience gave nurses the resolve to ‘stick to their guns’ and be strong even when being growled at and pressured to do something they knew was not right. As participants responded:

So you do have to have the communication and assertiveness skills that when you think there’s a gap, you’re willing to actually investigate it even if you’re told, don’t worry about that, that’s nothing...having sort of the right skills to be assertive enough to ring someone about it and get to the right person and not be fobbed off by someone else (70:20-22).

Well what would be of great concern to me was, if you weren’t a bit older, and a bit stronger and a bit prepared to stick to your guns and probably even half scared to do the wrong thing, you know. When you’re older, you’re more inclined to say look I’m just not budging on this and you can growl at me and tell me to send a patient back to the ward and do what you like but I just know it’s not right. If I had been younger or less experienced, I would have done what I was instructed to do, and that wouldn’t have been a good outcome for the patient I don’t believe (56:14).

You should go with your gut feeling, you do not move. She is a senior nurse but young. She has all of the skills and the knowledge but she didn’t have the confidence, she just thought the consultant knew what she was doing and I said no. Just trying to get them to feel assertive about themselves. If you feel something isn’t right then say something (18:19).

This study has captured many instances where nurses bridged gaps and prevented adverse events by communicating in an assertive manner. One participant described how she ‘put her foot down’ and emphatically declared to the resident medical officer that they were aborting a head CT scan on an agitated patient (40:18). The doctor wanted to sedate the patient further but the nurse knew that he was inadequately skilled to perform an intubation and that the patient’s life would be in danger should he lose his airway without the back up and resources of the Emergency Department. Another participant described how she had to ‘push the point’ and beg a doctor to order a blood test on a patient with chest pain. The test
revealed that the patient was having a myocardial infarction (45:21). When doctors were reluctant to leave rounds or handover to review deteriorating patients, nurses responded by presenting and arguing a case. They described needing to be rude and confrontational at times:

You know, it was just absolutely so bad that in the mornings, when you went and did your first round and looked at people, if someone was having chest pain, you’d ring the doctors and they’d say, well, I can’t come now, I’m in handover, and I’d say well, put it this way, would you like to come now or would you like me to call a medical emergency team call? You know, you had to be really sort of rude in your face about it. It took me a little while to settle down from that because I take it very seriously (70:06).

In spite of her confidence in her nursing ability and years of experience, one participant acknowledged that speaking up and being appropriately assertive was not always easy and something she consciously worked on. She commented that some of her medical colleagues refused to work with nurses that were in their view perpetually aggressive (50:20):

I’ve been there for a while, so you know how you get a bit older and bolshier. But it’s funny [...] I’m reasonably confident in my nursing ability and I’m very confident in my anaesthetic nursing ability but I still [...] sometimes have issues speaking up and saying things [...] so it’s something I’ve been consciously working on. What is an appropriate assertive way of just saying something which needed to be said? Because, as nurses, we do dance around the topic quite a lot of, maybe we should and what do you think and all those sorts of things (50:10).

(b) Change the framework

Emergency nurses prevented unsafe discharges by changing the framework from admission criteria and bed availability to one of patient safety. Nurses achieved this through skilful and direct questioning (Is this patient going to be safe at home?) and by personalising the situation (What if this was your mother?) (05:16). They advocated for patients to be admitted and used clinical data (i.e. the patient desaturating or being unable to walk or weight bear) to support their argument:
And so often I’m giving the medical staff data or reasons, actual reasons why they can’t go home. Whether it’s a walk test and showing that their saturations are actually dropping off, you know, and they might go 5 metres and then it starts to deteriorate. Physically proving that someone can’t do something, wait bear or walk (05:12).

So I asked three different doctors to check the x-ray because she couldn’t walk and they all said there’s nothing wrong with the x-ray we’re going to send her back to the next of kin flat. And I said you can’t send her back to her next of kin flat because she can barely stand, I don’t care if you’re telling me that the x-rays are normal, clinically she can’t walk (04:11).

On another occasion, a nurse changed the framework to the lack of diagnosis and understanding of what was ‘wrong’. She was concerned the patient’s care would be of poor quality and unsafe:

And I was saying ‘look there’s something wrong here, I don’t quite know what it is but I don’t feel comfortable about sending him home because we don’t know what the problem is. I was saying to the doctor ‘look I’m not happy about sending him home, even if he becomes not for resuscitation there’ll be issues of pain relief, eating, he won’t be able to eat, he’ll become obstructed, like you know, we need to do something. We can’t just send him home like this, I’m not happy sending him home just to know he’s going to perforate his bowel and die. That’s not a good outcome (04:09-10).

4.3.4 Teamwork

Participants described many attributes of teams and teamwork that were important to bridging gaps, solving problems, getting the work done, and ensuring that patients received adequate care. These qualities included co-operation, communication, respect, rapport, trust and faith; being able to depend and count on other members of the team; and the ability to pull together, support each other and approach the care of the patient as a team. As participants responded:

We do a lot of team work. We count on [each other] - I see us as all being a link in the chain and that we’re professionals and that we have to be able to trust our co-professionals [...] we have to trust that that link in the chain is going to work (64:13).

It’s very much a team game. I mean it’s a spiral, you all depend on each other to get the work done (03:07)
If there is a haemorrhage [...] everyone’s got to pull together, you know it’s the only way you’re going to save the patient (10:07).

The teamwork’s important because you need everybody to know each other’s role [...] and you need to have cooperation, communication and trust in each other’s expertise [...] and you also need to be able to support each other and back up (55:10-11)

One participant suggested that teamwork was a learned skill. While the experience of working with some of her colleagues was intuitive, natural and rewarding, she could not rely on all of her co-workers to function as a team. She commented that a lack of teamwork worsened discontinuity of care (13:18). Others acknowledged the importance of supporting and backing up colleagues, knowing that somebody will look after their patients, and yours, if necessary (13:16; 55:10-11). One participant described a situation where a medical colleague asked that she watch closely for any problems with his practice:

I actually had a registrar yesterday say to me, I’ve been sick the last few days, can you just keep an extra eye and make sure that you check on me, that I’m doing stuff right and let me know if you see a problem? I went, wow, that’s how the culture is actually changing. People are speaking up and saying, watch my back, this is where I’m at today, I want to let you know so that we are all working together (50:23).

Nurses managed gaps by liaising with medical staff, trouble shooting problems, co-ordinating the care of patients and ensuring that things were not missed. This involved making sure that medication and supplies were available and following up to ensure that planned x-rays and procedures actually occurred. As participants responded:

I think nurses are the ones sorting out all of the bullshit at the bedside. They're going “shit I can't do this because I haven't got this, I can't do this, I haven't got this drug, this drug is wrong I have to call someone they have to come fix it”. You have to be a medical liaison and trouble shooter all day every day (13:21).

It is the work of the nurses. We coordinate the care; we coordinate just about everything that goes on in the department. So our coordination is really important as well; like being on the ball, not letting things slip, because you can have a list of ten things in your brain and you’re prioritising which one is more important (52:18).
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It’s prompting too, it’s chasing the doctors up and saying remember on the ward round you said you were going to do such and such, well such and such hasn’t happened, it could be an x-ray it could be a procedure, it could be chasing up someone from the home team, it could be commencing a Lasix infusion that hasn’t been written up, things like that. So you have to go and find them and say look I need this done, I need that done (26:17).

While teamwork and close professional relationships were a strong feature of many perioperative settings, participants described feeling awful, sick and incredibly frustrated when their repeated requests for patients to be reviewed were challenged or ignored by their medical colleagues (56:14; 66:05). They described feeling fearful about being in conflict with the people whom they worked closely with every day. One nurse commented that knowing other team members well and feeling valued was essential to speaking up when something was wrong:

In relation to positioning the patient [...] monitoring and [...] aseptic practices [...] if you see a breach in any of those, or a potential for something to be wrong, you need to be able to speak up. So if you’re in a team where you feel that you’re valued and your input is valued, then you’re able to do that. Whereas if you feel - if you’re new to a team or you don’t know the people very well it’s much more difficult to have input, to be able to say, you know, ‘Why did you put that prep over there underneath that trolley? You need to re-gown and glove’ [...] A team member might struggle to say that if they don’t know the surgeon (55:11).

Interpersonal tensions and dynamics contributed to discontinuity in communication and undermined teamwork. When nurses felt embarrassed or humiliated by the nasty behaviour of a consultant they ‘shut down’ and were reluctant to volunteer that ‘vital little tip’ described as being important to the patient’s care. Potentially, a whole trail of communication was lost (26:32). One participant acknowledged that it was dangerous when nurses perceived that other members of the team were not listening to their concerns (66:09), for example, when a change in a patient’s neurological status is dismissed by the medical staff and attributed to incompetence or inconsistency in the nursing assessment of patients (15:09-10).

The following case illustrates the impact of emotions and interpersonal tensions on teamwork and patient safety. The participant described a situation where a doctor’s anger and mistrust of her as a nurse was a factor in his delayed assessment
of a deteriorating patient. Ultimately, the medical team was called when the patient suffered a cardiac arrest. The nurse was extremely distressed by the patient’s death and upset by the doctor’s behaviour. She felt that he wanted to teach her a lesson and that he did not want her telling him what to do:

We’d had another episode where someone had chest pain and the resident was trying to cannulate her and she had aphasia so she couldn’t say anything, and he just kept sticking her for like 10 times and I said, look you’ve got to stop, and then so I got the registrar and he came and tried to cannulate but he got flustered because this had gone on for some time, and I’m saying, look will I ring the anaesthetic person to come down? All I said to him was, look, if you let her arm dangle a little while and then put the tourniquet on, which was the wrong thing to say to the registrar because they’re a senior doctor, but it was out before I had a chance, you know, and he was just really angry with me. So then this was a couple of days after that and when I went to him and said, look, I don’t like the look of this man. This is his observations, this is his EEG, can you have a look at him? He just looked at me and more or less said, yeah, when I’m ready. That man coded and, you know, not long after he hadn’t been seen. He got seen then because the met call brought the whole team down and the doctor came and everyone sorted him out, we brought him back [resuscitated] and took him upstairs from rehabilitation into the cardiac care ward, and an hour later he died (70:05)

The risk of poor or adverse outcomes increased when the team was ineffective and did not meet the patient’s needs. This was especially evident in emergency situations when people went off on tangents, creating many little teams:

People go off on their own little tangents and stuff and things don’t happen and you get adverse outcomes [...] You end up with a whole lot of little teams but they’re not working together. They’re off on their own little tangents and not meeting anywhere near the patient’s needs (43:10).

If the teamwork is poor then you can have poor outcomes and not be very effective in what you’re doing (55:10-11).

4.4 What were the gaps identified by nurses?

The gaps identified by nurses are presented under the following subheadings:

- Failure to recognise and respond to a deteriorating patient
- ‘Simple things can cause incredible adverse outcomes’
- ‘A lapse in critical thinking...we seem to be on autopilot’
4.4.1 Failure to recognise and respond to a deteriorating patient

In the context of describing their experiences of responding to gaps and preventing adverse events, participants revealed catastrophic incidents that arose from a failure of nurses to recognise and act upon patient observations that were outside normal limits and suggestive of clinical deterioration. While nurses were diligent about observing patients and documenting their observations, they often failed to reflect on the significance of their findings and, when necessary, undertake further assessment or seek review of the patient (43:01; 66:18). One participant remarked on the ability of nurses to observe someone to the ‘death’ and document ‘beautifully’ but not act on the findings (21:07), while another disclosed that failure to attribute physiological signs to clinical deterioration was too common (58:05). As a member of an intensive care outreach team, one participant frequently ‘stumbled across’ patients in ward settings that were very, very sick and in need of urgent attention (23:01-02). He commented that frequently the team was not called about these patients. In some instances the signs of clinical deterioration were glaringly obvious, on other occasions they were more subtle and manifested as trends or incremental changes in physiological parameters. Examples provided by participants included:

- Severe hypotension or the BP starting to trend down
- Changes in skin colour i.e. the patient looked grey or stressed
- Abnormalities in the ECG tracing - i.e. ST elevation
- Tachycardia or the heart rate trending up a little
- Dyspnoea, an increase in the respiratory rate, the oxygen mask fogging up
- Poor urine output
- Confusion.

Of note are many instances where the signs of clinical deterioration were overlooked by a series of people - nurses from different shifts and a team of medical staff on patient rounds. While the many case examples of failure to recognise and respond to clinical deterioration were given by participants, three salient cases are presented for the purpose of this thesis.
Case 1

In the first case, a patient presenting to the ED with infected feet was found to have an extremely low blood pressure on arrival (i.e. 70mmHg systolic). The patient was described as a ‘frequent flyer’\(^{17}\), a person who visited the ED regularly and was well known to the nursing and medical staff. While the doctors and nurses were aware of the low blood pressure, it wasn’t reassessed or acted upon for many hours until the patient deteriorated further and required urgent medical treatment, which failed to save his life. It emerged that, some hours earlier, the patient had suffered a myocardial infarction and developed cardiogenic shock:

I remember coming in and seeing him there and he was someone who came regularly [...] you know they term the ‘frequent flyer’ [...] He was written down as having infected feet [...] and I thought nothing more of it but I remember as I was leaving that afternoon they [...] had the crash cart over by his bed [...] He'd come in with a low blood pressure and that wasn't considered by the nurses [...] or the medical staff looking after him as to what was causing that. It wasn't investigated really, it was just looked at in terms of his infected feet and at the end of the day he had had a myocardial infarction and was in cardiogenic shock and died [...] It was kind of a glaring obvious thing that apart from not doing anything about it, they didn't recheck it [...] for hours (45:03).

Case 2

In the second case, the medical team and nurses from two shifts failed to recognise that a patient was deteriorating in spite of the fact that he was grey in colour, puffing, tachycardic and his oxygen mask was fogging up. Upon walking into the patient’s room it was immediately evident to this participant that the patient was very unwell. An ECG, inadvertently filed away without being reviewed, showed that the patient was having a massive myocardial infarction. It was of great concern to this participant that the staff did not really think anything of the fact that the patient was tachycardic and dyspnoeic some hours earlier:

\(^{17}\) The term ‘frequent flyer’ is widely used to describe patients that are frequently admitted to the Emergency Department for medical care. These patients are known by name to the staff, are often elderly and have serious medical conditions.
I took the enrolled nurse [...] to assess this man [...] the medical team had
done a full round, two groups of nurses, the outgoing night shift and the
incoming morning shift had all assessed this man and you just had to
walk in the room, they had him sitting in a chair and he was grey and he
was puffing, you could see his oxygen mask was fogging up [...] I had
another look at his rhythm and his ST segments looked elevated [...] so I
went and checked the ECG that had been performed two hours earlier and
he was having a massive anteroseptal infarct. He went into cardiogenic
shock [...] within 20 minutes and we intubated him well before that
(20:04-05).

**Case 3**

In the third case, the nurse and anaesthetist recognised and treated a patient’s
hypotension but missed the fact that this was unusual and that in the normal course of
events there was no reason for this to occur after laparoscopic surgery. The patient
was transferred to the ward and shortly after arrival had a hypotensive cardiac arrest.
It emerged that the cause of the hypotension was internal bleeding:

The patient had had a laparoscopic cholecystectomy and was really
hypotensive post-op and needed all these bags of gelofusine (an
intravenous colloid used for therapeutic hydration replacement) and was
just holding their blood pressure at like 100 systolic. And this sort of
got on back and forth between the nurse and the anaesthetist for
probably like two hours. And eventually they decided to discharge the
patient to the ward where they promptly had a hypotensive arrest. Now
the thing that was missed was after laparoscopic surgery there’s no
reason that a patient should be that hypotensive because they haven’t
really lost any blood [...] which is an obvious thing but it didn’t occur to
people at the time that this patient shouldn’t be so hypotensive after a
laparoscopic procedure. And it turns out the patient was bleeding
internally (33:16).

When asked why the staff failed to recognise the patient’s hypotension as a sign
of clinical deterioration, the participant suggested they may have focussed on the
individual signs at the expense of thinking about the ‘big picture’ and why the patient
was hypotensive. She commented that it was difficult when the nurse and
anaesthetist both agreed that it was safe for the patient to be transferred to the ward.
She explained that situations such as these are challenging because nurses are
required to step back, think for themselves and challenge the view of their
colleagues. The case was complicated by the incorrect placement of the drains (of
which the nurses and anaesthetist were unaware) which meant there was no blood in
the bottles to serve as a cue to the possibility of internal bleeding (33:16-17).
4.4.2 ‘Simple things can cause incredible adverse outcomes’

Participants that described the importance of vigilance in managing gaps and preventing adverse events revealed that inattention to the ‘simple, basic, very, very small’ or seemingly insignificant things resulted in incredible and sometimes catastrophic adverse outcomes:

It often is simple things that can cause incredible adverse outcomes (06:06).

It sounds really simple but [...] even though it is intensive care it is the most basic things that make the biggest difference. It comes down to basic things (28:11).

I think I’ve got very much an awareness of the potential significance of something that might seem insignificant to someone [...] what can actually transpire as a result of something very, very small [...] I’ve seen what happens at the other end when something bad does happen (67:22).

On two occasions gaps described as ‘trivially minor’ and ‘nurse initiated’ created the potential for a catastrophe to occur (17:13-15). In the first instance, the nurse failed to secure the luer lock connection between a central venous catheter and intravenous line such that they disconnected and the patient developed a pulmonary embolus. While the patient survived, the nurse was distraught and left nursing, believing she had killed the patient. On the second occasion a graduate nurse removed a noradrenaline line from an intravenous pump and left it running free and unregulated. The patient, who was eighteen hours post repair of an abdominal aortic aneurysm, became dangerously hypertensive (i.e. blood pressure of 320mmHg) but was stabilised within a short period without any complications. The participant acknowledged that a number of factors contributed to this incident including the inexperience of the graduate nurse and knowledge gaps with regard to the care of patients receiving this type of therapy. The participant commented that this patient was considered to be the most stable and ‘easiest’ assignment in the unit for that shift.

On another occasion, failure to check a patient’s temperature in the recovery room had serious consequences. On receiving the patient in the ward, the nurses identified that the patient was hypothermic and so proceeded to rewarm the patient.

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18 Noradrenaline is a drug that increases blood pressure.
Over a thirty minute period the patient developed chest pain and became severely hypotensive, requiring emergency management. While blood pressures would be recorded every five minutes during patient rewarming in the recovery room, in the ward environment patient observations were taken only every half hour:

What they didn’t do, was they didn’t take the patient’s temperature. Everything else was stable [...] and so they sent the patient back to the ward. When the patient got to the ward, they took the patient’s temperature and realised that it was 34/35, so clearly they needed to be re-warmed. They rang the theatre and said could you please send the [medical device to prevent and treat hypothermia] and they were so busy nobody even asked why and so they sent it up there. Of course the ward put this on the patient and were at this stage doing half hourly observations whereas us in recovery would be doing 5 minute blood pressures and record a full set of observations every 10 minutes, the next thing the patient complained they had chest pains and when they took their blood pressure the blood pressure was 64 systolic (56:03)

4.4.3 ‘A lapse in critical thinking...we seem to be on autopilot’

Participants strongly suggested that a lack of critical thinking, planning and questioning, on the part of nurses, contributed to gaps in patient care. Many described a robotic approach to patient care where nurses are on ‘autopilot’, focussed on the physical doing without thought to what the patient needs, what they are doing and the impact of their actions. Factors that contributed to lapses in critical thinking, included nurses being busy and rushed, nurses not being given permission or perceiving there was no time to reflect on the patient’s needs, workplace cultures, and lack of a cohesive team approach to patient care such that nurses felt disempowered. As participants responded:

I find that the more busy we are the more we tend to become task focused sometimes. The more gaps, ironically, that there are, I think we sort of zone in on, perhaps, the physical doing, doing, doing, doing; and it's that planning and that questioning and that really thinking that tends to suffer […] In my experience, the more busy we become the more task focused, the more robotic it tends to be, the more gaps we have (66:13-14).
Well as I was saying, I think people just do the daily activities of their job often without a lot of thought and I don't mean that in a bad way. I just mean they're rushed, they're in the zone of I've got to get this person ready or whatever it is, they have to get this job done. I don't think they're given permission to step back and say, why am I doing this or there's a perception that people don't have time to [...] think about what they're doing and ultimately what the impact of that is (74:15).

What I see is [...] a lapse in real, critical thinking about patients. Really just trying to concentrate and focus on every bit of a patient, do you know what I mean? [...] I think that’s what nurses need to do, is really critically look at a patient and decide what that patient really needs. I actually don’t believe that happens, I really don’t [...] Sometimes we seem to be on auto pilot and rehabilitation is no more auto pilot than any other strand of health care (73:19).

One participant believed that nursing had been reduced to tasks, describing how nurses administer medications in a somewhat mechanical and programmed manner, ‘doling out pills’ while engaged in conversation and without knowledge of other factors that might be relevant (i.e. the patient’s blood pressure or other therapies). She suggested that priority was given to getting the task done rather than educating patients about their medications. Another participant expected nurses to examine and scrutinize a medication chart, but acknowledged that a significant number of nurses in her unit would not be able to do this. She was especially concerned by a recent occurrence where nurses failed to identify that a patient with heart failure was not on a diuretic. As participants responded:

Well I suppose I have an expectation that my nurses will analyse a medication chart. Not just read it though but actually look at it and say, oh [...] why have we increased this drug? Well, we've ceased that therefore we've put that on instead. But [...] I don’t think that happened and while I have a few nurses that would think, oh this guy has been in intensive care and he had heart failure, it's funny he's not even on a diuretic. I don’t have a significant number of people that would question that (73:07).
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We seem to [...] have been reduced to going back to tasks [...] I see my nurses all around the hospital [...] wherever I go, standing at a pill trolley at the desk having a conversation with a couple of other people while they dole out pills in a cup, and then they walk along to the end of the ward, past another 10 patients, and drop that pill cup on the bedside; ‘There you go, Mr Jones, there’s your pills’. They don’t know what the pills are, the patient doesn’t know what the pills are, we’re not even sure if it’s the right patient because we were having a chat when we filled out the pills [...] The task was to deliver the pills, it wasn’t to check whether I had an anti-hypertensive and [...] what their blood pressure was like or were there a combination of other therapies that might alter things? [...] They haven’t looked at the information in the context of everything else because it wasn’t about that, it was just about getting that task done at the time (20:21-22).

Participants identified a number of factors that detracted from the ability of clinicians to focus their attention (63:07). These included high noise levels associated with busy acute environments, nurses being constantly interrupted during important tasks (i.e. administering schedule four and eight drugs, triaging a patient), and nurses being taken away from the bedside by telephone calls (i.e. pathology, radiology, family members). Models of care in ward environments encouraged gaps when team leaders changed on a daily basis without the opportunity to get to know the patients or the strengths and weaknesses of their nursing colleagues. As participants responded:

So all of this activity, all those really critical - the thinking parts, the diagnostic parts and the interaction parts for all clinicians occur two steps away from where you’ve got ambulances lined up with all the associated staff that are with them. The ambulance officers, with family members, often milling around as well, and it’s just chaotic, and not conducive to good quality health care. I think without doubt I guess anecdotally and observationally and it detracts from the clinician’s ability to focus their mind on the task at hand (63:07).

Well if you're triaging a patient you can often have several colleagues talking to you about other patients that are in the department at the same time. There's always noise - cardiac monitors alarming. Then you might have - our ED, like everyone else, is always full so there's always something going on. So you might be in - and - oh look, there's distractions everywhere (41:04).

The environments nurses work in and a focus on patient throughput and attending to tasks promoted gaps. One participant believed that while organisational
management groups paid ‘lip service’ to the importance of patient centred care, the real drivers of health care were bed management and patient flow considerations. She described many instances where staff were forced to move patients to a lower level of care (i.e. from critical care to the ward) even when ‘red flags’ indicated that the patient was not ready or needed additional services:

So I think the culture and the environments that nurses are working in now [...] promote [...] discontinuity because the driving forces are different; it’s about beds, it’s about getting tasks ticked off [...] We’ve got a different person each day leading each of the teams who doesn’t know the patients, who doesn’t know the rest of their colleagues, so they don’t know their strengths and their weaknesses, all of those sorts of things [...] Whilst organisational management groups give a lot of lip service to the importance of clinical care and the patient comes first and we’re patient centred and all of those sorts of things, it isn’t about that in many, many areas, it is about making a bed. The patient isn’t a name, they’re a number, and if they don’t have a whole lot of things stuck in their body, they can go (20:22).

4.4.4 Cutting corners

A significant finding of this study is the extent to which nurses cut corners in patient care. The theme of taking short cuts and cutting corners emerged during an early participant interview. In keeping with the emergent nature of qualitative research inquiry, participants in subsequent interviews were probed to describe (i) what they understood by the term cutting corners, (ii) whether staff cut corners and, if they did, (iii) what corners were cut, and (iv) the implications of cutting corners. Participants defined cutting corners as taking short cuts; not doing things properly, fully or completely or the way they should be done; not following protocol or process; and doing things a faster and easier way to save time and effort. It was suggested that cutting corners was a common practice and something that nurses lived by and passed on to others. There was a strong view that cutting corners increased the risk of adverse events, although participants acknowledged that it did not always have negative consequences. As participants responded:

They find the shortcuts that they think work and if nobody comes to harm they just keep going. We are all very creative in finding shortcuts and ways to do things quicker. Nurses are very, very creative in that way, but we must always be mindful that there are policies, procedures and protocols in place there to protect not only the patient but ourselves (37:13).
When you cut a corner you don’t follow, say a protocol or a process as you should because you think for whatever reason [...] it's okay and [...] you think you’re saving some time or some effort. But I always find that those basic processes and when we don’t follow them that’s when things just all fall apart (67:16).

Having that safety culture of just checking and rechecking and making sure that you’re not cutting corners; that sometimes processes are actually there for a reason. I think sometimes it’s what everybody else does. Sometimes we just watch how other people do things and often we train people by showing them our favourite corners, don’t we? (50: 24-25).

Participants revealed that junior nurses adopted the corner cutting practices of their senior colleagues by observing their behaviour. Nurses also cut corners ‘on the run’, to manage their workload, unaware their actions might compromise patient safety (14:09). As participants responded:

A lot of it is just from observing the behaviour of [...] the more senior staff so [...] the junior staff tend to think you know I saw ‘Jane’ doing that [...] she’s been here for years it must be all right. So they’re almost copying bad practices (07:07).

I think they do it on the run. I don’t think they consciously plan I’m going to cut a corner today; I think they just do it without even realising they are doing it sometimes, it’s just a fact of life if you have to get from A to B to C to D and you’ve got to do it in a limited time you have got to say well what are the priorities; how do I prioritise my day (12:19).

I think they decide according to their level of experience. I think...less experienced clinicians don’t know what they don’t know so they don’t realise that the corners that they’re cutting might actually be integral. And, you know, that’s along a spectrum of interventions. You know, it might be mouth care, brushing their teeth, might be integral but they don’t know that it’s important along the whole spectrum (29:11).

(a) Cutting corners in patient assessment

Of note is the extent to which nurses cut corners in the assessment of patients by using medical devices as the dominant assessment tool rather than an adjunct. When these devices were available nurses performed radar observations, described as looking at a monitor, plotting and graphing the vital signs and other data without physically interacting or assessing the patient (37:28), or making the observations up. The practice of taking radar observations was described as unacceptable and unethical because critical treatment decisions (i.e. whether a head injured patient
required a craniotomy) were based on the observations documented by nurses (57:18). Other examples of corner cutting in patient assessment included nurses not checking pulses properly, ‘touching the surface’ and not doing a full or thorough pulse count, and filling in observations when they were busy to avoid the perception they were incompetent or not coping:

It’s come to my attention a few times as the nurse in charge that a nurse will come onto a shift and say “I found this patient, they’ve got no pulse and the last nurse and all the nurses said they had a pulse”. And so you get it reviewed by the doctor, because that’s an acute change and then the doctor will come up and go “Oh, I can’t find it either, call the registrar”. And the registrar will say “Oh, no, they never had a pulse there, ever”...The inference that I have from that is that the nurses have cut corners, gone “Oh well the foot is pink, it’s still got good return, so I’m not going to do the observations because it takes too long”. So yeah, that happens. I’ve had doctors alert me to that a couple of times that “That patient never had a pulse, why aren’t your nurses checking properly?” (34:21).

Participants were strong advocates of ‘hands on’ patient assessment techniques. They considered these irreplaceable and were concerned that an over reliance on technology had deskillled nurses in the areas of patient assessment and critical thinking, making them complacent. Participants explained that taking note of the subtleties; talking to the patient; observing body language and demeanour; assessing the limbs, skin colour, respiratory effort and body position; feeling for the pulse volume; and listening to the chest and gut provided invaluable assessment data not available from machines or monitors. As participants responded:

Machines make staff complacent [...] they’re just relying on machines to do all the work for them [...] they don’t actually do any assessments [...] they look at the numbers but not look at the patient, which would give you a lot more information than anything a box with numbers and patterns on it will tell you (11:15).

I think we cut corners a lot when it comes to taking observations. We use a lot of technology rather than getting back to basics and looking – just thinking and really touching our patients, talking to them, we just whack a non-invasive blood pressure cuff on, we do their respiration from the reading that comes from the saturation probe instead of counting [...] I think hands-on assessment techniques you can never replace (38:13-14).
Cutting corners in patient assessment increased the risk of adverse events because nurses focussed overly on data from the monitors and overlooked cues that might indicate the patient was deteriorating. The early signs of myocardial infarction (i.e. drowsiness, sweating, pain and dizziness), for example, might not be evident on the ECG tracing or monitor but may be detected using ‘hands on’ assessment techniques:

Someone who’s had a myocardial infarction [...] might have a second episode [...] and the heart rate on the monitor said 65 the whole time [...] the patient’s [...] getting progressively more drowsy or becoming quite clammy and then all of a sudden their blood pressure’s gone from 160 to 89, he’d had a heart attack but it wasn’t detected on ECG [...] there wasn’t actually anything to say he’d developed more pain or [...] had felt dizzy or [...] started feeling very sweaty (11:15).

When asked whether technology had deskilled nurses in the area of patient assessment, one participant expressed concern at bedside observations being performed by assistants in nursing and non-nurses with no higher level health education or diagnostic training and limited ability to interpret the data (63:29).

(b) Cutting corners in critical care

Numerous other examples were given of nurses cutting corners and failing to perform tasks at a constant level of effectiveness. A common theme to emerge from these examples was the occurrence of gaps and preventable adverse events from the failure of nurses to provide essential nursing care, described as the ‘simple’ or ‘little’ things. While nurses attended to the complex and highly technical aspects of patient care (i.e. balloon pumps, infusions), other things not perceived as being urgent or important were overlooked or ignored in spite of them being equally important. Examples included failure to follow evidence based guidelines for the management of central venous catheters and increasing the risk of nosocomial infections (i.e. clostridium difficile, MRSA) by placing dirty linen on the floor. Aspects of patient care described as ‘basic’ (i.e. mouth care, repositioning of patients, sitting patients out of bed) were not accorded priority, in spite of their role in the maintenance of bodily function and prevention of complications (i.e. ventilator acquired pneumonia, pressure ulcers). Pressure ulcers from endotracheal tubes, nasogastric tubes and ill fitting thrombo-embolic deterrent stockings (TEDS) caused unnecessary pain and suffering and, in some cases, required corrective surgery. As participants responded:
What surprises me is that the things that are simple are the things that are overlooked or ignored or just not taken enough care with. You know, the complex things - looking after a patient on [...] a balloon pump or whatever. Yes they will do [...] the blood tests every hour that they're meant to do. They will check all the parameters and do all those things - but it's a nosocomial infection that might kill the patient. The patient might develop methicillin resistant Staphylococcus aureus (MRSA) or clostridium difficile as a result of dirty linen on the floor and that might kill them (69:05).

I think just the sense of urgency is sort of missing - and I know it’s not an urgent thing to do. But the sense of importance - the little things like mouth care and positioning that help prevent ventilator acquired pneumonia, just aren’t viewed as important. It doesn’t matter how many times you tell them that this is why you do it - it just doesn’t seem to sink in or [...] resonate with them. It’s just so easy to do and they just don’t bother (58:07).

I know we're supposed to be working in a no blame environment when it comes to incidents and errors but it's very frustrating when you know that that could have been prevented just because somebody just didn’t take that little bit of extra care or didn't have that knowledge base. So it's very frustrating when those things happen because they are preventable incidents (62:02).

The risk of patient harm increased when nurses cut corners by ignoring systems and evidence based protocols and performing procedures their own way. The following case provides a powerful example. While investigating the causes of central venous catheter (CVC) infection, one participant uncovered a range of unsafe practices. One of the most concerning was the practice of nurses using tissues ‘dabbed’ in Chlorhexidine to clean the catheter site rather than a sterile dressing pack and gloves (57:23). In response, an extensive education and consultation process was undertaken. Nonetheless, nurses continued to cut corners in the care of CVCs, prompting the participant to comment that ‘nurses will get away with what they can’.

In critical care settings, essential nursing care was overlooked when nurses were overly distracted by the diagnostic process. The handover period might be dominated by discussion of the medical plan with less attention given to assessment of the patient’s nursing needs and the nursing plan. This participant commented that planning for nursing care was equally as important as planning for the patient’s medical needs:
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Everyone’s focused on what the doctor’s doing and usually they’re focusing on diagnosis. They talk about how interesting this is to diagnose and they can’t work out what it is. Everyone gets all caught up with that. Then you go and you focus on the nursing things and you find things like the endotracheal tube’s not in the right spot. To me [...] they’re so different but they’re just as important and it seems people get whisked away by the other things and dazzled by the interesting nature of that condition. Then they miss out on the more important things [...] So that it seems like there’s a big practice gap that I can see and there has to be a better practice for developing a nursing plan for a person through the course of a day. I’ve seen this in all ICUs that I’ve worked at (23:19-20).

Participants suggested that nurses cut corners judiciously in emergency situations where preserving life was a greater priority. Clinical judgement and expertise played a role in determining the priorities and which corners could ‘safely’ be cut. Nurses prioritised the care of patients with multi-system problems to maintain respiratory and cardiovascular function at the expense of, for example, repositioning the patient to prevent pressure ulcers. While a pressure ulcer in these situations was undesirable, there was a perception that it could be dealt with later if the patient survived:

I just know [...] from my perspective if I’ve got a patient that has multi-system problems then I have to prioritise which it is that I have to do first, and so some things will get missed [...] This lady had resistant streptococcus and was so respiratory compromised that no pressure area care could be done. Her position changes just weren’t tolerated; it would compromise her respiratory and cardiovascular status way too much. So in those circumstances cutting corners, I guess it just becomes [...] about what it is that you want to deal with first. And had she got, you know, stage three or stage four damage from pressure, that could be dealt with later, but she would still be alive to deal with it (17:17-19).

(c) Cutting corners in perioperative care

In perioperative settings nurses cut corners in an effort to save time and meet the demands of surgeons and anaesthetists. This sometimes involved changing their routine and not following established protocols and processes (i.e. allowing a patient into the theatre before dirty equipment from the previous case had been cleaned) so as to avoid public humiliation at the hands of their colleagues. One participant revealed that nurses felt ‘rushed’ and ‘bullied’ in these circumstances:
There’s an element of pressure in that, you know, sometimes you’ve got surgeons and anaesthetists saying “Come on, come on, we’re bringing the next patient in” when you’ve still got dirty equipment from the previous patient. So there’s a fair bit of that happening and newer people might [...] feel pressured into changing their routine or cutting corners to avoid, you know, being publicly humiliated by other staff members, I guess (25:12).

In theatre there is the potential for many things to go wrong usually they are picked up before any damage is done and they usually relate to not doing things the way you would normally do them, allowing yourself to be rushed or bullied by others to not follow the process you would normally (08:03).

It was suggested that time pressures in perioperative settings were a function of doctors being business oriented and hurrying so they had more time to consult privately. One participant believed that adverse events were almost guaranteed when corners were cut:

The doctors are under the pump, I understand that, they’re wanting to get out there and consult more because it’s their business. And I guess that’s the difference between doctors and nurses. They’re running a business and even if they’re in the public sector they’re still going to be consulting privately. So they’re focused on that and making a dollar. We’re focused on process and making sure that we’ve got patient safety. Now they are too, but they know that their consulting rooms are building up and if they can hurry things along a little bit they will. Some of them just won’t conform to protocol and that’s where you need a good medical director in a hospital to help drive it a bit. But you can almost bet on it, if they cut corners there’s going to be an adverse event. You can almost guarantee it (06:15).

Of note was the fact that two instances of blatant corner cutting were either sanctioned by senior management or described as routine procedure, even when the nurse argued stringently that the practices should not be allowed. On the first occasion, the blood bank refused a request for a bag of blood to be relabelled with the patient’s correct name and the nurse was directed by the hospital coordinator to administer the blood:
I’d ordered some packed red blood cells for a patient in recovery and the blood came and it had the right UR number but the wrong name. And anyway, I called the blood bank and said “I’m sending you this blood back, it’s got the wrong name on it” and they said “No, no, it’s the right blood. We’re not relabelling it, you have to give it”. And I said “No, I can’t possibly do that [...] I can’t give the blood and she needs blood so you’re going to have to send me different blood with the correct label on it”, and they refused. They rang the hospital coordinator and the hospital coordinator came up to me and said “We’re giving this blood, I’ve had the okay from blood bank” and so we gave the blood (33:09).

On the second occasion, the anaesthetist left to go to another hospital while the surgeon was closing the wound, explaining that this was a routine situation that occurred regularly. The nurse was left to manage the patient for the remainder of the case and take the patient out to the recovery room:

Another one I would say that I would call a massive corner cutting was a shift I was doing in a private hospital doing anaesthetics for a caesarean list and it came to the end and they were sewing up - they had just started the final layer, which is skin, and the anaesthetist said to me, “I’ve got to go to the [private hospital] now, can you take the patient out to recovery”? And I said “No. No way, I can’t […] I don’t know whether you’re aware that that’s completely not allowed”. Anyway, he said “Look, it’s routine procedure here, we do it all the time” and I said “Well I’m not comfortable with it” and he left anyway. So I took the patient out to recovery. Yeah, to me that’s - I mean that’s totally wrong (33:14-15).

(d) Cutting corners in emergency care

Many of the EDs described in the context of this study were operating well above capacity and frequently experienced periods of ‘bed block’\(^\text{19}\) with long waiting times for inpatient beds. One participant described feeling like she was ‘out on a wavy sea in a rubber dinghy’ at these times (52:16). During times of bed block the patient load of ED nurses increased substantially as they looked after their ‘core business’ along with the overflow of patients awaiting admission. In this busy and demanding environment the ability to get things done quickly was highly valued. Cutting corners was described as a ‘workaround’ and way of getting ‘through the day’:

\(^{19}\) Bed block’ is a situation in which a patient stays in hospital because there is no other suitable place where they can be looked after. This means that beds are unavailable for others that might need them.
4.4.5 Failure to communicate the information required to plan and deliver care safely

Participants described numerous deficiencies in the communication of information critical to the safe delivery of patient care. Inadequacies in the clinical handover process (i.e. shift to shift, transfer to another agency) and a lack of communication between nursing and medical staff increased the risk of adverse events because nurses were not equipped with the information required to plan and deliver care safely. Nurses described their common experience of patient information being lost, incomplete, unclear, vague or not properly handed over. As participants responded:

If you ever look back and look at something that has gone wrong, it has always been that there has been a lack of continuity or information that hasn’t been passed on (56:10).

From a nursing angle, nurses are giving handover but they’re not selecting the information that the next shift need not only to plan their care but to actually match the staff to the needs of the patient [...] the fact that a drain is bubbling and there’s a massive air leak isn’t communicated [...] What to do if the person with an organ level wound and no sternum actually arrests or why they need to have cardiac monitoring isn’t communicated. And so that doesn’t adequately equip those at the bedside to know why they need to do levels of observation, what they need to be observing for, and then how they should respond (20:08-09).

In some organisations, direct patient care was seen as a higher priority and omitting parts of handover was acceptable if there were time constraints. One participant explained that gaps emerged when handover was poorly understood because it was taped or staff spoke English as a second language. Participants were of the view that handover was a key part of patient care that should be taken seriously and was not an opportunity to socialise:

Just really good communication [...] and really giving that clinical handover priority and showing people that it is serious, this isn’t just a chance to have a chat and a catch-up and a cup of coffee, that this is clinical handover, this is part of the care (70:24).
Then there’s the Chinese whispers\textsuperscript{20} kind of gap where you’re doing handover and you might be taping it or you might have someone who has got a really heavy accent. So you’re not understanding half of what is being said or, you know, someone saying to you, look you can’t listen to that any more, you have to come on the floor now, or you’ve been called in because someone is sick or whatever and you haven’t got time for a handover. That’s when problems happen because you don’t know, so you assume and you do the best you can and other people assume that you know something else, and you don’t. So that’s how I sort of see those gaps and that’s what results in the gap in care because everyone thinks that someone else did that for that person, but they haven’t had it done (70:07).

Important contextual details might be lost because staff forgot or played down some of the information, perceived that it was not that important, or very slightly altered the story (45:21; 11:08). Participants revealed that a slight alteration in the story created the potential for gaps in the patient’s treatment and for things to be missed because the person receiving the information did not have the ‘full picture’ (i.e. was not fully informed of the patient’s needs). On one occasion a doctor was not aware of the whole picture, having been told that the patient was vomiting, but not that their heart rate was increasing and blood pressure decreasing:

Somebody’s been vomiting and vomiting and vomiting and the doctors know they’ve been vomiting. But nobody hands over that yes, their heart rate is going up and their blood pressure’s dropping. So yeah, they’re probably dehydrated. So the doctor just says, yeah they’re nauseated and vomiting, but they haven’t been given the whole picture (58:08).

I suppose the potential for things to get missed; that’s probably the biggest thing, that’s the biggest concern [...] if there’s a constant chain [...] most patients are verbally handed over [...] to the next person, so that opens up room for people to forget things or sort of just very slightly alter the story and [...] you know just a slight alteration in the story can lead to big changes in the treatment plan or big gaps in the treatment plan, I suppose (11:08).

Participants described many gaps in the information provided to services and agencies when patients transferred. These included a lack of clarity and detail

\textsuperscript{20} The term ‘Chinese whispers’ refers to the process whereby a story is distorted or exaggerated as it passes from person to person. Retrieved on 17 October 2011, < from http://www.usingenglish.com>. 

regarding the patient’s medical history, recent treatment and care needs; half hearted verbal handovers; and the use of standard post-operative instructions and care plans that failed to address individual patient needs:

The care that was required wasn’t always clear or wasn’t specific enough and yet when I would contact the hospital to clarify, there was always more information than that which was provided. So there was like huge gaps in the information that came to me, the head clinician, to provide that service [...] it’s worrying because of the things that could occur for the patient [...] if the care in the community or the care in our program isn’t transferred across, then there is a risk to the patient that things won’t be right or a risk of harm in respect to the patient as well if you’re not aware of what the care requirements are (59:03-06).

(a) Communication lapses contributed to adverse events

Lapses in communication contributed to preventable adverse events such as incorrect surgery, the use of unsterile equipment and patient falls. On one occasion, staff left their posts for a break without handing over that a colonoscope needed to be sterilised and the dirty equipment was used on a patient. Another participant described an incident where crucial information regarding a change to the patient’s consent was not handed over to staff in the theatre. Consequently the incorrect surgery was performed on a child:

I would have to say one that really comes to mind is [...] an instance where a paediatric patient had a procedure that they were not meant to have done [...] really crucial information that was identified preoperatively was never actually handed over to the people who should have known [...] so that somebody would have stopped and gone “oh hang on a minute, we shouldn’t be doing this”. The consent was changed but none of that information was communicated to the theatre staff. When the child was brought into the operating theatre, they didn’t check the consent (67:04).

Participants identified a number of factors that contributed to these events, including the need to maintain high levels of patient throughput in the operating suite, the perception that the surgery or procedure was routine and that simple checking procedures were mundane and repetitive, the scheduling of many cases within a short period, and failure to follow proper procedure by checking the consent prior to commencement of the case:
Really helping people to understand that something as simple as why do we check certain bits of paperwork, what are the implications when on a busy, busy day as often happens when you’re doing a routine procedure, what happens when you don’t follow through with those processes. It seems so mundane and repetitive. Well this is what unfortunately can happen. You end up with tragic results (67:06).

The following case illustrates the tragic consequences when vital contextual information is lost. In this instance, the triage nurse did not pass on important details about the severity of the patient’s fall, the damage to the bicycle helmet and the patient’s neurological status at the scene of the accident. Consequently other staff believed the injury to be of a minor nature and discharged the patient home after a short period of observation. It transpired that this information was critical to the planning and delivery of safe care to this patient. The patient deteriorated and was brought back to the hospital deeply unconscious some three hours later before he died from an epidural haematoma:

It’s not that long back a young chap […] fell off a pushbike [and] cracked right through his helmet, which the Triage Nurse saw […] it actually divided his helmet, he hit the ground that hard. He had a minor loss of consciousness at the scene and […] that information wasn’t passed on, it was completely lost. He went home with a head injury card thinking it was a very minor thing and actually came back deeply unconscious three hours later with an epidural haematoma and in fact died about four days later from that. I mean it may not have been preventable but […] those two nurses involved at the very start have belted themselves up for weeks over it. So there is that potential loss of information that really did and would’ve made a difference to his ongoing care while he was in the Emergency Department and may not ever have been sent home in such a short period of time (07:12).

In another notable case, a series of gaps, mostly relating to a lack of complete and accurate information at the time of transfer, culminated in the death of a child because of a blocked ventriculo-peritoneal shunt (22:18-19). Comprehensive notes were not available to the hospital taking over the child’s care nor were staff informed of the child’s shunt. When asked about neurological issues the parents did not mention the shunt. These gaps were compounded by the fact that a CT scan performed prior to the child’s transfer was reported as being normal. It later emerged that this particular scan was compared with a previously abnormal scan rather than earlier normal scans. The participant acknowledged something was missed for this patient because the staff did not have all the facts and described the case as a really
tragic example of poor communication. On another occasion, the information required to provide safe care did not translate down to the direct care providers. These staff had a poor understanding of the patient’s care requirements and need for supervision and as a consequence, the patient was inadequately supervised and fell, fracturing their hip:

There was a client [...] who was an elderly person who had some memory impairment that required one person standby supervision with transfers and mobility [...] The level of support wasn’t given to the client and that person fell and had a hip fracture [...] In this situation the information regarding the need to have one person supervising the transfers and mobility didn’t appear to get translated down to the worker level in the...aged care organisation [...] So there didn’t appear to be the level of understanding around the kind of care requirements that were needed for this particular patient (59:02-03).

(b) Communication lapses in the ED

A number of salient themes emerged in relation to clinical handover in the ED. In ED settings patients were moved frequently in order to maximise patient flow and achieve established benchmarks for the delivery of emergency care. This movement was unpredictable and often occurred without consultation with the nurse responsible for the patient’s care. When the ED was very busy there wasn’t always time for a formal handover and while the team leader focused on the most important things, participants acknowledged that important things could be forgotten. At times, handover occurred through an intermediary rather than as a continuous process from one care provider directly to the next. In these situations the nurse responsible for the patient’s care received a very truncated version of events without much of the relevant background. Participants described situations where they discovered a patient had been moved and then had to set about finding and communicating with the nurse taking over the care:

You come back from the ward and you find you’ve got a patient that you know nothing about other than (a) what the ambulance sheet tells you and (b) what the patient tells you if they are in a condition to tell you anything at all (03:22).
But the ambulance then take the patient to the bedside and it's really beneficial if the nurse at the bedside can then get the handover. It doesn’t always happen because they're in with other patients. So they may come out and the patient's already settled on the bed and the coordinator just says, oh you know that's a respiratory distress or whatever. You know, and they have to start from scratch. And they see that this patient's having trouble with their breathing and they start to intervene appropriately. But they haven't got all the background relating to that patient that's required, that even the - you know the first nurse actually had that. And if - you know if the nurse at the bedside had been able to hear directly from the ambulance, you can get so much more (45:17-18).

So sometimes people haven't even got a handle on what's going on with their patient and they're moved to another area, sometimes before they've had a chance to hand over to the next lot of nurses (45:07).

4.5 What is the relationship between gaps management and patient safety outcomes?

The management of gaps by nurses was viewed as being vital to the realisation of patient safety outcomes. In many instances nurses stood as the last ‘causally and critically linked person’ to an unintended consequence or outcome (Johnstone & Kanitsaki 2006b, p. 369) and provided the conditions, both necessary and sufficient, for the patient’s safety. On these occasions, nurses were a necessary condition for patient safety because had they not acted when they did, an adverse event most certainly would have occurred. Examples are included in Box 4.4 (page 143 of this thesis).
Box 4.4 Examples where nurses were a necessary condition for patient safety

- During a ‘head to toe’, systematic assessment a nurse detected that the patient’s radial pulse was absent. Further investigations revealed that a large embolus was occluding the radial artery and the patient was taken immediately to the operating theatre for surgery. This action saved his arm (31:11-12).

- During routine assessment of a patient’s heart sounds prior to administration of a thrombolytic medication, a nurse detected a ‘murmur’ (a sound heard via a stethoscope that may indicate disease or structural problems). This murmur was judged by the nurse to indicate that the patient may have had an arterial dissection. This finding was reported to the senior cardiologist in the room who concurred and immediately changed the patient’s treatment. The planned thrombolytic medication was cancelled to avert the risk of catastrophic bleeding and further investigations were arranged (14:06).

- A nurse realised that a surgeon was about to inject local anaesthetic with adrenaline into a patient’s penis. Adrenaline carries the risk of necrosis of the penis because of its vasoconstrictor effect. To avert this adverse outcome she placed her arm in front of the surgeon, deliberately contaminating the sterile field and forcing the procedure to be abandoned (06:11).

- A nurse detected that a temporary clip (whose mechanical and technical characteristics are only for temporary purposes) had been inadvertently placed over a cerebral aneurysm rather than a long term, permanent aneurysm clip. She immediately spoke up and informed the surgeon who was about to begin closing the wound. The clip was replaced with a permanent clip and the risk of haemorrhage from the clip opening or slipping when the patient’s blood pressure returned to normal was averted (10:15-16).

- A nurse recognised that a patient who was being discharged was experiencing an oculogyric crisis from the administration of stemetil. The junior doctor was not aware of the condition or how to treat it. The nurse informed the doctor about the condition, retrieved and administered the appropriate medication and arranged for a senior doctor to review the patient (03:03).

- A nurse identified that a patient had previously received the drug Streptokinase and prevented the patient receiving a second dose of the drug which carries the risk of an anaphylactic reaction. Streptokinase cannot usually be administered safely a second time within 6 months, because it is highly antigenic and results in high levels of antistreptococcal antibodies (07:14).

- Nurses working in a setting that cared for both children and adults prevented children from receiving an ‘adult’ dose of medication by always checking the recommended paediatric dosage and weight of the child against the order. This process uncovered incorrect medication orders and prevented adverse events on a regular basis.
On other occasions, however, the management of gaps was a sufficient condition for the realisation of patient safety outcomes, meaning that the nurse’s actions were enough to prevent the adverse event, although not exclusively. It was possible that other variables may have interceded. Examples are included in Box 4.5 below:

**Box 4.5 Examples where nurses were a sufficient condition for patient safety**

Looking for specific, commonly overlooked things and making necessary preparations or changes to minimise their impact on patients:

- making sure that a drain had the appropriate amount of suction and was being correctly observed so it was not inappropriately removed;
- ensuring that arrhythmias were correctly identified and actioned;
- checking blood sugar levels so that patients did not develop wound infections;
- checking for patient allergies;
- checking the accuracy of ventilator and alarm settings, and abdominal and central venous pressures;
- checking that intravenous lines and endotracheal tubes were correctly positioned and secure;
- monitoring the patient’s weight and fluid status and ensuring that diuretics were recommenced postoperatively; and
- checking blood and x-ray results before patients were discharged.

Observing patients closely when their diet was advanced to thin fluids and performing an overnight blood sugar level when their insulin regimen was changed.

**Identification of a deteriorating patient.**

*Identification of pressure areas and missed injuries or problems (e.g. pneumothorax, forearm and spinal fractures, a fluid collection in the knee) during comprehensive patient assessment.*

The routine checking and double checking of medications prevented medication errors and adverse events.

### 4.6 Education in patient safety and human error management

In spite of their critical role in keeping patients safe, almost a third (N=24) of the participants in this study revealed that they had not undertaken any formal instruction in the principles and theory of patient safety and human error management. Furthermore, the education and training of many was limited to hospital based in-services on specific patient safety issues (i.e. the deteriorating patient, the surgical safety checklist, falls prevention, clinical handover) and risk management software programs (See Table 4.2, page 145 of this thesis). Nurses revealed that they kept...
abreast of patient safety issues through ‘word of mouth’ conversations with
colleagues and were discouraged from attending patient safety education on the
grounds that it would be uninteresting. In sharp contrast, a participant from the
United States revealed that, in her organisation, attendance at a three day university
program on patient safety was compulsory.

Table 4.2 Types of patient safety education described by participants

<table>
<thead>
<tr>
<th>Type of education session</th>
<th>No of participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Human error and patient safety (HEAPS) course</td>
<td>6</td>
</tr>
<tr>
<td>Root cause analysis training</td>
<td>7</td>
</tr>
<tr>
<td>Hospital based in-services on specific patient safety topics (i.e. the deteriorating patient, surgical safety checklist, falls prevention, interdisciplinary communication tools)</td>
<td>12</td>
</tr>
<tr>
<td>Patient safety as a component of post-graduate education</td>
<td>8</td>
</tr>
<tr>
<td>Attendance at seminars, conferences, external programs</td>
<td>11</td>
</tr>
<tr>
<td>Training in incident and risk management software programs (i.e. Risk man, AIMS)</td>
<td>12</td>
</tr>
<tr>
<td>No formal patient safety or clinical risk management education</td>
<td>24</td>
</tr>
</tbody>
</table>

4.7 Conclusion

In this chapter, data obtained and analysed from interviewing emergency, critical
care, perioperative, neuroscience, rehabilitation and transitional care nurses have
been presented. A composite depiction of participant’s knowledge, understandings,
insights and experiences regarding the following processes has also been presented:

- how nurses anticipate, detect and bridge gaps;
- gaps in patient care;
- patient safety and adverse events in a variety of clinical settings;
- the relationship between gaps, patient safety and nursing; and
• the processes that are best suited to promoting safety and quality in health care.

In the next chapter of this thesis, attention will turn to a discussion of these findings.
It's interesting you can always remember the bad things because you learn from them. The good ones they tend to be just be part of everyday (08:11).

I think what you’ve chosen to study is going to make an incredible contribution to the body of nursing knowledge because it’s such an important area and talking to just my own colleagues even in my hospital, it’s something that we all spend so much time doing, you know, in varying degrees; some days it’s the big safety net, other times it’s small, but if it wasn’t caught then it would become something big, you know, that would either impact on life or add to the cost of the health care system, length of stay, any number of things (20:26).

5.1 Introduction

The key purpose of this study has been to explore and describe the relationship between patient safety and the management of gaps by nurses. Specifically, the study has investigated how nurses anticipate, detect and bridge gaps in patient care and protect patients from harm. In keeping with the aims and focus of this study, the findings will be discussed with a view to presenting new insights regarding participants’ experience of gaps, the management of these gaps and the implications for patient safety. These findings have been synthesised into the following core themes, namely:

- Nurses, gaps, complexity and resilience
- Chance, serendipity, luck
- How nurses managed gaps
- The gaps identified by nurses
- Education in patient safety and human error management
- The emotionality associated with adverse events
- Near misses and emotional distress.
Each of these themes will be addressed separately by firstly presenting a synthesised understanding of the findings and an explanation of each theme. Relevant literature will then be introduced and discussed as a means of challenging emergent views and, where appropriate, proposing possible alternatives to the views which constituted the themes identified in this study.

5.2 Nurses, gaps, complexity and resilience

The ‘New Look’ approach to safety holds that humans are active creators of safety and integral to the safe and sustained functioning of complex systems (Cook, Woods & Miller 1998; Hollnagel 2011; 2012a; 2012b). This approach is concerned with enhancing the adaptive capabilities that enable people to create safety in the face of production pressures, resource constraints, gaps, hazards and competing goals (Dekker et al. 2008; Nemeth et al. 2008; Woods & Hollnagel 2006). Previous research has investigated the role of nurses in the management of risk (Groves, Finfgeld-Connett & Wakefield 2012), recovery of medical errors (Henneman, EA et al. 2006; Henneman, EA & Gawlinski 2004; Henneman, EA et al. 2010; Hurley et al. 2008) and nursing surveillance (Schmidt 2010). The current study builds on this research and extends the knowledge on how nurses create safety.

It has been argued that there are valuable lessons to be learned from research of successful performance and what goes ‘right’ (Woods & Cook 2002; Hollnagel 2012a; 2012b). Through the investigation of how nurses anticipate, identify and bridge gaps and get it ‘right’, the current study has generated valuable insights into successful everyday nursing performance. It has also deepened understanding of how nurses cope with complexity and the processes that increase system resilience. Furthermore, the study has captured resilience in its different forms as described by Westrum (2006). Westrum’s taxonomy encompasses nurses, individually and collectively, (i) foreseeing and preventing bad things from happening; (ii) coping with instances of failure by preventing their evolution into something more serious or catastrophic; and (iii) recovering and returning to normal operations in the aftermath of failure. These acts of resilience which supported the delivery of safe patient care in this study will be discussed throughout this chapter.

5.3 Chance, serendipity, luck

Chance, serendipity and luck, in the form of an unknown or unpredictable element or fortunate discovery, played a part in the management of gaps and forestalling of
harm. Luck, ‘the random combination of circumstances’ (van der Schaaf, Lucas & Hale 1991, p. 5) is recognised as a mechanism by which harm may be averted in patient safety incidents (Hollnagel 2011; Reason 2008). A study of factors by Jeffs, Affonso and McMillan (2008, p. 491) revealed that ‘chance’, ‘luck’ and ‘randomness’ were associated with near miss occurrences in hospital settings. Participants in the current study revealed that ‘coincidence’, ‘happenstance’ and ‘chance’ placed nurses in situations where they noticed or heard something and thus acted to forestall patient harm.

Chance, luck and serendipity cannot be designed into health care systems, nor can they be relied upon to prevent adverse patient outcomes. Nonetheless, in some instances, these factors provide an explanation for how patient harm is avoided. These cases serve as a reminder that health care professionals cannot control all aspects of health care delivery nor are they always responsible for everything that goes ‘right’ in patient care.

5.4 How nurses managed gaps?

In accordance with Cook, Render and Woods (2000), the anticipation, identification and bridging of gaps is based on nurses’ knowledge and experience of: where gaps occur; the types of gaps that occur; the things that happen, go wrong and are overlooked; the clinical environment; available equipment; and correct processes and procedures, as shown in Figure 5.1 (page 150 of this thesis). Analysis of the data revealed that the anticipation, identification and bridging of gaps occurred in a rapid sequence such that it was not possible to assign strategies exclusively to each aspect of gaps management. Similarly, Hurley and colleagues (2008, p. 223) identified cases where the identification, interruption and correction of medical errors was a rapid and ‘nearly indistinguishable’ process. However, sufficient data were collected in the current study to make inferences about the relationship between patient safety, nurses and the management of gaps. Significantly, the study has also revealed that the same strategies were used by nurses to manage gaps, irrespective of whether the gaps were familiar or new and unfamiliar. These strategies will now be discussed under the following subheadings:

- The nursing safety net
- Knowledge and experience
- Higher order thinking skills
Chapter 5. Discussion of Findings

- Nursing surveillance
- Enhancement of nursing surveillance
- Effective, constant and assertive communication
- Teamwork.

5.5 The nursing safety net

The current study found that the management of gaps was a function of nurses’ knowledge, experience, intuition, higher order thinking (critical thinking and clinical judgement) and key processes such as surveillance, teamwork and communication. Collectively, these attributes and processes increased system resilience and protected patients from the harmful, and, on occasions, potentially catastrophic effects of gaps. They might therefore be characterised as the ‘nursing safety net’. The dimensions of the nursing safety net are depicted in Figure 5.2 (page 151 of this thesis).

The term ‘nursing safety net’ was coined by Rothschild and colleagues (2006) to describe the role of critical care nurses in protecting patients from the harmful effects of medical errors. Their study yielded important findings with regard to the nature and extent of medical errors recovered by nurses in critical care settings (Rothschild et al. 2006). It revealed that a large proportion of the errors recovered by nurses were medication related and that most were intercepted before reaching patients. Extrapolation of the findings from the study by Rothschild and colleagues (2006) suggests that, in a ten bed critical care unit, as many as 7,300 medical errors may be
recovered annually. The current study builds on the notion of ‘the nursing safety net’ in two respects. Firstly, it provides a characterisation of the nursing safety net. Secondly, it suggests that the notion of the nursing safety net has application and relevance in a range of clinical contexts. Strong congruence was found across all clinical settings for the components of the nursing safety net identified in the context of this study. These elements might thus be considered core elements of nursing practice that create safety and increase system resilience.

![Diagram of the nursing safety net](image)

**Figure 5.2 The nursing safety net**

### 5.5.1 Knowledge and experience

The ability of nurses to anticipate, detect and bridge gaps was a result of their direct and previous experience of the things that happened or went wrong; specific things that were commonly incorrect, overlooked or forgotten; and their knowledge of the correct procedures and available equipment in their environment. Knowledge and experience alerted nurses to where gaps were likely to occur and the types of gaps that might occur. Experience also formed the basis for nurses’ intuitive awareness of gaps.
(a) Intuition

Nurses in the current study revealed that a feeling or ‘gut reaction’ alerted them to the presence of gaps. They counselled their junior colleagues to ‘always go with their gut’ and ‘never let go of it’. Intuition, a uniquely human quality, has been defined as a form of reasoning (Winkler 1996), an instinctive knowledge of or belief about something without conscious reasoning (Collins Dictionary of the English Language 2010). Intuition, a ‘legitimate and essential aspect of clinical judgement’ (Benner & Tanner 1987, p. 23), develops through the experience of similar and dissimilar situations (Benner, Hooper-Kyriakidis & Stannard 1999). In line with the work of Benner, Hooper-Kyriakidis and Stannard (1999), nurses’ intuition encompassed a sense of salience and concern in certain situations, an awareness, for example, that the patient was about to deteriorate in the absence of any physiological signs.

The importance of intuition has been highlighted by Weick and Sutcliffe (2007, p. 31) who argue that an important aspect of reliable performance is trusting intuitive feelings because they are a ‘solid clue that your model of the world is in error’. Research has established that intuition plays a key role in nurses detecting clinical deterioration (Andrews & Waterman 2005; Minick & Harvey 2003; Odell, Victor & Oliver 2009). Efforts to reduce communication failure and rates of in-hospital cardiac arrest have given legitimacy to the intuitive ‘something is not quite right’ feelings experienced by health care practitioners (Bellamo et al. 2003; Leonard, Graham & Bonacum 2004). In one Australian hospital, for example, feeling ‘worried’ about a patient is a valid and common reason to activate the medical emergency team (Bellamo et al. 2003). Likewise, a neonatal critical care unit in the U.S.A. has an established process whereby doctors are required to attend an infant, without question or hesitation, whenever a nurse is concerned (Leonard, Graham & Bonacum 2004).

(b) Pattern recognition

The feeling or ‘gut reaction’ that alerted nurses to the presence of gaps may be an example of pattern recognition. Being able to make an immediate and intuitive interpretation of an undefined clinical situation is a result of prior experience of similar clinical situations and the ability to recognise a pattern (Benner & Tanner 1987; Benner, Tanner & Chesla 2009; Tanner 2006). Pattern recognition is a mental process whereby an individual matches the salient aspects of a situation against a ‘mental library of prior experiences’ (Leonard, Graham & Bonacum 2004, p. i87).
Pattern recognition is widely recognised as an important attribute of expert nursing practice (Benner & Tanner 1987; Brykczynski 1998; Orsolini-Hain & Malone 2007) that enables nurses to identify early and subtle changes suggestive of patient problems (Minick & Harvey 2003). Of note, research has found that ‘diligent and vigilant’ recognition of patterns in the delivery of care contributes to the recovery of near misses in clinical domains (Jeffs, Affonso & MacMillan 2008).

(c) Priming

It is posited that nurses’ experience of gaps and the things that went wrong or were overlooked ‘primed’ them to anticipate, detect and bridge gaps. Priming, a phenomenon widely studied in the field of cognitive psychology, is subconscious and pervasive in everyday life (Tulving & Schacter 1990). Priming occurs when the presentation of a stimulus or task results in processing of that stimulus or task (Dennis, Minas & Bhagwatwar 2013; Marsolek 2003). This processing involves the activation of a mental representation of certain aspects of the task (i.e. concepts, attitudes, beliefs, behaviour) in a person’s working memory. Research has demonstrated that these mental concepts can then influence an individual’s behaviour and judgement in future unrelated tasks without the person concerned even being aware of this effect (Dennis, Minas & Bhagwatwar 2013; Teunissen et al. 2009). When these mental concepts are assimilated, the individual’s behaviour and judgement accord with the original stimulus or task that was primed. In summary, priming refers to an increased sensitivity to certain stimuli as a result of prior experience and the tendency for humans to consistently see a phenomenon after an initial exposure to it. It is suggested that the effects of priming can be long lasting and salient.

Priming has been identified as a useful method for developing mindfulness, an awareness of one’s mental processes (i.e. thoughts and processes) in everyday life (Epstein 1999; Epstein 2003). Priming has also been used in clinical education to develop patient care and learning goals and prepare students for clinical tasks (Epstein 2003; Paulman 2002). In the context of the current study, and with reference to the work of Tulving and Schacter (1990), it is hypothesised that the ability of nurses to anticipate, detect and bridge gaps was a function not only of their perception but also of their experience and subsequent memory of health care gaps. The priming effect was not directly observed or researched thus it is only possible to speculate
about its role in the management of gaps. It is, however, an area for further research and inquiry.

(d) Foresight training as a counter to inexperience

The inexperience of health care practitioners has been identified as a contributing factor in cases of safety failure (Toft 2001). It has been noted that novice practitioners may not possess the requisite knowledge and experience to anticipate situations where there is a heightened risk of error or harm (Reason 2004). Thus, Reason (2004) has argued that foresight training is a means of developing ‘basic mental’ (as distinct from technical) skills that allow a novice doctor or nurse to prospectively analyse risk in any given situation.

Foresight training has been widely adopted by other safety critical industries (i.e. aviation, nuclear power, off-shore oil and gas organisations) (Boakes 2009) and the National Patient Safety Agency (2008) in the United Kingdom. A key benefit of such programs is increased awareness of the factors that contribute to preventable adverse events in the absence of direct or first-hand experience of such events (Boakes 2009). The program, based on Reason’s (2004) ‘three bucket model of error likelihood’, highlights three system factors that contribute to health care risk in any given situation. These include:

(i) Self - the level of knowledge and experience of the individuals and other factors such as fatigue, stress or poor health;
(ii) Context - interruptions, distractions, issues with equipment, time constraints; and
(iii) Task - the complexity of the task and the potential for error (p. ii31).

Foresight training focuses on skill development such that staff can make an assessment of the ‘bad stuff’ in a clinical situation - the negative factors in each ‘bucket’ that increase the risk of an error or adverse event (Boakes 2009; Reason 2004). While not a definitive measure of the risk of an unsafe act in a given clinical situation, the presence of many factors in one or more buckets serves as a ‘red flag’ that the risk is increased. Similarly, the apparent absence of any identifiable risk factors does not guarantee safety (Boakes 2009).
5.5.2 Higher order thinking skills - critical thinking and clinical judgement

Higher order thinking skills (i.e. clinical reasoning, critical thinking, clinical decision making and clinical judgement) are widely recognised as being fundamental to the delivery of quality patient care and achievement of patient safety outcomes (Benner, Hughes & Sutphen 2008; Bittner & Tobin 1998; Edwards 2003; 2007; Hurley et al. 2008; Mottola & Murphy 2001; Simmons 2010). The current study has revealed that critical thinking and clinical judgement were key elements of the nursing safety.

Clinical judgement, a form of thinking, has been defined as the ability to reach an ‘interpretation or conclusion about a patient’s needs, concerns or health problems’ in situations that are ‘underdetermined [and] ambiguous’ (Tanner 2006, p. 204). It encompasses important subconscious elements such as intuition and is derived through experience (Benner, Tanner & Chesla 2009). Critical thinking encompasses the use of situational and practical knowledge (i.e. knowledge acquired through clinical experience) (Bittner & Tobin 1998) to recognise patient problems, make clinical judgements and weigh up alternative courses of action (Benner, Hughes & Sutphen 2008).

A case described in Chapter 4 of this thesis (page 124) captures an act of resilience where a nurse identified failure and prevented its evolution into something catastrophic. In this case, critical thinking and clinical judgement were crucial to the nurse detecting and bridging the gap, the patient’s unrecognised clinical deterioration from a large myocardial infarction. In accordance with the work of Cook, Render and Woods (2000) the nurse possessed a mental catalogue of (i) the clinical conditions that pointed to the presence of gaps (i.e. the patient’s colour; a blood pressure that did not ‘match up’ with the patient’s tachycardia; low urine output; abnormalities in the patient’s ECG tracing), and (ii) the gaps that may be present (i.e. variations in the placement of electrodes for continuous ECG monitoring; inadequate patient assessment; the possibility that an ECG might be filed away without review). The nurse promptly checked the ECG (completed some hours earlier) and immediately identified that the patient had suffered a large myocardial infarction. She seamlessly escalated the patient’s care to minimise the adverse consequences - advising the doctor that he needed to review the patient immediately, and arranging for the patient to be moved to the main part of the unit where the necessary resources were readily available.
Chapter 5. Discussion of Findings

In line with the work of Patterson and colleagues (in press) the skill and expertise of the nurse in successfully identifying and bridging the gap, minimised the impact of the gap on the patient and also reduced its visibility and significance. In the absence of the nurse’s action, this is said to suggest the patient’s condition would have rapidly deteriorated. Reason (2008) points out that the work of front line clinicians in forestalling harm ‘conceals’ the system weaknesses and faults that contribute to failure. Similarly, a participant in the current study remarked that the successes just become part of the everyday.

5.5.3 Nursing surveillance

Knowledge, experience, intuition, and higher order thinking skills were key features of the nursing safety net described in this study. In accordance with the conceptual framework of surveillance advanced by Kelly and Vincent (2011, p. 656), these characteristics were also antecedents, ‘prepossessed abilities, knowledge or training’ that positively influenced the process of nursing surveillance.

Surveillance has been described as one of the most fundamental activities undertaken by nurses (Page 2004). Furthermore, it has been posited as a factor in the relationship between higher levels of registered nurse staffing and superior patient outcomes (Aiken et al. 2003). There is a paucity of research, however, on the process of surveillance itself (Henneman, EA Gawlinski & Giuliano 2012; Kelly 2009; Kutney-Lee, Lake & Aiken 2009; Schmidt 2010). An important finding of this study is that nursing surveillance was an integral component of the nursing safety net and a key process used by nurses to manage gaps and create safety. The rich, descriptive data presented depict effective nursing surveillance ‘in action’ and deepen understanding of this important process. To this end, the findings represent a new contribution to the field of knowledge.

In keeping with definitions of surveillance advanced by Dougherty (1999), McCloskey Dochterman and Bulechek (2004), Kutney-Lee, Lake and Aiken (2009), Schmidt (2010), Kelly and Vincent (2011), Henneman, Gawlinski and Giuliano (2012), and a study of nursing surveillance (Schmidt 2010), effective nursing surveillance was a complex process with behavioural and cognitive components. The components of surveillance identified in this study included: vigilance; a systematic, comprehensive, head-to-toe and ‘hands-on’ approach to patient assessment; observing and looking; checking; and making sure. These components and their key features are summarised in Table 5.1 (page 157 of this thesis).
Table 5.1 Components of nursing surveillance

<table>
<thead>
<tr>
<th>Remaining vigilant</th>
</tr>
</thead>
<tbody>
<tr>
<td>• never taking anything for granted</td>
</tr>
<tr>
<td>• maintaining a sustained and watchful state of attention</td>
</tr>
<tr>
<td>• being alert and attentive to unpredictable and infrequent events</td>
</tr>
<tr>
<td>• keeping careful watch for potential dangers and clinical deterioration</td>
</tr>
<tr>
<td>• paying close attention to patient cues</td>
</tr>
<tr>
<td>• performing tasks at a constant level of efficiency and effectiveness</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>A systematic, comprehensive, head-to-toe, ‘hands on’ approach to patient assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Observing and looking</strong></td>
</tr>
<tr>
<td>• carefully and critically</td>
</tr>
<tr>
<td>• at the whole patient and broadly (i.e. the ‘big picture’)</td>
</tr>
<tr>
<td>• included elements of searching, examining, watching, observing, and investigating</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Checking</th>
</tr>
</thead>
<tbody>
<tr>
<td>• backwards and forwards</td>
</tr>
<tr>
<td>• double and triple checking everything about a patient and their environment</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Making sure</th>
</tr>
</thead>
<tbody>
<tr>
<td>• making certain, leaving no doubt</td>
</tr>
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</table>

(a) **Vigilance**

Nurses that successfully managed gaps approached their work with a sustained and watchful state of attention and thus were highly vigilant. Vigilance was a pivotal element of the nursing safety net that increased resilience. Vigilance encompassed being ready to detect events that occurred unpredictably; keeping careful watch for possible danger or difficulties; and performing tasks at a constant level of efficiency and effectiveness. Vigilance has been defined as the ‘intentional and knowledgeable watchfulness of the patient, the care environment and one’s own thinking’ (Kookencited in Ebright et al. 2006, p. 346). Vigilance has been described as the ‘essence’ of nursing (Meyer & Lavin 2005) and one of the most important attributes of a safe practitioner (Long et al. 2011). A range of studies have revealed that vigilance plays a role in the recovery of nursing and medical errors (Balas, Scott & Rogers 2004; 2006; Henneman, EA et al. 2006; Henneman, EA et al. 2010; Hurley et al. 2008), the mitigation of near misses (Jeffs, Affonso & MacMillan 2008), the safe administration of medications (Eisenhauers, Hurley & Dolan 2007) and recognition of the
deteriorating patient (Clarke 2004). These studies, however, reveal little about the process of vigilance itself. A small number of studies have investigated the phenomena of vigilance in health care contexts (Carr 1998; Howard et al. 2003; Mahoney et al. 2003; Meyer 2002), the most informative of these being a study of the vigilance experiences of cancer patients, families and nurses (Kookén 2008). Kookén (2008) found that nursing vigilance was a complex, multi-dimensional process that involved monitoring and tending to the small but essential aspects of patient care:

Vigilance is often not about large, noticeable, or even unusual symptoms. Vigilance is about tending to and monitoring the small, on a daily basis. Vigilance, is about watching the mundane, just in case (p. 173).

In line with the work of Kookén (2008), the findings of this study indicate that vigilant nurses were knowledgeable and experienced; used different forms of communication (i.e. questioning, listening and watching) to elicit information; went to the patient to ‘see’ for themselves; were acutely aware of what they needed to be vigilant about; and were able to think broadly, gather information from many sources, consider all possibilities and seek answers. A key element of vigilance in Kookén’s (2008, p. 168) study was the ability to ‘notice small things in the moment’. Similarly, nurses in the current study were aware of the salience of the ‘simple’ or ‘little’ things and their potential to evolve into something larger and possibly catastrophic. As noted in the previous chapter, inattention to the simple, essential or small aspects of patient care (i.e. checking a patient’s temperature) created the opportunity for preventable adverse outcomes.

(b) Mindfulness

The intentional watchfulness that was key to managing gaps and creating safety might also be characterised as mindfulness. Mindfulness has been discussed in a number of different contexts in the health care literature. Collective and individual mindfulness have been linked to safety and resilience and identified as positive attributes of high reliability organisations (Reason 2000; 2008; Weick & Sutcliffe 2007; Weick, Sutcliffe & Obstfeld 2008). In this context, mindfulness encompasses ‘a set of cognitive processes that allows individuals to be highly attuned to the many ways things can go wrong in unkind environments and ways to recover from them’ (Henriksen et al. 2008, p. 15). These processes include vigilance for the possibility of
failure; the reluctance to simplify interpretations; sensitivity to operations; the commitment to resilience; and deference to expertise. Indeed, a trait shared by nurses in the current study was their acute awareness that something might go wrong and the danger of being complacent about the possibility of failure. Nurses described feeling uneasy about the widespread nature of gaps in health care and their potential to cause preventable patient harm.

In health care contexts, mindfulness has been used as an intervention to reduce stress and burn out in health care professionals (Cohen-Katz et al. 2005; Dimidjian & Linehan 2003; Irving, Dobkin & Park 2009). It has also been conceptualised as a practice that health care practitioners can constructively apply to all aspects of their work (Epstein 1999). In this context, mindfulness is a form of self reflection with origins in the philosophical-religious tradition (Epstein 1999). Even so, Epstein (1999) explains that it is pragmatic, underpinned by the interrelated processes of action, memory, cognition and emotion and thus relevant to health care providers. While Epstein (1999) writes largely for a medical audience, the views expressed hold equally for nurses. A mindful practitioner is described as someone who:

attends, in a nonjudgmental way to his or her own physical and mental processes during ordinary everyday tasks to act with clarity and insight (Epstein 1999, p. 833).

According to Epstein (1999, p. 835), mindfulness involves attending to ‘the ordinary, the obvious and the present’. A degree of overlap is noted between mindfulness and the notion of vigilance, as described by Kookén (2008), namely, attention to the ordinary or commonplace in everyday life. While mindfulness was not directly observed or researched, nurses that successfully managed gaps in the current study displayed two key habits of mind, ‘attentive observation’ and ‘critical curiosity’, as described by Epstein (1999; 2003).

Critical curiosity has been described as a dimension of learning power, the capacity to learn how to learn (Crick 2007). Curiosity has also been identified as an attribute of resilient teams and organisations (Dekker et al. 2008). It appears that nurses in the current study demonstrated some of the attributes of critically curious individuals identified by Crick (2007). These nurses possessed a strong desire to find out what was going on; they asked questions, preferred to see for themselves, came to their own conclusions, and were reluctant to uncritically accept the views of others. They highlighted the importance of really looking at the patient.
In the context of patient safety, mindfulness has been advanced as a useful strategy in addressing cognitive biases that contribute to diagnostic and medical errors (Sibinga & Wu 2010). A recent analysis by White (2013) concluded that the integration of mindfulness into nursing holds important benefits for the health of nurses and quality of nursing care. The findings of this study suggest that mindfulness may also be of use to nurses in coping with complexity and managing gaps. Further research and inquiry is required to explore this idea.

(c) Vigilant patient assessment and observation

The importance of observing and assessing patients was first formally recognised by Florence Nightingale, the British nurse reformer and founder of modern nursing science. In her book, Notes on Nursing. What it is, and what it is not, Nightingale (1969) writes of the importance of teaching nurses what and how to observe patients:

> The most important practical lesson that can be given to nurses is to teach them what to observe - how to observe - what symptoms indicate improvement - what the reverse - which are of importance - which are of none - which are the evidence of neglect - and of what kind of neglect...But if you cannot get the habit of observation one way or other, you had better give up the being a nurse, for it is not your calling, however kind and anxious you may be’ (p. vii).

Patient assessment is widely recognised as a vital first step in the planning and delivery of nursing care (Fennessey & Wittmann-Price 2011; Munroe et al. 2013; West SL 2006). The findings generated through patient assessment form a baseline against which the effectiveness of treatments can be evaluated and further assessments can be compared. Nonetheless, the notion of physical assessment as distinct from the taking and recording of observations (i.e. vital signs) is a contested notion in the nursing literature (Birks et al. 2013; Fennessey & Wittmann-Price 2011; Giddens 2007; West SL 2006). The increasing complexity and acuity of patients in hospital settings and the significant patient safety problem of failure-to-rescue have drawn attention, however, to the importance of patient assessment (Buist & Stevens 2013) and the need for a systematic, comprehensive, head-to-toe approach (Baid 2006; West SL 2006). Research has revealed that ‘looking’, ‘watching’, and the ‘close, direct observation’ of patients are important components of nursing surveillance (Schmidt 2010). Likewise, previous studies of error recovery (Henneman, EA et al. 2006; Henneman, EA et al. 2010; Hurley et al. 2008) have
identified the important role of vigilance, observation and assessment in protecting patients from harm.

The findings from this study indicate that three interrelated processes, amongst others, were integral to the identification and management of gaps in patient care: systematic, comprehensive, head-to-toe, ‘hands on’ patient assessment; observing and looking; and, remaining vigilant. Collectively, they underscore the importance of observing and assessing patients closely, attentively and thoroughly, using a careful, well organised and systematic approach. These processes protected patients from the serious effects of health care gaps and increased system resilience. In line with Westrum (2006), these strategies enabled nurses to (i) foresee and prevent bad things from happening; and (ii) cope with instances of failure by preventing their evolution into something more serious or catastrophic. Examples of nurses preventing bad things from happening included: a nurse identifying that a patient’s radial pulse was absent and that the patient was at risk of losing their arm; a nurse detecting the presence of a heart ‘murmur’ which was found to be indicative of an arterial dissection; and, a nurse preventing the injection of local anaesthetic with adrenaline into a patient’s penis. Similarly, examples of nurses preventing the evolution of failures into something more serious included the detection of: two missed injuries in a trauma patient (i.e. a pneumothorax and fractured wrist); a misplaced endotracheal breathing tube; pressure areas; the placement of a temporary clip over a cerebral aneurysm which carries the risk of opening and slipping when the blood pressure returns to normal; an adverse reaction to an iron infusion; the failure to recommence diuretics post operatively; and incorrectly diagnosed cardiac rhythms.

(d) A ‘hands on’ approach to patient assessment

Ebright (2006, p. 345) contends that ‘vigilance is a function of human beings’ and that the role of machines is to augment rather than substitute this vital function. Thus a key consideration for the nursing profession in an era of rapid technological advancement is determining which nursing practices are still relevant (Ebright 2006). Participants in the current study highlighted the importance of ‘hands on’ assessment and cautioned against over reliance on technology, arguing that human hands are irreplaceable. They expressed concern that the use of medical devices had evolved into the dominant method of patient assessment and called for a return to the ‘basics’ of looking, thinking, touching and talking to patients. This view concurs with research by Schmidt (2010, p. 404) who identified that ‘close, direct observation of
patients’ using the eyes, ears and hands was a key element of surveillance. Furthermore, research has suggested that the use of electronic monitoring equipment is common in patient assessment and that much of this work is undertaken by health care assistants (Wheatley 2006). Wheatley (2006) concluded that the taking of observations and basic physical assessment of patients in ward settings was superficial and looked upon as a ‘task to be done’. While Wheatley’s (2006) study was exploratory in nature and involved a small sample, its findings offer valuable insights on how patient assessment has evolved from a ‘hands-on’ activity to one that is more reliant on technology.

(e) Gaps in the vigilant assessment and observation of patients

Patient assessment plays a critical role in the identification of clinical deterioration, maintenance of physiological safety, and decision making about patient care (Cioffi 2000; Considine & Botti 2004). Participants in the current study suggested, however, that in spite of this, nurses took short cuts in patient observation and assessment by fabricating observations and not assessing patients thoroughly. Participants conveyed a sense that patient assessment generally was undervalued, not widely implemented and a process for which nurses may be inadequately skilled. A number of studies have drawn attention to gaps in the assessment and observation of patients in hospital settings, revealing significant variation in the documentation of vital signs (Buist & Stevens 2013; Hands et al. 2013; McGain et al. 2008; National Patient Safety Agency 2007). A small qualitative study, undertaken by the National Patient Safety Agency (2007) in the U.K. revealed that routine observations were rarely taken during the night (i.e. between 10.30pm-6am) and performing observations was considered a ‘low priority’ task (National Patient Safety Agency 2007). Analysis of a large cohort (i.e. almost 1 million sets of patient observations) revealed that overnight observations on unwell patients were not repeated in a timely manner and in line with the hospital’s escalation policy (Hands et al. 2013). Where the recommended interval between observations sets for a ViEWS\(^{21}\) value of 9 or more (suggestive of critical physiological disturbance) is 30 minutes, almost a third of patients with these values did not have vital signs recorded in the following six hour period.

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\(^{21}\) The ViEWS system is a type of early warning system (EWS). The system calculates a weighted value that is a measure of the patient’s level of physiological variation from a predetermined ‘normal’ range. In most EWS protocols, higher values trigger more frequent observations.
Research studies in the U.S.A. and Australia point to a large discrepancy between the number of physical assessment skills taught in undergraduate nursing programs (as many as 121) and the number used in clinical practice (Birks et al. 2013; Giddens 2007). Furthermore, research conducted in a simulated environment has revealed significant gaps in the assessment skills of final-year nursing students during patient deterioration (Cooper et al. 2010). Many students performed poorly on basic assessment tasks and while they possessed knowledge of the management of deterioration they were unable to apply this knowledge in a clinical context. Furthermore, the skills performance of the students declined as the clinical deterioration worsened. A key question raised by these research studies is whether a reduction in the overall number of physical assessment skills taught in undergraduate nursing programs might allow for greater focus on those skills essential in identifying clinical deterioration or a change in the patient’s health status (Birks et al. 2013; Giddens 2007).

(f) The promotion of vigilant patient assessment and observation

An important consideration raised by this study is how the process of vigilant patient assessment and observation can be enhanced to create safety benefits for patients. Maria Montessori (1964, p. 228), the originator of the Montessori educational method that is used throughout the world, has written that the key to creating observers is ‘giving them the power and the means for this observation […] through education of the senses’. Similarly, Pellico and colleagues (2009, p. 648), with reference to the work of Csikszentmihalyi and Robinson (1990), contend that the skill of observation is not ‘bequeathed but earned through diligence in the skill of looking and seeing’. A study by Pellico and colleagues (2009) explored the use of novel environments (i.e. observing artwork in a museum) to enhance the ‘process of clinical seeing’ through the development of nurses’ observational skills. The study found that, when presented with a series of patient photographs, students that participated in the museum experience provided more written observational data and identified a greater number of differential diagnoses.

Recently, Buist and Stevens (2013) argued that health care professionals have lost sight of their ‘core business’, the practice of diligent observation and monitoring to detect patient problems and inform appropriate action. The ‘New Look’ approach to patient safety acknowledges that the addition of technology may create new and unintended gaps and error opportunities (Nemeth et al. 2008; Patterson et al. in
Press). Thus, it is posited that the widespread availability of electronic monitoring equipment in health care settings has created a gap, a diminished perception of the value of thorough observation and assessment of patients using a hands-on, well organised and systematic approach. A key challenge lies in convincing health care practitioners, including nurses, that a hands on approach creates safety and makes a difference to patient outcomes. In the context of the current study, and with reference to the work of Buist and Stevens (2013) and Florence Nightingale (1969), further research and inquiry is required to determine how health care systems can provide the conditions for vigilant patient assessment and observation to occur.

\(g\) Vigilant checking and making sure

Checking and rechecking are important safety skills in health care contexts (Long et al. 2011; Shillito, Arfanis & Smith 2010) with studies in emergency and critical care settings identifying ‘double-checking’ as a useful strategy in the recovery of medical errors (Henneman, EA et al. 2006; Henneman, EA et al. 2010). Similarly, participants in the current study revealed that checking encompassed constant ‘double’ and ‘triple’ checking, ‘backwards and forwards’ of the patient and their environment. Checking was not a routine or automated process, however. Checking had behavioural and cognitive elements evidenced by nurses constantly returning to the patient, methodically and systematically checking the patient and their environment and also checking their own thinking. Some overlap is noted here with the notions of vigilance and mindfulness, previously discussed in this chapter. Vigilance and mindfulness both encompass a watchfulness or attention to mental processes (Epstein 1999; Kook en 2008). Participants also indicated that nurses ‘mental checklists’ (as opposed to textual checklists) of the things that were commonly overlooked or might go wrong informed the checking process.

To make sure of something is to make certain and be free from doubt (Collins Dictionary of the English Language 2010). The term ‘making sure’ appeared frequently throughout the interview transcripts. Making sure involved looking and checking in a purposeful and intentional way. Of note, a grounded theory study of nursing surveillance revealed that ‘making sure’ was the basic social process through which nurses watched over patients (Schmidt 2010).
(h) Nursing surveillance during periods of ‘going solid’ in the ED

Participants in this study revealed that, during periods of ‘going solid’, nurses increased their level of patient surveillance to prevent bad things from happening and maintain the safe and sustained operations of emergency departments. ‘Going solid’ is a term from the nuclear power industry used to describe a ‘shift in operations’ where the functioning of one department or unit becomes ‘critically dependent on seemingly insignificant events in seemingly distant areas’ of an organisation (Cook & Rasmussen 2005, p. 130). The phenomenon of ‘going solid’ is seen in complex, tightly coupled systems such as hospitals which operate close to capacity. When hospitals experience periods of ‘going solid’, the risk of patient harm increases.

Participants suggested that ‘going solid’ was evident when EDs became overcrowded due to a lack of inpatient beds in other parts of the hospital. They revealed that, at these times, triage nurses increased their levels of surveillance to manage the risk of caring for a large group of patients (as many as 30) with undiagnosed problems. Nurses observed and assessed patients at regular intervals to determine whether their need for care had changed; provided pain relief; and, where possible, arranged for investigations to be completed. They described the importance of acknowledging patient’s concerns, providing reassurance, ‘telling patients what is going on’ and avoiding ‘platitudes’. These actions contributed to the smooth and sustained operations of the department during periods of ‘going solid’.

5.5.4 The enhancement of nursing surveillance

The current study has found that nursing surveillance was a critical process used by nurses to manage gaps that created safety and increased system resilience. Attention will now turn to a consideration of how nursing surveillance might be enhanced in hospital settings.

(a) Checklists and worksheets

Formal tools (i.e. electronic or paper-based checklists, transfer forms) have been widely implemented in hospital settings to bridge well known gaps (Cook, Render & Woods 2000; Patterson et al. in press) and improve the management of critically important elements of care (i.e. central venous catheters) (Pronovost, Needham, Berenholtz et al. 2006). It is suggested that the use of checklists may be a means of enhancing bedside nursing surveillance (Henneman, EA Gawlinski & Giuliano 2012). Checklists are designed to encourage consideration or action with regard to
specific items or criteria and also provide for documentation of their absence or presence (Hales & Pronovost 2006). Checklists are widely accepted as tools that may improve performance, increase adherence to evidence-based guidelines, and decrease the incidence of errors and preventable adverse events (Hales & Pronovost 2006; Pronovost, Needham, Berenholtz et al. 2006; Halm 2008; Leape 2009; Jeffs, MacMillan & Maione 2009).

Checklists are common place in other safety critical industries such as aviation and aeronautics. Nonetheless, research suggests that as many as half of all aeroplane checklists are not completed and that pressures to meet operating targets are a contributing factor (Degani & Wiener 1993). The translation of checklists into health care has proved slow and challenging, not least due to resistance by health care providers to their introduction (Bosk et al. 2009; Hales & Pronovost 2006). Explanations put forward for this resistance have included perceptions that checklists replace and devalue intuitive clinical judgement and slow down decision making and action (Bosk et al. 2009; Hales & Pronovost 2006; King & Appleton 2008; Shillito, Arfanis & Smith 2010). It has also been suggested that overuse of checklists may contribute to checklist ‘fatigue’ (Hales & Pronovost 2006, p. 234)

A key limitation of formal checklists and tools is their inflexibility and inability to support the adaptive capacity of health care providers in situations that are complex, novel and undefined (Hunte 2010). A notable finding of this study is that textual checklists and tools did not feature in participants’ accounts of how they managed gaps. Participants revealed that individual, internal, ‘mental checklists’ informed nurses of the gaps, risks and hazards in their clinical environments. In emergency, perioperative and critical care settings where the margins of error are narrow and clinical deterioration can progress rapidly, these checklists supported swift decision making and action. Mental checklists, as participants suggested, were accessible and effective, alerting nurses to gaps and the increased risk of patient harm. Thus, it would appear that mental checklists, as described in the context of the current study, enhanced the adaptive capacity of nurses and increased resilience in hospital contexts.

Further research might focus on studying the concept of mental checklists in greater depth. Key areas for further research and inquiry include how these checklists are acquired and how they might be passed on to novice nurses.
(b) Surveillance and nurse staffing

Surveillance and its impact on patient outcomes are difficult concepts to measure directly. Research has suggested that lower rates of failure-to-rescue in hospitalised patients are a function of lower nurse to patient ratios and more effective nursing surveillance (Aiken et al. 2002; Clarke & Aiken 2003; Needleman et al. 2002). The findings of this study suggest, however, that the quality of nursing surveillance is influenced not only by the number of nurses per patient but other factors such as knowledge, experience and expertise. These attributes have been identified as important antecedents of nursing surveillance (Kelly & Vincent 2011) and essential elements of the ‘nurse dose’ (Brooten & Youngblut 2006). Furthermore, research has suggested that the presence of well educated, expert and experienced nurses is associated with quality care and lower rates of patient falls and nosocomial infection (Kutney-Lee, Lake & Aiken 2009).

A recent policy framework, developed by the American Nurses Association, recognises that an evidence-based approach to nurse staffing is critical to the delivery of safe and quality patient care (American Nurses Association 2012). Nonetheless, the achievement of appropriate nurse staffing such that the expertise of the registered nurse matches the needs of the care recipient is a complex and challenging task (Weston, Brewer & Peterson 2012). In complex and dynamic environments such as hospital settings, unforeseen fluctuations in the census and patient acuity can disrupt even the best staffing plans and compromise patient safety (Weston, Brewer & Peterson 2012).

(c) Nursing care delivery

Participants in the current study expressed concern about the safety of patients transferred out of critical care settings during periods of ‘going solid’. Similarly, a study by Dykes, Rothschild and Hurley (2010a) revealed that nurses are troubled by this issue. At times of ‘going solid’, patients are moved to a lower level of care to create room for those with a greater need for the resources of a critical care unit. While the phenomena of ‘going solid’ is well recognised in acute hospital environments (Cook & Rasmussen 2005) nurses expressed the view that existing

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22 The nurse dose is a nursing measure that comprises three equal elements: ‘the dose (number of nurses or amount of care by nurses), nurse (education, expertise, and experience), and host response (organizational or patient receptiveness)’ (Brooten & Youngblut 2006, p. 94).
models of nursing care delivery in Australian hospitals may not adequately protect critical care patients at these times. Participants also conveyed a sense that the real focus of many acute hospitals is efficiency and throughput rather than the provision of patient-centred, compassionate and safe care, a concern also raised by Benner, Hughes and Sutphen (2008). Important considerations raised by these views include the planning of nursing care and implementation of care models that minimise discontinuity and support patient safety outcomes.

The role of the nursing safety net and nursing surveillance in managing gaps and creating safety suggests that the organisation and delivery of nursing services (i.e. model of care) is an important consideration. While methods of patient allocation can promote continuity and surveillance by ‘enhancing the accumulation of knowledge about a patient’ (Kutney-Lee, Lake & Aiken 2009, p. 220), participants in the current study suggested that models of care may also inadvertently contribute to discontinuity and fragmentation in patient care. Contemporary models, described in the context of this study, were characterised by a task-oriented approach to patient care and the daily turnover of the shift co-ordinator or nurse in charge such that the person in this vital leadership role lacked knowledge of the patients and the strengths and weaknesses of the nurses. Consequently, the critical task of matching the needs of the patient to the skill level of the nurse (Duffield et al. 2010) was difficult and fraught with risk. Participants revealed that in critical care settings, shift coordinators responded to the lack of experienced, specialty qualified and permanent staff by placing inexperienced nurses next to an experienced colleague and reassigning patients throughout the shift as their care requirements changed. In line with the work of Cook, Render and Woods (2000), participants revealed that these measures created gaps because patients were handed over mid-shift placing experienced nurses in a position of needing to divide their attention between critically ill patients.
(i) Australian research

Research in Australian hospital settings has identified high variability in the models of nursing care adopted by ward nurses with patient allocation and team nursing\(^{23}\) being the most common (Duffield et al. 2010). Likewise, participants in the current study suggested that the model adopted on a daily or shift basis was in line with pragmatic considerations such as patient needs, the skill mix of the nursing staff, and characteristics of the ward environment.

Nursing leadership and models of nursing care delivery have been the subject of recommendations by a Special Commission of Inquiry into acute care services in the state of New South Wales (Garling 2008). The Commission identified a lack of nursing leadership in relation to the safety and quality of patient care and enforcement of standards in unit and ward settings, urging Nurse Unit Managers to take a greater role in the supervision of patient care. Of note, an examination of the roles and educational levels of Nurse Unit Managers revealed that over 40 percent had not undertaken any further education beyond their direct entry level qualification (NSW Health 2009).

(ii) Models to improve patient safety

The organisation of nursing care and effective nursing leadership at a ward or unit level are important considerations in efforts to improve patient safety (Tregunno et al. 2009). Participants in the current study proposed that surveillance and patient safety might be enhanced through access to a clinical nursing support service, especially during after hour periods. An example of such a service is the Early Nurse Intervention Team (ENIT), a nurse-led team that provides clinical advice and support to ward nurses (Daly et al. 2007). Based on the concept of a rapid rescue or medical

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\(^{23}\) (i) Patient allocation or total patient care where a registered nurse assumes responsibility for the full care of a group of patients. (ii) Team nursing where a team, under the direction of a ‘team leader’ provides care to a large group of patients. Members of the team may be assigned specific patient care tasks (i.e. medications, dressings, observations, showers) and supervision is provided to lesser-qualified or inexperienced staff. The team leader plays a role in the coordination of resources, personnel and patient care.
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Emergency team, the ENIT uses regular ward rounds to identify those patients ‘at the edge of instability’ and pre-empt further deterioration (Daly et al. 2007, p. 18).

Concerns about the quality and safety of patient care at the unit level have lead to the development of alternative models of nursing care delivery such as the ‘12-Bed Hospital’ (Kimball et al. 2007) and ‘Primary Care Team’ (PCT) (Batcheller et al. 2004; Kimball et al. 2007) and the creation of new roles such as ‘The Clinical Nurse Leader: Point-of-Care Safety Clinician’ (Reid & Dennison 2011). The ‘12-Bed Hospital’ involves the creation of many small hospitals, each of 12-16 beds, within the larger hospital (Kimball et al. 2007). A registered nurse performs the key role of patient care facilitator or ‘clinical CEO’ for each unit with responsibility for directing and supervising the care of individual patients; mentoring junior staff; and communicating with the interdisciplinary team, patients and families.

In the ‘Primary Care Team’ model the experienced registered nurse performs a ‘primary oversight role’ as team leader, care manager and mentor (Batcheller et al. 2004; Kimball et al. 2007). Designed for a variety of clinical settings, the key principles underpinning this model included the premise that every patient deserves an experienced registered nurse and every novice nurse deserves mentoring from an experienced registered nurse. This model has sought to maximise the contribution of the experienced registered nurse to patient care. This model and others identified in this discussion may have application in Australian health care settings given the important role of knowledge and experience in the management of gaps. This is a fruitful area for further research and inquiry.

5.5.5 Effective, constant and assertive communication

Efforts to improve patient safety have focused on safety culture (Page 2004) and the shared values, attitudes, beliefs and competencies that underpin an organisation’s approach to safety management (Sammer et al. 2010). It is suggested that assertive communication and the ability to speak up are critical components of such a culture (Clarke, Lerner & Marella 2007; Sammer et al. 2010). Assertive behaviour has been defined as ‘a person giving expression to his/her rights, thoughts and feelings without denying the rights of others’ (Timmins & McCabe 2005, p. 62). Participants in the current study revealed that effective, constant, and assertive communication was critical to managing gaps. They highlighted the importance of being willing to question and challenge; take a firm stance; speak up and say no when it was unsafe to proceed. Indeed, the study captured instances where assertive communication on
the part of nurses prevented bad things from happening and increased system resilience. An example of this can be found in a case described in Chapter Four (page 114) of this thesis where a junior doctor wanted to sedate an agitated patient during a CT scan. On this occasion the nurse ‘put her foot down’ and insisted they return to the ED. She was acutely aware that the doctor was inexperienced in intubation and that the patient’s life would be in danger should he lose his airway without the back-up and resources of the ED. The patient safety literature contains similar cases where assertive communication was key to forestalling patient harm (Carthey et al. cited in Reason 2008; Weinstock 2007).

Nonetheless, participants acknowledged that the ability to speak up and ‘stick to their guns’ came with knowledge and experience and often met with resistance from colleagues. Perioperative participants, in particular, expressed concern about being in conflict with colleagues with whom they worked closely each day. This view is supported by research which suggests that while many nurses have the necessary skills for assertive communication they prefer to avoid conflict with colleagues in the workplace (Timmins & McCabe 2005). Research on team communication in the operating room has revealed that a wide range of communication strategies (i.e. questions, commands, stories and non-verbal signs) are used by perioperative team members (Lingard et al. 2002). The authors characterised these as a ‘complicated “dance” that maintains relationships and minimises tension while still achieving goals’ (Lingard et al. 2002, p. 235).

Further research and inquiry might focus on how to build the capacity of younger and less experienced staff and make it easier for them to be assertive.

(a) Teamwork

Cross monitoring of performance has been identified as an important attribute of effective teams that enhances patient safety (Baker, DP et al. 2003; Baker, DP, Day & Salas 2006; Manser 2009; Xyrichis & Ream 2008). On this point, Benner and colleagues (2002) write that:

Errors are often the result of a chain of events that might have been interrupted at many different points if team members shared a culture of speaking up, asking questions and cross monitoring each other’s performance (p. 282).

The current study captured many cases where cross monitoring of nurses’ performance, especially by experienced nurses, was a key factor in the identification
and bridging of gaps such as unrecognised clinical deterioration. Furthermore, the ability of nurses to pull together, count on each other, and approach the care of the patient as a team was crucial to getting the work done and ensuring that patient’s received adequate care. Kalisch and Lee (2010) note that interdisciplinary teamwork as opposed to nursing teamwork has been the primary focus of the patient safety literature. They argue, however, that nursing teamwork is equally important given the acute, unpredictable and rapidly changing nature of many health care environments. A study undertaken by Kalisch and Lee (2010) revealed that nursing teamwork was an important determinant of omitted nursing care in hospital settings. Higher scores for measures of team function (i.e. trust, team orientation, leadership, and shared mental models) were associated with less omitted care.

Maintaining constant communication with medical staff and other members of the interdisciplinary team was found to be an important aspect of teamwork in the current study that enhanced vigilance and prevented gaps in patient care. Similarly, research has indicated that vigilance resides not only in individuals but also in teams and that communication between team members creates partnerships that enhance vigilance (Kookén 2008). Nonetheless, it is argued that ‘planned’ and ‘collective’ vigilance whereby ‘clinicians proactively mitigate potentially harmful errors by watching over or consulting colleagues’ is both a ‘safety net’ and ‘safety threat’ (Jeffs 2010; Jeffs et al. 2012, p. 124). Jeffs and colleagues (2012) contend that this form of vigilance may discourage professional accountability, creating a situation whereby health care providers come to rely on colleagues to identify and correct their errors. The current study found that gaps in medication safety were anticipated, detected and bridged by nurses proactively checking medication charts, educating doctors in how to write medication orders, and being physically present while orders were written. These actions created safety by preventing medication errors and, in line with the work of Jeffs and colleagues (2012), might be characterised as examples of planned, collective vigilance.

(b) Storytelling

In health care contexts, stories and storytelling can serve as substitutes for trial and error learning and enhance reliable performance (Weick 1987). Storytelling is a means by which experienced practitioners may share their experiences of errors and safety failure. As Weick (1987) explains:
A system that values stories and storytelling is potentially more reliable because people know more about their system, know more of the potential errors that might occur, and they are more confident that they can handle those errors that do occur because they know that other people have already handled similar errors (p. 113).

Storytelling has been incorporated into foresight training programs (discussed in Section 5.5.1) in the form of short descriptions of actual patient safety incidents (Reason 2004; 2008). In the current study, nurses that were effective in managing gaps were not only skilful ‘story tellers’ but were adept in eliciting patient stories. Furthermore, storytelling was a method used by expert nurses to inform others of their experiences of gaps and the things that went wrong or were overlooked. For example, one nurse used a story of ‘gaps all over the place’ as a teaching tool to inform others of the risk associated with gaps.

The ability to incorporate salient information about the patient and physiological data into a ‘well crafted story’ has been found to reduce the risk of communication failure during clinical handover (Sharit et al. 2005; Sharit, Thevenin & Barach 2008). In the context of nursing handover, participants in the current study revealed that a focussed presentation of the most relevant patient data (a well crafted story) was vital to preventing gaps and forestalling harm. The inclusion of pertinent information equipped the oncoming nurse to anticipate and respond to patient problems (e.g. what to do if a patient with an organ level wound and no sternum suffers a cardiac arrest?).

(c) Frames and reframing

‘Reframing’ was a strategy used by ED nurses to resolve conflict and achieve a change of course when they perceived that the discharge of a patient threatened the person’s safety. Frames are mental structures that influence how people see the world, the decisions they make and the way they act (Lakoff 2004). They are cognitive shortcuts that enable people to make sense of and organise complex information (Kaufman, Elliott & Shmueli 2003). Frames cannot be seen or heard but are part of the ‘cognitive unconscious’ that informs thinking and what people regard as common-sense (Lakoff 2004). An individual’s beliefs, values, experiences, expectations and needs determine how they frame people, events and processes and determine what is important (Lewicki, Barry & Saunders 2010). Lakoff (2004) writes that frames are known through language and that hearing a word triggers its associated frames in the brain.
Language is the means by which reframing occurs (Lakoff 2004). Participants indicated that while the language of the medical staff focussed on the notions of clinical stability, medical admission criteria and the availability of hospital beds, nurses used a different language to reframe the discharge as a threat to the patient’s safety. This was achieved by posing questions such as: ‘Is this patient going to be safe at home? What if this was your mother?’ Reframing changes the way people view a situation and what counts as common sense (Lakoff 2004). The goals of frame analysis and reframing processes include:

- To clarify the perception of the issues in dispute and promote the productive exchange of information.
- To sharpen the parties' understanding of their interests and how the modes of action they have chosen serve those interests.
- To identify those subjects which the involved parties view differently.
- To identify differences which cannot be bridged and seek ways to address them (Kaufman, Elliott & Shmueli 2003).

5.6 The gaps identified by nurses

The discussion of this study’s key findings will now focus on the gaps identified by participants. In line with the work of Cook, Render and Woods (2000), gaps were described as vulnerabilities, points in the patient’s journey where an opportunity had been created for something to go ‘wrong’ in the form of an error or adverse event. Participants revealed that when gaps were present, patient care was disjointed and lacking organisation such that the normal, expected or planned sequence of events was delayed, disrupted or did not occur as it should.

One of the objectives of this study was to determine whether the gaps identified by participants were (i) familiar to nurses, (ii) new and unfamiliar to nurses, and (iii) familiar to nurses but their characteristics had changed. Nurses were familiar with most of the gaps identified in the current study. That is to say nurses had knowledge or direct experience of these gaps. Nonetheless, participants identified three new, unfamiliar and rare gaps of which nurses had no prior knowledge or experience. Attention will now turn to a discussion of these gaps.

5.7 Gaps that were new and unfamiliar to nurses

The only gaps that were new and unfamiliar to nurses involved technology or equipment, namely, a life support machine that reached the end of its battery life and
shut down as it was plugged into the power supply; a faulty connection between the oxygen hose of a ventilator and the boom of the oxygen supply; and, a life support machine that fell to the floor. Each of these new and unfamiliar gaps occurred in critical care settings, was unanticipated, and created the potential for catastrophic harm. In two cases, serious patient harm was forestalled, while in the third the patient died. The nature of these gaps supports the notion that the introduction of technology and other measures to improve patient safety creates the potential for new, unintended and unforeseen gaps and forms of failure (Jeffs et al. 2012; Nemeth et al. 2008; Patterson et al. in press; Westbrook et al. 2013).

5.8 Gaps that were familiar but their characteristics had changed

The study also sought to identify gaps that were familiar to nurses but their characteristics had changed. Careful examination of the data failed to identify any gaps with these attributes. However, the study found that nurses used the same processes to manage gaps irrespective of their characteristics (familiar, new and unfamiliar).

5.9 Gaps that were familiar to nurses

Participants identified a number of gaps that were familiar to nurses, namely, failure to recognise and respond to the deteriorating patient; inattention to the ‘simple things’; the practice of taking ‘short cuts’; failure to communicate the information required to plan and deliver care safely; and lapses in critical thinking. It is to discussing these gaps that the remainder of this chapter will now turn.

5.9.1 Failure to recognise and respond to a deteriorating patient

Participants in the current study suggested that nurses were generally diligent about observing patients and documenting their observations. Nonetheless, they described numerous occasions where clinical deterioration was overlooked, not only in general medical and surgical wards but also in emergency and critical care settings where systems are usually in place to care for patients with acute and unpredictable needs (i.e. skilled clinicians, medical back-up, haemodynamic monitoring, and lower nurse to patient ratios). Failure to recognise and respond to clinical deterioration is a significant patient safety problem that has been the subject of intense research (Clarke & Aiken 2003; Needleman & Buerhaus 2007; Silber et al. 2007). Studies have revealed that it is a multifaceted problem, characterised by the complex
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Interplay between numerous patient and system factors (Hravnak et al. 2011; Mackintosh & Sandall 2008; National Patient Safety Agency 2007). The field of cognitive neurosciences provides useful insights into human cognition that may be helpful in understanding the cases identified in the current study. It is to a consideration of these factors, namely, inattentional blindness and confirmation bias, that the discussion will now turn.

(a) Inattentional blindness

Participants revealed that even when the documentation of patient observations was thorough and complete, clinical deterioration was overlooked by experienced nurses as well as other health care providers. A possible explanation for this is the phenomenon of ‘inattentional blindness’, the failure to see things that are in plain sight but unexpected (Chabris & Simons 2010; Mack & Rock 1998). The famous, ‘gorilla in the midst’ psychology experiment, demonstrates the limits of our attention and cognitive abilities (Chabris & Simons 2010). This and other studies confirm that human persons may fail to notice salient but unexpected events when their attention is focussed on a task. The phenomenon of inattentional blindness reveals that looking and seeing are not the same (Mack 2003). In the absence of attention, looking at something is no guarantee that it will be seen.

Inattentional blindness may explain the failure of a nurse to recognise that a patient’s steadily decreasing blood pressure over the course of an eight hour shift was indicative of clinical deterioration. In focussing attention on the task (i.e. the care of a patient with acute and complex needs in a rapidly changing, highly unpredictable environment), it seems the nurse failed to ‘see’ the patient’s clinical deterioration. This case also highlights the challenge of maintaining a state of watchfulness while repeatedly performing a task (i.e. the taking and recording of patient observations) over long periods, as noted by Chabris and Simons (2010). Of note, this case and

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24 The ‘gorilla’ experiment is a test for inattentional blindness. Participants watch a short video in which six people (three in white shirts and three in black shirts) pass basketballs to each other. Participants keep a silent count of the number of passes made by the people in white shirts. During the video a gorilla strolls into the middle of the action, faces the camera and thumps its chest, and then leaves, spending nine seconds on screen. As many as half of the people that watch the video and count the passes fail to notice the gorilla, as though it is invisible (Retrieved 13 March 2013 from, http://www.theinvisiblegorilla.com/gorilla).
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others from the current study occurred during the night shift. It is suggested that health care providers ‘see’ the patient with a higher level of alertness during the day and the greater number of ‘eyes’ (i.e. clinical and administrative staff) and the availability of support staff may contribute to higher levels of vigilance during day time periods (Hravnak et al. 2011).

Another case from the current study also raises the possibility of inattentional blindness. On this occasion a health care professional failed to notice a misplaced endotracheal tube on a patient’s chest x-ray. In focussing attention on the patient’s lung function and pulmonary oedema, it would appear this person failed to ‘see’ the unexpected, the misplaced endotracheal tube, even though it was in plain sight. On this occasion, another member of the team identified that the tube was in the wrong position and acted to remedy the situation.

(b) Confirmation bias

Confirmation bias, an error of cognition, has been identified as a significant threat to patient safety and cause of preventable harm, especially in emergency settings where it creates the potential for diagnostic error (Croskerry 2003; Pines 2006). It involves the tendency of humans to minimise cognitive dissonance (Johnstone 2007). Confirmation bias occurs:

when people selectively focus upon evidence that supports their beliefs or what they want, or believe to be true, while ignoring evidence that serves to disconfirm those ideas (Pines 2006, p. 91).

Cases where the signs of clinical deterioration were overlooked by a series of nurses and doctors over a period of time were noted in the findings of this study and raise the possibility that they confirmed each other’s beliefs that the patient was stable and nothing was untoward. In a further case, an ED triage nurse created the potential for diagnostic error when she seemingly confirmed the belief of the ambulance personnel that the patient had a soft tissue injury not a broken leg. The patient, in pain and unable to walk, was triaged to the waiting room for several hours until the delay in care was identified and acted upon by another ED nurse. This nurse assessed the patient and recognised immediately that something was ‘wrong’.
5.9.2 Communication, clinical handover and teamwork

Numerous studies in the patient safety literature have revealed that gaps in the interrelated processes of communication, clinical handover and teamwork are a significant contributor to preventable patient harm (El-Dawlatly et al. 2004; Greenberg et al. 2007; Lingard et al. 2004; Pronovost, Thompson, Holzmueller et al. 2006; Riesenberg, Leitzsch & Cunningham 2010; Suresh et al. 2004; Symons et al. 2012; Wiegmann et al. 2007; Wilson et al. 1995). Participants in the current study revealed that deficiencies in clinical handover and the communication of information created gaps and the potential for patient harm. An example of this was the progressive loss of information as the patient’s story was communicated between health care providers. Significantly, a study of clinical handover by Pothier and colleagues (2005) found that all information was lost after three cycles of verbal handover without supporting documentation or notes. This progressive loss of information might be characterised as ‘information funnelling’, the omission, oversight or failure to remember information (Anthony & Preuss 2002). Anthony and Preuss (2002) contend that information funnelling contributes to inadequate nursing surveillance because nurses are not equipped with the information required to plan and deliver care safely.

Participants in the current study also revealed that interpersonal tensions in the form of demeaning and humiliating behaviour contributed to gaps in patient care. When nurses were humiliated by a medical colleague, for example, they were reluctant to volunteer information that might be important to the patient’s care and a chain of valuable information was potentially lost. Intimidating communication is known to negatively influence the ability and willingness of nurses to recover errors (Henneman, EA et al. 2010) and question medication orders (Smetzer & Cohen 2005). Furthermore, some of the behaviours described by participants suggest the presence of hierarchical structures rather than collaborative teams based on mutual respect and trust (Manser 2009). Lucian Leape (2009), a pioneer of the patient safety movement, describes the devastating impact of degrading behaviour on patient safety and the clinicians involved:
there is no room for autocratic, demeaning, humiliating behaviour to nurses, residents, students, anyone. It never was right, but now we know how devastating it can be, how it stifles creativity and saps the joy from everyday life, how it leads to mistakes and patient harm as nurses, residents, and students shy away from warning the abusive physician of an error in the making, avoid communication with those who put them down, are inhibited in their thinking about the patient’s welfare as they try to protect their own ego and self-image from attack (p. 396).

5.9.3 Lack of higher order thinking

Research indicates that nurses understand the concept of critical thinking (Borglin & Fagerström 2012) and have the requisite theoretical knowledge. But even so they have difficulty applying this requisite theoretical knowledge in clinical situations (del Bueno 2005; Cooper et al. 2010). Ebright (2003) contends that the application of higher order thinking skills to intricate aspects of patient care is constrained by the patterns of complexity (e.g. poorly functioning supply systems, interruptions, and shortcomings in communication) that nurses encounter in hospital contexts. Similarly, Cook and Woods (1994) note that resource limitations and pressures to meet production targets also influence the cognitive abilities of health care providers.

A lack of higher order thinking by nurses contributed to gaps in care in this study. Many participants described a robotic approach to patient care where nurses were on ‘autopilot’, focussed on the physical doing without thought to what the patient’s needs were or the impact of their actions. They revealed that a lack of reflection and higher order thinking were related to knowledge and skill gaps and nurses feeling rushed in their daily work. In the absence of critical thinking, nursing practice was task oriented and lacking in expertise and reflection. Many participants in this study worked in rapidly changing, very acute and highly unpredictable environments (e.g. critical care, emergency and perioperative). The nature of these settings and the prospect of further sources of complexity, as described by Ebright (2003), may have diminished the cognitive resources of nurses and their capacity for higher order thinking.

5.9.4 Cutting corners, taking short cuts

The term to ‘cut corners’ has been defined as ‘to take the shortest or easiest way at the expense of high standards’ (Collins Dictionary of the English Language 2010). The theme of ‘cutting corners’ emerged during one of the first participant interviews
and, in keeping with the emergent nature of this inquiry, was explored in subsequent interviews. The phenomenon of short cuts was, however, not the primary focus of the current study, nor did the study specifically explore how nurses responded to shortcuts. Nonetheless, the data captured in the current study are illustrative and thus worthy of discussion.

Participants in the current study suggested that taking shortcuts was a common practice where nurses failed to follow established protocols and processes, often to save time and effort. They revealed that shortcuts were taken in key areas such as patient assessment, essential nursing care and medication administration. Taking shortcuts encompassed (i) the partial or complete omission of essential patient care (i.e. not doing things completely or at all), (ii) delays in providing care, and (iii) the failure to do things correctly. The practice of cutting corners created gaps that contributed to preventable adverse events such as pressure ulcers and infections. Participants also revealed that novice nurses learnt the shortcuts of their senior colleagues. Furthermore, they were virtually unanimous in their view that the practice of taking shortcuts undermined patient safety. Nonetheless, they acknowledged that nurses generally did not believe they were jeopardising patient safety by taking shortcuts. In advancing a discussion of the phenomenon of short cuts, consideration will be given to the following four themes: (i) competing goals, trade-offs and workarounds; (ii) ‘tasks undone’, ‘missed nursing care’, ‘care left undone’ and ‘rationing of nursing care’; (iii) ‘at risk’ behaviour and violations; and (iv) the normalisation of deviance.

(a) Competing goals, trade-offs and workarounds

The ‘New Look’ approach to safety holds that competing goals are an inevitable feature of complex systems (Woods et al. 1994; Cook, Woods & Render 2000). It is recognised that much of the work of front line clinicians, such as nurses, involves making trade-offs, choosing between competing patient, organisational and personal goals (Ebright et al. 2006; 2003). Participants in the current study revealed that essential care (i.e. turning and repositioning) and the maintenance of physiological stability can be competing goals in critically ill patients. Nurses expressed the view that skin complications could be managed later, if and when, the patient survived. In this context, the omission of essential care might thus be characterised as a trade-off rather than a short cut.
Workarounds have been defined as behaviours that ‘circumvent or temporarily “fix” an evident or perceived workflow hindrance in order to meet a goal or to achieve it more readily’ (Debono et al. 2013). They are a means of managing complexity that often involve some form of deviation from established organisational processes and procedures. Health care professionals have been described as ‘masters’ of workarounds (Morath & Turnbull 2005, p. 52), although Debono and colleagues (2013) note that nursing research of this concept has been slow to evolve. While workarounds contribute to the smooth and efficient operation of complex systems, they may also undermine safety. For example, the investigation of a fatal intrathecal dose of the drug vincristine revealed that gaps created by workarounds were a contributing factor in this catastrophic outcome (see Toft 2001).

Participants in the current study described variations in established processes for checking and documenting medication administration. These examples might be characterised as workarounds. In line with a recent conceptualisation by Debono and colleagues (2013), participants revealed that nurses omitted steps in the process because this represented the only way to ‘get things done’ and achieve the goal of timely medication administration. Furthermore, nurses expressed concern that getting behind created gaps in patient care. ‘Not getting behind’, ‘staying on time’ and ‘immediately addressing issues’ have been identified as key attributes of vigilant nurses (Kookan 2008, p. 173).


Participants in the current study suggested that nurses took shortcuts not in the highly technical and complex aspects of patient care but in patient assessment and the provision of essential care (i.e. mouth care, repositioning and sitting patients out of bed, maintaining and changing dressings). Various studies of nursing care quality have suggested that the omission of essential nursing care is widespread. The driver of this research has been the unexplained association between levels of registered nurse staffing and adverse patient outcomes (Aiken et al. 2002; Estabrooks et al. 2005; Needleman et al. 2002). The omitted areas of care identified in these studies have been conceptualised as ‘tasks undone’ (Sochalski 2004), ‘missed nursing care’ (Kalisch 2006; Kalisch & Williams 2009; Kalisch, Landstrom & Williams 2009; Kalisch, Landstrom & Hinshaw 2009; Kalisch et al. 2011), ‘care left undone’ (Ball et al. 2013) and ‘rationing of nursing care’ (Schubert et al. 2008). Themes common to
these studies include the omission or delay of ambulation, repositioning, feedings, patient teaching, discharge planning, emotional support, hygiene, documentation of fluid intake and output. Reasons for omitted or delayed care include nursing workload, the availability of material resources and deficiencies in communication and teamwork. Of concern, the study by Schubert and colleagues (2008) revealed that while implicit rationing of nursing care (the failure to provide nursing care because of inadequate time, staffing or skill mix) was uncommon, it was a significant predictor of various adverse outcomes including patient satisfaction, nurse reported medication errors, patient falls, nosocomial infection, pressure ulcers and critical incidents.

Worthy of note, is the characterisation of missed nursing care as an error of omission (Kalisch, Landstrom & Williams 2009), the failure to act and provide care. Reason’s (1990; 1995) widely accepted model of human error would appear, however, to refute this conceptualisation. According to Reason (1990; 1995), errors involve execution or performance failures (i.e. slips, lapses, trips or fumbles) where the plan selected for a particular goal is adequate but its execution does not proceed as intended, or mistakes, the selection of the incorrect plan for a particular goal. Commonly, errors result from a lack of information. The basis for the phenomenon of ‘missed nursing care’ does not consistently point to the presence of informational problems (inattention, inadequate knowledge or forgetting) and thus errors, as defined by Reason (1990; 1995). Rather, missed nursing care encompasses the omission of essential nursing care of which all nurses have knowledge.

(c) ‘At risk’ behaviours or violations

In the current study, the omission of essential care might also be considered a ‘violation’, a deliberate deviation from safe operating practices, procedures, standards, or rules (Amalberti et al. 2006; Reason 1995). Reason (1995, p. 82) explains that violations occur in a social context and ‘are more generally associated with motivational problems (that is, low morale, poor supervisory example, perceived lack of concern, the failure to reward compliance and sanction non-compliance)’. The example of perioperative nurses taking shortcuts to avoid public humiliation at the hands of their senior medical colleagues, might be considered an example of a ‘necessary’ or ‘situational’ violation where taking a shortcut seemed ‘the only path available to getting the job done’ (Reason 1995, p. 82).
The practice of nurses dabbing a tissue in the top of a bottle of Chlorhexidine and using it to clean a CVC whenever the opportunity presented, and, in spite of education on best practice might be characterised as an example of ‘reckless behaviour’, defined by Marx (2001, p. 5) as the ‘conscious disregard of a visible, significant risk’.

(d) The normalisation of deviance

The normalisation of deviance has been defined as an ‘incremental process’ that involves:

‘...the gradual erosion of normal procedures that would never be tolerated if proposed in 1 single, abrupt leap. Instead, small incremental deviations are observed and tolerated. Lacking an accident, they become ‘normalised’ (Prielipp et al. 2010, p. 284).

In the aerospace industry, the normalisation of deviance has been a contributing factor in the catastrophic failure of two spacecraft (Westgard & Westgard 2009). Over time, flaws in the design of the spacecraft became ‘normalised’ (i.e. considered routine and acceptable) and were no longer considered a safety threat. Similarly, it has been argued that shortcuts and violations (i.e. deviations from accepted and standard practice) in the delivery of health care may, over time, become acceptable to the point that they become a ‘new standard of care’ (Amalberti et al. 2006; Banja 2010; Jeffs et al. 2009). It is posited that poor practice in the nursing management of central venous catheters (see page 133 of this thesis), for example, may have become ‘normalised’ to the point where it was considered ‘acceptable’ and ‘standard’ practice. Nonetheless, it might also be argued that this and other shortcuts captured in the current study (i.e. a case of candida sepsis from contamination of a CVC site with saliva, a stage three pressure area under a dressing on the back of the head) are examples of poor, sub-standard or incompetent nursing practice. Participants in the current study revealed that ‘nurses will get away with what they can’ and that leadership is crucial in enforcing standards of nursing care. Leape (2009) and Banja (2010) contend that effective leadership is vital in setting, maintaining and modelling safe practice; identifying and eradicating deviant practices and behaviours, even in the absence of apparent harm; and educating individuals about the dangerous consequences.
Chapter 5. Discussion of Findings

(e) Monitoring the gap between standard operating procedures and actual practice

It has been argued that deviations from safe operating practices, procedures, and standards are a complex, multifaceted phenomena and a feature of all organisations, even those with excellent safety records (Amalberti et al. 2006). The smooth and successful functioning of complex systems is dependent upon the creativity, flexibility and judgement of humans in the face of production pressures, resource constraints, gaps, hazards and competing goals (Cook & Woods 1994; Dekker et al. 2008; Nemeth et al. 2008; Woods & Hollnagel 2006). Nonetheless, achieving a balance between organisational efficiency and safety requires close examination of actual practice (Amalberti et al. 2006). An important feature of resilient systems is the attention given to continuously monitoring the gap between standard operating procedures and actual practice, and working to reduce this gap (Patterson et al. in press).

The discussion of the phenomenon of short cuts, as described in the current study, has considered a number of relevant themes from the patient safety literature. Further research and inquiry is required to deepen understanding of this practice and its impact on patient safety.

5.10 Education in patient safety and human error management

Almost a third (N=24) of participants in the current study revealed they had not undertaken any formal instruction in the principles and theory of patient safety and human error management. Furthermore, the education and training of others were limited to hospital based in-services on specific patient safety issues (i.e. the deteriorating patient, surgical safety checklist, falls prevention) and risk management software programs (i.e. clinical incident management systems, RiskMan). While much attention in health care has been directed at systems improvement, one of the most important investments that can be made is in the education and training of people (Johnstone & Kanitsaki 2007), including nurses, who, as this study has found, play a key role in creating safety.

Education in patient safety and human error management is widely recognised as being critical to the achievement of patient safety outcomes (Australian Council for Safety and Quality in Health Care 2005; Johnstone & Kanitsaki 2007; Kohn, Corrigan & Donaldson, M 2000; Taylor-Adams, Brodie & Vincent 2008). An Australian study of new graduate nurses revealed that a lack of information on the principles and processes of clinical risk management was an impediment to their
management of risk (Johnstone & Kanitsaki 2006a). Furthermore, it has been argued that the skills and behaviours that underpin safe clinical practice should be made ‘explicit’ and ‘formally taught’ rather than be regarded as intuitive and derived from experience (Taylor-Adams, Brodie & Vincent 2008, p. 141).

In Australia, attention has been given to the development of a National Patient Safety Education Framework (Australian Council for Safety and Quality in Health Care 2005). This framework identifies the knowledge, skills, behaviours and attitudes central to the delivery of quality and safe care. Nonetheless, an important and largely unanswered question relates to how patient safety and clinical risk management courses can be most effectively designed and delivered for all nursing programs (i.e. undergraduate, post-registration, post-graduate and professional development). On this point, Johnstone and Kanitsaki (2007) contend that research is urgently needed to identify appropriate and effective models of patient safety and clinical risk management education.

A key inference to be drawn from this study is that further research is needed to identify the range of patient safety education programmes available to registered nurses employed in hospital contexts throughout Australia.

5.11 The emotionality associated with adverse events

Participants provided first and second hand accounts of nurses’ deeply emotional experiences when patients were harmed by preventable adverse events. The range of emotions identified in these accounts included feeling ‘physically ill’, ‘bad’, ‘horrified’, ‘scared’, ‘stressed’, ‘tense’, ‘disappointed’, ‘powerless’, ‘angry’, ‘frustrated’, and ‘sorry’. Furthermore, participants acknowledged the ability of nurses to recall these events in vivid detail, in spite of the passage of time, describing them as tragic and memorable.

Wu (2000) coined the phrase ‘the second victim’ to describe the emotional trauma experienced by health care providers when a patient is seriously harmed by health care. These events have been described as ‘career-altering’, with the potential to exact a ‘heavy personal toll’ (Scott et al. 2011, p. 323). The prevalence of second victims after an adverse events has been estimated at between ten and 43 percent (Seys et al. 2013). Furthermore, research has suggested that particular adverse events (i.e. those involving children, preventable harm, ‘unexpected patient demise’ and ‘first death under their watch’) carry an increased risk of emotional distress (Scott et al. 2011, p. 326). The range of emotions identified in the current study and the ability
to recall these events in vivid detail concur with studies of the second victim experience (Crigger & Meek 2007; Rassin, Kanti & Silner 2005; Scott et al. 2009; Todesco, Rasic & Capstick 2010; White et al. 2008; Wolf et al. 2000). Participants in the current study described cases where the emotional impact of adverse events was such that nurses left the profession altogether. Others revealed having very unpleasant memories and feelings of sadness for some months.

There is now widespread recognition that supporting health care providers when they are emotionally distressed is the ‘right’ thing to do in a moral sense and key to reducing risk and improving patient safety outcomes over the long term (White et al. 2008). A study of resident doctors revealed that self perceived medical errors were associated with reduced quality of life, burnout and depression, which in turn increased the risk of future errors (West, CP et al. 2006). The availability of support from peers has been identified as a key factor in the success of support programs for distressed health care professionals (Scott et al. 2010; Van Pelt 2008). Wu (Agency for Healthcare Research and Quality 2012a) argues that the health care system can ill afford to lose skilled clinicians, especially those who experience distress when bad things happen. He advocates a three pronged approach that increases awareness of the second victim experience, develops interventions to support distressed health care providers, and enhances system and individual resilience (Agency for Healthcare Research and Quality 2012a).

5.12 Near misses and emotional distress

Nurses characterised their participation in the current study and the interview process as a helpful and positive experience. Of note, they revealed that the process of talking to a fellow nurse about instances where the management of gaps forestalled significant patient harm was especially cathartic and healing. Research efforts have tended to have as their focus the emotional experience of health care providers when patients are seriously harmed (Seys et al. 2013). Nonetheless, research has suggested that near miss events where serious harm is averted may also evoke feelings of fear (Engel, Rosenthal & Sutcliffe 2006). Such events have been identified as a significant but under-investigated source of emotional distress (Waterman et al. 2007). An important and largely unanswered question concerns the nature of nurses’ emotional distress and need for support when harm is forestalled and safety is achieved. This is an area for further research and inquiry.
5.13 Conclusion

This chapter has discussed the significance of the research findings presented in Chapter four of this thesis. Attention has been given to the implications of these findings with regard to patient safety and the role of nurses in managing gaps and increasing resilience. Specifically, this chapter has advanced a critical discussion of the skills and expertise that comprise the nursing safety net, namely, knowledge and experience, intuition, higher order thinking skills, nursing surveillance, communication and teamwork. This discussion has raised the notion that the management of gaps and resilience might be enhanced through efforts to promote the close, attentive and thorough observation and assessment of patients using a careful, well organised and systematic approach. Other avenues of inquiry that might be fruitful include the role of priming in the anticipation and management of gaps; the concept of ‘mental checklists’, how they are acquired and how they might be passed on to novice nurses; the notion of shortcuts in nursing practice; and existing models of nursing care delivery in Australian hospital settings and their impact on gaps and patient safety. In the next and final chapter of this thesis, conclusions will be drawn and recommendations made in regard to the ‘practical action’ needed to enhance the role of nurses in managing gaps and creating safety.
6.1 Introduction

In the final chapter of this thesis, firstly, the aims of the study are restated. Following this, a summary of the key findings is presented, together with a list of recommendations informed by these findings. Finally, a concluding statement is made about the role that nurses play in creating safety and how research of ‘safety success’ yields valuable insights into everyday nursing performance and the strategies nurses use to cope with complexity.

6.2 Aims

The purpose of this study has been to explore the relationship between patient safety and the management of gaps by nurses. Specifically, the study has investigated how nurses anticipate, identify and bridge gaps in patient care to create safety. While gaps are frequently cited as a contributing factor in preventable adverse events, the role and expertise of nurses in anticipating, detecting, and bridging gaps to prevent harm from reaching the patient has not been formally investigated. A key objective of this study was to redress this oversight.

The main aims of this study have been to:

- describe the patient care gaps that nurses commonly anticipate, detect and bridge;
- provide a comprehensive explanation of how nurses anticipate, detect and bridge:
  - familiar gaps;
  - new and unfamiliar gaps; and
  - familiar gaps whose characteristics have changed.
- describe the processes used by nurses to do so;
- propose a practice model of gaps management by nurses;
- posit a hypothesis of possible linkages that exist between gaps management and patient safety outcomes for further investigation.
6.3 The gaps identified by nurses

The gaps identified in this study and found to be familiar to nurses were failure to recognise and respond to the deteriorating patient; inattention to the ‘simple things’; the practice of taking ‘short cuts’; failure to communicate the information required to plan and deliver care safely; and lapses in critical thinking. The study also identified three gaps involving technology or equipment that were new and unfamiliar to nurses. These gaps were unanticipated, occurred in critical care settings, and created the potential for catastrophic patient harm. A close examination of the data failed to identify any gaps that were familiar to nurses but their characteristics had changed, however.

Knowledge of the gaps anticipated, detected and bridged by nurses provides a foundation for further inquiry and research. The phenomenon of nurses taking short cuts was not the primary focus of the study, nonetheless, participants indicated that it was widespread and a contributor to preventable adverse events. Accordingly, further research and inquiry is recommended to explore these ideas in greater depth by refining the concept of ‘short cuts’ and developing a catalogue of the short cuts taken by nurses. Other avenues for exploration include the rationale for nurses taking shortcuts and the relationship between this practice and patient safety.

6.4 How nurses managed gaps

The study found that the anticipation, identification and bridging (management) of gaps was based on nurses’ knowledge and experience of: where gaps occur; the types of gaps that occur; the things that happen, go wrong and are overlooked; the clinical environment; available equipment; and correct processes and procedures. Furthermore, nurses’ clinical knowledge and experience, intuition and higher order thinking abilities (critical thinking and clinical judgement) were key attributes that underpinned successful gaps management. The same processes were used by nurses to manage gaps, irrespective of whether the gaps were familiar or new and unfamiliar. Nonetheless, the anticipation, identification and bridging of gaps occurred in a rapid sequence such that it was not possible to assign clearly delineated strategies to each facet of gaps management.

The strategies used by nurses to anticipate, identify and bridge gaps were surveillance, teamwork and communication. Effective nursing surveillance was found to be a complex process with many components: a systematic, comprehensive, head-to-toe and ‘hands-on’ approach to patient assessment; vigilance; observing and
looking; checking; and making sure. Happenstance (luck) also played a part in the management of gaps. Collectively, the elements of nursing expertise and strategies captured in this study embody what has been termed ‘the nursing safety net’, a vital defence against preventable adverse events in hospital settings. Through the anticipation, identification and bridging of gaps, the ‘nursing safety net’ enabled nurses to: foresee and prevent bad things from happening; prevent the evolution of small failures into something more serious or catastrophic; and contribute to the smooth and safe functioning of hospital settings (Figures 5.1 and 5.2). It is thus an important source of resilience in hospital contexts.

The study has demonstrated that the investigation of how nurses anticipate, identify and bridge gaps generates valuable insights into successful everyday nursing performance and the strategies used by nurses to cope with complexity. In spite of the wide availability of technology in modern health care, the human person was invaluable in navigating and managing the gaps spawned by the complex and undefined nature of patient care. Specifically, the study found that safety is created through fundamental assessment skills, whereby nurses use their hands, eyes and ears. It is concluded that vigilant observation and assessment of patients using a ‘hands on’, head-to-toe and systematic approach protects patients from the harmful consequences of gaps in health care. Nonetheless, such an approach tends to be undervalued, poorly implemented and a method for which many nurses may be inadequately prepared in Australian hospital contexts. Further research and inquiry is recommended to explore this issue. Additional avenues of inquiry include the perceptions and understandings of nurses about the role and importance of patient assessment and observation, and identification of the system factors that augment and subvert vigilant patient assessment and observation.

6.4.1 The ‘nursing safety net’

The important role of the ‘nursing safety net’ in creating safety and increasing system resilience suggest that the organisation and delivery of nursing services (i.e. model of care) are important considerations. Participants in this study suggested that existing models of nursing care delivery in Australian hospital settings contribute to discontinuity and fragmentation in patient care. Accordingly, it is recommended that further research is undertaken to examine the relationship between models of nursing care delivery, gaps and patient safety.
6.4.2 ‘Mental checklists’

The nursing management of gaps was found to be enhanced through the use of ‘mental checklists’; the phenomenon of priming; mindfulness; and assertive communication. Individual, internal, ‘mental checklists’ informed nurses of gaps in their clinical environment and supported swift decision making and action in undefined clinical situations. Areas for further exploration include the concept of ‘mental checklists’, how nurses devise these checklists, and how they might be transferred to novice nurses. The priming effect was not directly observed or researched thus it is only possible to describe its role in the management of gaps and patient safety, even so, it is worthy of further consideration. Nurses in the study displayed some of the key attributes of mindful practice, namely, attentive observation and critical curiosity. Further research and inquiry is recommended to explore these attributes in greater depth as well as the usefulness of mindfulness in coping with complexity.

6.5 Education in patient safety and clinical risk management

The study found that almost a third (N=24) of participants had not undertaken any formal instruction in the principles and theory of patient safety and clinical risk management while the education and training of others were limited to hospital based in-services on specific patient safety issues and software programs. Further research is recommended to identify the formal learning opportunities in patient safety available to Australian nurses.

6.6 Nurses’ emotional response when harm is averted

Nurses’ emotional response when harm is averted was not the primary focus of this study. However participants revealed that the process of talking to a fellow nurse about instances where the management of gaps forestalled significant patient harm was especially cathartic and healing. The nature of nurses’ emotional response and need for emotional support when harm is forestalled is an area for further consideration.

6.7 Key recommendations

On the basis of the findings of this study, it is recommended that further research and scholarly inquiry is conducted to investigate:
Chapter 6. Conclusion & Recommendations

- the skills of nurses in systematic, head-to-toe and ‘hands on’ assessment;
- the perceptions and understandings of nurses about the role and importance of patient assessment and observation;
- the system factors that augment and subvert patient observation and assessment;
- the relationship between existing models of nursing care delivery in Australian hospital settings, gaps and patient safety;
- the concept of ‘mental checklists’ and how nurses devise these checklists;
- how these checklists might be transferred to novice and inexperienced nurses;
- the phenomenon of priming in the nursing management of gaps and the relationship between priming and patient safety;
- the attributes of attentive observation and critical curiosity in nurses and the relationship between these attributes, the management of gaps and patient safety;
- how assertive communication might be promoted in younger and less experienced nurses;
- the concept of ‘short cuts’, the ‘short cuts’ taken by nurses and the rationale for nurses taking ‘short cuts’;
- the relationship between ‘short cuts’ and patient safety;
- the formal learning opportunities available to Australian nurses in clinical risk management and patient safety; and
- the nature of nurses’ emotional response and their need for support when harm is forestalled and patient safety is maintained.

6.8 Conclusion

In this, the final chapter of this thesis, conclusions have been drawn and recommendations made on the basis of the findings of this study and the discussion advanced in Chapter five. These recommendations have encompassed the research and inquiry needed to enhance the role of nurses in the management of gaps and creation of safety in hospital contexts.
APPENDIX 1

DEAKIN UNIVERSITY
PATIENT SAFETY AND GAPS MANAGEMENT BY REGISTERED NURSES

BROAD INTERVIEW QUESTIONS

1. Tell me a little bit about your nursing career and your current work environment and role.
2. Have you had an opportunity to attend any education sessions around patient safety and clinical risk management?
3. Describe for me what you understand by the terms adverse event and harm.
4. Have you been involved in a situation where a patient has suffered an adverse event?
   - Can you describe it for me?
   - Can you think of where things went wrong?
   - What do you think happened?
   - What alerted you to the event?
   - How did you respond?
   - How did you feel at the time?
5. Describe for me what you understand by the terms ‘discontinuities’ or ‘gaps’.
6. Can you describe for me some of the ‘discontinuities’ or ‘gaps’ that you commonly encounter in your current work environment and role?
   - What, if anything, particularly stands out about these ‘discontinuities’ or ‘gaps’?
   - What alerts you to the presence of these gaps?
   - How do you respond to these gaps?
   - How do you feel?
   - Why do you feel that way?
   - What makes you feel that way
   - Do you go to your practice anticipating/expecting that gap, or is it a case of it happening and you responding?
9. Tell me about your best experience of responding to a gap.
   - What alerted you to the presence of this gap?
   - How did you respond to the situation?
   - How did you feel at the time?
   - What, if anything, particularly stood out about this ‘discontinuity’ or ‘gap’?

10. Tell me about your worst experience of responding to a gap.
    - What alerted you to the presence of this gap?
    - How did you respond to the situation?
    - How did you feel at the time?
    - What, if anything, particularly stood out about this ‘discontinuity’ or ‘gap’?
    - With the wisdom of hindsight would you have dealt with this differently?

11. What do you understand by the term ‘cutting corners’?
    - Do you think that staff cut corners?
    - What corners do they cut?
    - How do they decide which corners to cut?
    - What are the implications?

12. How do you think nurses can best help themselves in managing gaps in clinical practice?

13. Describe the kind of relationships you have developed with co-workers in managing gaps.

14. What processes do you believe are best suited to promoting safety and quality in nursing and health care settings?

15. Is there anything in your own background or life experience that you think has influenced your capacity to manage gaps?

16. Any other comments. Can I return to you at a later date if I have any further queries?
INVITATION TO PARTICIPATE IN A RESEARCH PROJECT

PROJECT INFORMATION STATEMENT

**Project Title:**
Patient safety and gaps (discontinuities of care) management by registered nurses

**Investigators:**
Ms Angela Jones (PhD student, School of Nursing, Deakin University, amj@deakin.edu.au)  
Professor Megan-Jane Johnstone (Principal Supervisor, Professor of Nursing, School of Nursing, Deakin University, megan.johnstone@deakin.edu.au, 92446159)  
Professor Maxine Duke, (Associate Supervisor, Head, School of Nursing, Deakin University, maxine.duke@deakin.edu.au)

Dear

You are invited to participate in a research project being conducted by Deakin University. This information sheet describes the project in straightforward language, or ‘plain English’. Please read this sheet carefully and be confident that you understand its contents before deciding whether to participate. If you have any questions about the project, please ask one of the investigators.

**Who is involved in this research project? Why is it being conducted?**

The researcher in this project is Angela Jones. This project is being conducted as part of a PhD degree and will be supervised by Professor Megan-Jane Johnstone and Professor Maxine Duke of Deakin University. The project has been approved by the Deakin University Human Research Ethics Committee. This project is being conducted to understand how nurses positively influence patient safety outcomes by bridging gaps in patient care. Little is known about how nurses anticipate, detect and then bridge gaps in clinical practice so as to prevent adverse events and harm to patients. An important aim of this study is to redress this oversight.

**Why have you been approached?**

You have been approached with this invitation because you are working as a nurse in a clinical setting relevant to the study and have indicated that you are interested in participating.

**What is the project about? What are the questions being addressed?**

Research studies conducted since the early 1990s in the USA, the United Kingdom, Canada and Australia have found that a significant number of hospital patients suffer some kind of harm during their admission due to human error and/or an adverse event. In approximately 50 percent of cases these harms could have been prevented and were therefore ‘preventable adverse events’. There is a need to find out what went ‘wrong’ by looking at the ‘root causes’ of preventable adverse events. However, it is also true that many more people have not been injured in health care, and that this too is worthy of investigation. In short, we
need to focus on safety successes and find out what went ‘right’. This study aims to generate knowledge about the creative ways in which nurses manage gaps in clinical practice and avert harm to patients.

Gaps, or discontinuities in patient care, may appear as losses of information, momentum or interruptions in the delivery of care. In health care, the complex combination of processes, technologies and human interaction produces many gaps between providers, stages and processes. However, little is known about how nurses anticipate, detect and bridge gaps in clinical practice so as to prevent adverse events and the harm that may occur as a consequence.

The questions being addressed are:

What are the gaps that are commonly anticipated, detected and bridged by nurses?
How do nurses anticipate, detect and bridge gaps that are familiar to them?
How do nurses anticipate, detect and bridge new and unfamiliar gaps?
How do nurses anticipate, detect and bridge familiar gaps whose characteristics have changed?
How do nurses bridge gaps once detected?

If I agree to participate, what will I be required to do?

If you agree to participate in this project you will be required to complete a consent form and demographic questionnaire and return it to me in an addressed, stamped envelope or by e-mail. You will also be required to participate in a semi-structured interview where you will be asked to talk about your clinical experiences of rescuing patients from harm or an adverse event.

You will be able to choose between face to face and e-mail interviewing. The face to face interviews will involve 1-2 interviews of approximately 1-1.5 hours each. These interviews will be audio taped and conducted in a location and at a time that is convenient to you. The e-mail interviews will consist of regular exchanges between you and the researcher over a period of weeks to months. You will need regular access to the internet and your own email address to participate in this type of interview. The researcher will provide clear instructions about how to complete the interview and you will be encouraged to write in a conversational style. You can participate at a time that is convenient to you. There are no incorrect answers and you will be encouraged to include as much detail as possible in your responses. Symbols can be used to communicate emotions and there is no need to correct spelling and grammatical errors.

What are the risks or disadvantages associated with participation?

There are no risks outside normal day-to-day activities associated with participation in this study. If you are unduly concerned about your responses to any of the questionnaire items or if you find participation in the project distressing, you should contact Professor Megan-Jane Johnstone as soon as convenient. Professor Johnstone will discuss your concerns with you confidentially and suggest appropriate follow-up, if necessary.

What are the benefits associated with participation?

It is acknowledged that there may be no immediate benefits to you; nevertheless your input would make a valuable contribution to the area of patient safety and discipline of nursing.

What will happen to the information I provide?

Your responses will be kept strictly confidential and your anonymity assured by the following processes: demographic questionnaires and envelopes will not have any personally identifying codes or markings on them; any identifying information contained in data will be
Appendix 2

seen only by the researcher before it is removed; the information collected will be presented in such a manner that it is not possible to identify participants or their workplaces. Any information that you provide can be disclosed only if (1) it is to protect you or others from harm, (2) a court order is produced, or (3) you provide the researchers with written permission. The face to face interviews will be audio taped and erased once they have been transcribed. The findings of this study will be published in professional nursing journals and conference papers but will contain no personally identifying information. The research data will be kept securely at Deakin University for a period of 5 years before being destroyed.

What are my rights as a participant?

You are under no obligation to participate in this study. Your decision to participate is entirely voluntary. Should you decide to take part and then change your mind, at any stage of the study, even after the information has been collected, you are still free to do so without giving a reason and without prejudice. You are entitled to have any unprocessed data withdrawn and destroyed, provided it can be reliably identified, and provided that so doing does not increase the risk for the participant. Any questions that you may have will be answered at any time.

Whom should I contact if I have any questions?

In the first instance please contact me if you have any general questions or concerns. I can be reached via e-mail at amj@deakin.edu.au or by telephone during work hours on 0450 781 606. My principal supervisor is Professor Megan-Jane Johnstone, School of Nursing, Deakin University and she can be contacted by e-mail at megan.johnstone@deakin.edu.au or by telephoning 03 92446159.

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Executive Officer, Human Research Ethics Committee, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7123, Facsimile: 9244 6581; research-ethics@deakin.edu.au.

Please quote project number EC 153 -2008.

Yours sincerely,

Angela Jones
RN, BEd, Grad. Dip. Neurosciences, MNg
APPENDIX 3

Prescribed Consent Form For Persons Participating In Research Projects Involving Interviews, Questionnaires or Disclosure of Personal Information

Faculty
Health, Medicine, Nursing & Behavioural Sciences
School of
Nursing
Name of participant:

Project Title:
Patient safety and gaps (discontinuities of care) management by registered nurses

Name(s) of investigators:
(1) Angela Jones Phone: 0450 781606
(2) Prof. Megan-Jane Johnstone Phone: 9244 6120
(3) Professor Maxine Duke Phone:

1. I have received a statement explaining the interview/questionnaire involved in this project.

2. I consent to participate in the above project, the particulars of which - including details of the interviews or questionnaires - have been explained to me.

3. I authorise the investigator or his or her assistant to interview me or administer a questionnaire.

4. I acknowledge that:
   
   (a) Having read Plain Language Statement, I agree to the general purpose, methods and demands of the study.
   
   (b) I have been informed that I am free to withdraw from the project at any time and to withdraw any unprocessed data previously supplied.
   
   (c) The project is for the purpose of research and/or teaching. It may not be of direct benefit to me.
   
   (d) The privacy of the personal information I provide will be safeguarded and only disclosed where I have consented to the disclosure or as required by law.
   
   (e) The security of the research data is assured during and after completion of the study. The data collected during the study may be published, and a report of the project outcomes will be provided to __________ (researcher to specify). Any information which will identify me will not be used.

Participant’s Consent
Appendix 3

Participant: ___________________________ Date: ________________
(Signature)

Witness: _______________________________ Date: ________________
(Signature)

Participants should be given a photocopy of this consent form after it has been signed.

If you have any complaints about any aspect of the project, the way it is being conducted or any questions about your rights as a research participant, then you may contact:

The Executive Officer, Human Research Ethics Committee, Deakin University, 221 Burwood Highway, Burwood Victoria 3125, Telephone: 9251 7123, Facsimile: 9244 6581; research-ethics@deakin.edu.au.

Please quote project number EC 153 -2008.
APPENDIX 4

Demographic Questionnaire

Participant Identification Code (PIC) _______________

Please tick the appropriate box.

1. Age
   - 20 – 25 □
   - 26 – 30 □
   - 31 – 35 □
   - 36 – 40 □
   - 41 – 45 □
   - 46 – 50 □
   - 51 – 55 □
   - 56 – 60 □
   - 61 – 65 □
   - 65 – 70 □

2. Gender
   - Male □
   - Female □

3. In which State/Territory are you currently working?
   - WA □
   - NT □
   - QLD □
   - NSW □
   - ACT □
   - VIC □
   - TAS □
   - SA □

4. Which clinical area are you currently working in?
   - Emergency Department □
   - Operating Room □
   - Intensive Care/Critical Care □
   - Rehabilitation □
   - Neurosurgery □
   - Transitional care □
   - Neurology □
5. What type of organisation do you work in?

- [ ] Public hospital
- [ ] Private hospital
- [ ] Community/primary health care
- [ ] Other: ____________________

6. What is your current role?

- [ ] Ward nurse
- [ ] Associate nursing unit manager
- [ ] Nursing unit manager
- [ ] Nurse educator
- [ ] Clinical nurse specialist
- [ ] Clinical nurse consultant
- [ ] Other: ____________________

7. Please provide details of your qualifications:

____________________________________________________________________
____________________________________________________________________
____________________________________________________________________


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