Antecedents and Consequences of Patient Safety Culture: Investigations in a Dynamic Clinical Setting

By

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Abstract

Patient safety culture is one of the most intriguing and researched new phenomena to emerge in the health literature in the last two decades. One in ten patients will experience an adverse event during their hospital stay (Australian Commission on Safety and Quality in Health Care, 2014). Improving patient safety culture is seen as one way of enhancing patient safety outcomes in health services. Despite the enormous interest in this area, there remains much that is unknown. The literature is voluminous and diverse, and the term “culture” is often used to explain lapses in health care outcomes. Numerous enquiries into health system failings have unequivocally attributed causation to issues of patient safety culture. While recommendations have been made to improve safety culture there is little evidence on how this can be achieved.

This thesis investigates patient safety culture by looking at the antecedents that contribute to this phenomena and consequent outcomes. Key points of differentiation from existing work in this area are that the method employs an interprofessional approach and a post positivist philosophy. This research occurs over a period that includes the relocation of a major tertiary hospital. A longitudinal case study contains data collected from a staff survey in 2013, with a follow up in 2015. The context of studying patient safety culture longitudinally and encapsulating a major hospital move is unique to this PhD. Additionally, a patient perspective is provided using qualitative and quantitative methodology. Triangulation of findings from a comprehensive review of the literature, and three data collections makes some new discoveries not previously reported. These findings are presented in one literature review, three empirical papers and one mixed method report. A summary of each chapter is provided below.
Abstract

Chapter 1, the Introduction, includes high level information regarding the Australian health care system, describes the research setting and lays out the research aims and an overview of the chapters. In Chapter 2, the philosophy and methodology used is described. Theoretical models are presented and a philosophical research paradigm discussed. The overall methods are outlined and a summary of each paper is provided.

Chapter 3, paper 1 is a comprehensive review of the literature including a bibliometric analysis and a synthesis of findings. This chapter demonstrates what is known and what isn’t known on patient safety culture, and refines the research questions to be considered in this thesis. Chapter 4 includes paper 2, an empirical paper that explores workforce relationships finding a significant interaction between employee engagement, interprofessional collaboration and patient safety culture. Chapter 5 includes two papers (papers 3 and 4) providing different perspectives of changing the work environment and using different paradigms. Paper 3 is an empirical paper from the staff perspective and paper 4 is a report of the patient’s experience derived from a patient survey and interviews. The impact of moving hospitals on patient safety culture is explored. Differences in the patient safety perceptions of clinical and non-clinical staff are compared and considered. Chapter 6, paper 5 explores the theme of developing workforce capacity and tests the moderating effect of reflexivity on patient safety culture and quality patient care. The goal here is to gain a better understanding of patient safety culture and inform the development of strategies aimed at improving quality of patient care. Finally, Chapter 7 brings all the findings together with a discussion and conclusions. Particular emphasis is given to the implications for practice and the unique contribution that this thesis makes to understanding the research endeavour.
Statement of Originality

This work has not been previously submitted for a degree of diploma in any University. To the best of my knowledge and belief, this thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Signature

Susan Brandis

Date 31st July 2017
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"You have been my friend," replied Charlotte. "That in itself is a tremendous thing’’

White (1963) Charlotte’s Web
Acknowledgements

Statement of contribution to co-authored papers

Three peer reviewed conference papers were co-authored with Professor John Rice and Dr Stephanie Schleimer. An additional two peer reviewed papers were published, and another two currently under review. The candidate was the principle author of these papers, responsible for the intellectual text and the majority of the writing. Professor John Rice provided advisory assistance with statistical interpretation and in editing. Dr Stephanie Schleimer provided invaluable mentorship, assisted with paper structure and editing. The papers were produced under supervision and during the period of candidature.

List of Publications

Peer reviewed publications during Candidature


Publications currently under review


**Peer reviewed presentations at conferences**


**Additional Publications during candidature which do not form a part of this thesis:**


Chapter 1 Introduction

“Life is always a rich and steady time when you are waiting for something to happen or to hatch.”
White (1963), Charlotte's Web

Preface

This first chapter is an introduction to this study and outlines the background for this thesis. The context is set and the research aims, goals and questions are described. A discussion of key terms and timelines for the research are presented to assist in setting the scene. Finally a road map of the chapters and papers that form this thesis will be provided.

Anticipation is high and we start on a journey into the future. Some of the greatest journeys ever described have been those written in children’s literature. The use of imagination, poetic phrase and deep meaning are throughout the books I read as a child. When I came to tell the story of this thesis I was stumped as to how to make the story “flow”. Patient safety and adverse patient events are confronting and several chapters on the topic is pretty solid reading.

Alice in Wonderland, Peter Pan, The Wizard of Oz and others are stories so full of risk and meaning, that aligning these to the tale of patient safety culture seemed a natural thing to do. There is something magical about these tales and the quotes inserted throughout aim to entertain as well as provoke the reader to think about the underlying moral and philosophy.
Chapter 1 Introduction

1.0 Introduction

Australia has one of the most advanced healthcare systems in the world (Biggs, 2013). Healthcare places a large demand on resources as expenditure on health in Australia amounted to $147.4 billion in 2012–2013, 9.67 per cent of gross domestic product (GDP) which is equivalent to $6430 per Australian (Biggs, 2013). The last census of the Australian population in 2011 identified that 1,167,633 people were employed by the health industry (Australian Institute of Health and Welfare, 2012). As a service, health is huge and complex. While the government invests a large amount of resources into ensuring world class health services for Australians, the system is fraught with risk (Australian Commission on Safety and Quality in Health Care, 2014). It is frequently quoted that one in ten patients will experience an adverse event during their hospital stay (Australian Commission on Safety and Quality in Health Care, 2014). The World Health Organisation (WHO) has identified patient safety as a global issue (Jha et al., 2010), and recommends that research into patient safety is a priority.

While significant effort has been invested into creating a safer health system in Australia both on a state and national level (Australian Institute of Health and Welfare, 2014), healthcare remains to be one of the most challenging industry sectors. The increased burden of care placed on health services by the culmination of an aging population, the escalating incidence of chronic disease (Australian Institute of Health and Welfare, 2012), and the frightening number of patient safety incidents highlight the urgent need to explore patient safety.

Improving patient safety culture is seen as one way of improving patient safety outcomes in health services (El-Jardali, Dimassi, Jamal, Jaafar, & Hemadeh, 2011). However, although there is a large amount of research on patient safety, we still do not
have conclusive evidence of what we need to do to improve patient safety culture (Ausserhofer et al., 2013). In particular we still do not know what organisational processes and relationships lead to improved patient safety culture and ultimately better patient outcomes.

This thesis sets out to add to our current knowledge on improving our understanding of patient safety culture in clinical settings by exploring antecedents and consequences of these intriguing phenomena. This thesis is structured as a series of theoretical and empirical papers that each look at the research endeavours from a different angle.

The research articles (presented in four chapters) that form this thesis are inter-connected in terms of content but can also stand-alone due to their individual contributions to the overarching research quest. A preface will introduce each chapter in order to set the scene and ensure clarity of linkages between these. A schematic summary of all chapters is provided in Figure 1.1.

*Figure 1.1 Chapters of this thesis*
Chapter 1 Introduction

1.1 Patient safety culture

Patient safety is measured by the amount of and severity of clinical incidents, or adverse events (Verelst et al., 2012). Patient safety culture is comprised of staff behaviours that surround the reporting of and management of adverse events (Agnew, Flin, & Mearns, 2013). Patient safety culture includes concepts of team trust, leadership and accountability (Agnew, Flin, & Mearns, 2013). For this reason a more in-depth introduction to patient safety and adverse events is required to assist in setting the background for this thesis.

1.1.1 Defining patient safety culture

While there is a plethora of studies that consider patient safety culture, there is no single agreed definition (Morello et al., 2013). The definition used here and most commonly cited is from the Agency for Healthcare Research and Quality (AHRQ):

“The safety culture of an organization is the product of individual and group values, attitudes, perceptions, competencies, and patterns of behaviour that determine the commitment to, and the style and proficiency of, an organization’s health and safety management. Organizations with a positive safety culture are characterized by communications founded on mutual trust, by shared perceptions of the importance of safety and by confidence in the efficacy of preventive measures.’’ (Nieva & Sorra, 2003 p.18; Sammer, Lykens, Singh, Mains, & Lackan, 2010 p.156)

The World Health Organisation (WHO) has identified patient safety culture as an important structural barrier to achieving a reduction in adverse events (Jha et al., 2010). Furthermore, WHO recognise that while the logic of a relation between culture and safety exists, there is limited evidence in the published literature. This finding is supported by the results of the literature review presented in chapter 3 of this thesis.
1.1.2 Adverse events

Adverse events are defined as an unintended injury or complication of health care which results in disability, death, or extended length of hospital stay (Wilson et al., 1995). Examples of adverse events include infections, falls resulting in injuries, wrong side surgery, retained instruments and problems with medication and medical devices.

In 2011–12, 5.3% of hospital separations reported a code indicating an adverse event. Table 1.1 has been sourced from the Australian Institute of Health and Welfare (2014) and shows the proportion of separations with an adverse event was 6.1% for public hospitals and 3.9% for private hospitals. The data for public hospitals is not comparable with the data for private hospitals because their case-mix differs and recording practices are different. For public hospital separations, 1.8% of same-day separations reported an adverse event compared with 10.7% of overnight separations. For private hospitals, 1.4% of same-day separations reported an adverse event compared with 9.4% of overnight (Australian Institute of Health and Welfare, 2014).

Separations for sub and non-acute care had higher rates of adverse events than acute care separations (9.3% and 5.0% of separations respectively). Emergency admissions had higher rates of adverse events than non-emergency admissions (9.1% and 3.8% of separations). This information is presented in Table 1.1.
### Chapter 1 Introduction

#### Table 1.1 Separations with an adverse event per 100 separations, public and private hospitals, 2011-2012

<table>
<thead>
<tr>
<th>Adverse event /100 separations</th>
<th>Public hospitals</th>
<th>Private hospitals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Same-day separations</td>
<td>1.8</td>
<td>1.4</td>
<td>1.6</td>
</tr>
<tr>
<td>Overnight separations</td>
<td>10.7</td>
<td>9.4</td>
<td>10.3</td>
</tr>
<tr>
<td>Acute care separations</td>
<td>5.9</td>
<td>3.7</td>
<td>5.0</td>
</tr>
<tr>
<td>Sub- and non-acute care separations</td>
<td>11.2</td>
<td>7.4</td>
<td>9.3</td>
</tr>
<tr>
<td>Emergency admission</td>
<td>8.9</td>
<td>11.9</td>
<td>9.1</td>
</tr>
<tr>
<td>Non-emergency admission</td>
<td>4.2</td>
<td>3.5</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>Total per 100 seps</strong></td>
<td><strong>6.1</strong></td>
<td><strong>3.9</strong></td>
<td><strong>5.3</strong></td>
</tr>
<tr>
<td><strong>Total Separations with an adverse event</strong></td>
<td>338,579</td>
<td>147,731</td>
<td>486,310</td>
</tr>
</tbody>
</table>

Source: (Australian Institute of Health and Welfare, 2014)

#### 1.2 Research context

The empirical chapters of this thesis (chapters 4, 5, 6) entail two datasets whose collections took place at the Gold Coast Hospital and Health Service (GCHHS), Queensland Australia in 2013 and 2015 respectively. In 2006, the state government of Queensland announced a commitment of $1.23 billion to construct a new hospital on land opposite Griffith University for the community of the Gold Coast. This would develop as the heart of the Gold Coast Health and Knowledge Precinct and later the location for the planned Commonwealth Games’ Athlete’s Village in 2018 (“CGIA - Commonwealth Games Athletes Village: Residential Complex - Queensland Project Profile,” 2017). The next seven years involved detailed planning, anticipation and preparation for what was to become “the hospital move that made Australian history” (Capper, 2013).
Chapter 1 Introduction

This service relocation involved the largest patient transfer in Australia’s healthcare history. Approximately 4,000 staff were involved with the move which occurred in September 2013. The former facility, at 54,000 square metres of floor space was significantly smaller than the new facility with over 170,000 square metres of floor space. A service cramped onto the 3.4 hectare site at Southport; would be uplifted and moved to a Greenfield site specifically designed on 20 hectares of cleared land. In the 12 months prior to the study commencing, there had been a new State Government elected foreshadowing significant budget cuts, realignment in the governance of health from a highly centralised model to a decentralised structure, and extensive turnover of executive staff at a local level, including a new chief executive.

In what could be described as the “perfect storm” in a dynamic clinical environment, an opportunity to research patient safety culture of the same institution at two different times in two different environments presented. At the time, a seemingly never ending barrage of negative media coverage combined with an unfortunate sequence of “bad news” stories from supposed terrorist medical officers to public concerns around maternity and mental health services dominated the health sector (Donaghey, 2009; Hickson, 2010; Hudson, 2007). The work force was under considerable pressure in meeting the needs of the community, and, in addition had a never ending array of capital works planning meetings to attend. Already busy staff were expected to attend programs aimed at “transformation”, “leadership development”, and “communication and patient safety training”. The hospital was moving; services being relocated and the aging bricks and mortar left behind. There was an expectation that the culture was going to improve when staff and patients arrived at the new purpose built hospital.
Chapter 1 Introduction

On the 28th and 29th of September 2013 the new Gold Coast University Hospital opened its doors to the public. The relocation of 219 patients from the Gold Coast Hospital Southport to the Gold Coast University Hospital at Parklands occurred over two days. Some 104 people moved on Friday, and another 115 followed on the Saturday. Five babies were also born at Gold Coast University Hospital on the day of the move. This piece of trivia made the staff feel warm and fuzzy. Babies are symbolic of new life, new beginnings and a future ahead. Staff continued their familiar routines in an unfamiliar environment, the public turned up in droves and the health service experienced an unprecedented increase of activity.

This is the backdrop for this research. There are two data points where staff surveys were conducted. The first was in August 2013 in the weeks leading up to move, and the second in September 2015, two years after the move. In the period between the two data collections a change in executive brought a renewed focus on patient safety and quality with a large injection of funding aimed at enhancing clinical services. While a change of this magnitude offers many research openings; I was particularly interested to see what the impact of the “move and grow” strategy would be on patient safety culture. The assumption was that it would be positive; and that patient safety culture would be improved. This longitudinal data set has enabled the exploration of the phenomena of patient safety culture to include a variety of constructs and in doing so makes an original and unique contribution to the knowledge base. This thesis uses sections of the data collected by the Culture, Transformation and Performance project (CTP) as well as patient survey information. The data collected and analysed for this thesis is shown in Table 1.2.
Chapter 1 Introduction

Table 1.2 Data sets collected for this thesis

<table>
<thead>
<tr>
<th>Data</th>
<th>Survey</th>
<th>Date</th>
<th>Method</th>
<th>Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pre move survey of staff (CTP1)</td>
<td>August 2013</td>
<td>Validated survey tool</td>
<td>306 staff</td>
</tr>
<tr>
<td>B</td>
<td>Post move survey of staff (CTP2)</td>
<td>October 2015</td>
<td>Validated survey tool</td>
<td>246 staff</td>
</tr>
<tr>
<td>C</td>
<td>Peri move survey of patients (Patient Experience Survey)</td>
<td>October 2013</td>
<td>Assisted patient survey</td>
<td>40 patients</td>
</tr>
</tbody>
</table>

The first data set (A) was collected in 2013 before the move. Data set B was collected in 2015 two years after the move. Data set C was collected information on the patient experience during the move.

The following graphic visually displays the timeline of events.
Chapter 1 Introduction

Figure 1.2 Contextual timeline

TIMELINE

2013

Gold Coast Hospital
480 beds, 3.4 hectares, 5,000 staff
ETHICS - July
August: CTP Survey 1 (A)

September 29th: Old Gold Coast Hospital closes its doors
219 patients from Gold Coast Hospital Southport move to the Gold Coast University Hospital

September 29th: The new Gold Coast University Hospital opens to the public
750 beds, 20 hectares, 7,000 staff

2 – 4th October: Patient experience survey conducted (B)

2015

September: CTP Survey 2 (C)

Chapter 1 Introduction

1.3 Research aims, justification and questions

The purpose of this research is to increase our understanding of the key organisational drivers that increase patient safety culture, and the relationship between patient safety culture and patient outcomes. This thesis is constructed of a series of discrete papers including a literature review and four empirical papers. This web of papers is shown visually in figure 1.3 demonstrating how each chapter and paper link and contribute to the overall topic of antecedents and consequences of patient safety culture in a dynamic clinical setting.

Figure 1.3 Linkages of chapters and papers

Table 1.3 expands on Figure 1.3 providing an overview of my research. It summarises the four studies, the method to be used, relevant chapter, and aims.
Table 1.3 Research overview

<table>
<thead>
<tr>
<th>Studies</th>
<th>Method</th>
<th>Chapter &amp; paper</th>
<th>Aim</th>
</tr>
</thead>
<tbody>
<tr>
<td>2. Culture, Transformation and Performance 2013 (CTP 1)</td>
<td>Use of online and hard copy surveys using standardised questions data collected 2013</td>
<td>Chapter 4, paper 2: “Dynamic workplace interactions for improving patient safety climate”</td>
<td>Explore the role specific antecedents have on PSC. Safety Climate, Employee Engagement, Supervisory Support and Intergroup Collaboration</td>
</tr>
<tr>
<td>3. CTP1 and CTP2 comparison</td>
<td>Use of online and hard copy surveys using standardised questions data collected in 2013 and 2015</td>
<td>Chapter 5, paper 3: “Bricks-and-mortar, and patient safety culture”</td>
<td>Validate findings across two time periods. Conduct an analyses of variance across clinical and non-clinical staff to understand the strength of relationship of antecedents and PSC.</td>
</tr>
<tr>
<td>5. Culture, Transformation and Performance 2015 (CTP2)</td>
<td>Use of online and hard copy surveys using standardised questions data collected 2015</td>
<td>Chapter 6, paper 5: “Pixie dust - The moderating effect of reflexivity on patient safety culture and quality patient care”</td>
<td>Explore the effect of reflexivity on PSC in leading to higher perceptions of quality patient care.</td>
</tr>
</tbody>
</table>
Chapter 1 Introduction

1.6 Roadmap to this thesis

This thesis is structured into seven chapters including five independent papers (summarised in Figure 1.3). The first paper is a systematic review of the literature and forms a part of the research methodology. As the philosophy and methodology section provides essential information on the method used to conduct the literature review, the chapter on Philosophy and Methodology precedes paper 1. The questions emanating from paper 1 then lead to the following chapters. Given the complex and comprehensive nature of the literature review, it is important to explain the method used in the philosophy and methodology section prior to paper 1 (and not the usual pattern of after). As each of the chapter is based on a standalone paper, a preface will introduce each section so as to provide context. The separate papers make a distinct as well as an integrated contribution to the overall research question. This paper based approach allows the clear delineation and exploration of sub-questions sitting under the main umbrella research question. Each paper includes a discussion section and implications for practice. As individual papers were submitted to different journals for publication, the academic style of the destination journal has been used. References are listed at the end of each chapter with a single aggregated reference list at the back of this thesis.

Chapter 1, the Introduction, includes summary information regarding the Australian health care system, a background to adverse events and an overview of patient safety culture. The research setting is described, commencing in Southport, at the previous Gold Coast Hospital in 2013 and continuing to the new Gold Coast University Hospital in 2015. The research aims, justification and questions are introduced. An overview of chapters is presented, including scope and limitations.
Chapter 1 Introduction

In Chapter 2, the philosophy and methodology used is described. Theoretical models are presented and a philosophical research paradigm discussed. The first part of this chapter provides an overarching framework for the papers to come. The second part of this chapter presents the methodology used to address the research endeavour. The overall methods are outlined and a summary of each paper is provided. Finally, ethics and research method are discussed.

Chapter 3 includes paper 1, a review of the literature, which is presented in sections. In Section A, the search methods are described in two steps. The first step identifies key constructs in the patient safety literature and sets the scene. Nineteen publications of peer reviewed literature reviews are considered. Step 2 presents a systematic search of the literature that builds on Step 1 by considering publications from 2011 to 2014. Section B is a bibliometric analysis, Section C provides a discussion and synthesis of findings. Section D identifies key knowledge and potential research questions. This chapter demonstrates what is known and what isn’t known on patient safety culture, and refines the research questions to be considered in this thesis. While there is a large amount of literature on the research topic, this paper takes stock of the evidence and presents this in a model of antecedent, patient safety culture and consequences. Three broad areas for further investigation are articulated including workforce relationships, work environment and workforce capacity.

Chapter 4 includes paper 2, an empirical paper that explores workforce relationships. In this chapter data from the first survey collection point in 2013 is analysed. The constructs of employee engagement, supervisory support and interprofessional collaboration are considered. Health care is delivered by teams and the exploration of the interaction of these constructs with patient safety culture adds to the knowledge base.
Chapter 1 Introduction

Chapter 5 builds on the previous chapters where patient safety culture was defined and antecedents of patient safety culture were explored. This section includes two papers (papers 3 and 4) providing different perspectives of changing the work environment and using different paradigms. Paper 3 is an empirical paper from the staff perspective and paper 4 is a report of the patient’s experience derived from a patient survey and interviews. In paper 3, data from before the move (2013) and after the move (2015) of the hospital is studied using analysis of variance to test a number of hypotheses. The impact of moving hospitals on patient safety culture is explored. Differences in the patient safety perceptions of clinical and non-clinical staff are compared and considered.

In the second part of this chapter, paper 4 reports the patient’s experience of the former and new environments, providing an important insight. Using quantitative and qualitative methods, data was collected from 40 inpatients moved from the old to the new hospital. Relational and functional domains of the patient experience are explored. Findings show that while moving to a new facility improved the patients experience and satisfaction with the physical environment, relational domains that link to organisational culture remained the same. A number of implications for practice are considered.

Chapter 6, paper 5 explores the theme of developing workforce capacity using data collected in 2015 to test the moderating effect of reflexivity on patient safety culture and quality patient care. The goal here is to gain a better understanding of patient safety culture and inform the development of strategies aimed at improving quality of patient care. Using empirical modelling, this paper shows that when combined, reflexivity and patient safety culture lead to positive influences on quality patient care. Implications for practice extend to professional issues and organisational approaches to teams and change management.
### Chapter 1 Introduction

#### Figure 1.4 Roadmap of this thesis

<table>
<thead>
<tr>
<th>Chapter 1</th>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chapter 2</td>
<td>Philosophy and methodology</td>
</tr>
</tbody>
</table>
| Chapter 3 | Literature review  
  Paper 1  
  Presentation 1: "The Meaning of Patient Safety Culture for Patient Outcomes—Is the glass half empty or half full?" (presented International Safety and Quality in Healthcare Conference, Qatar October 2015) |
| Chapter 4 | Improving workplace relationships  
  Paper 2: "Dynamic workplace interactions for improving patient safety climate"  
  Paper 2: "Employee Engagement, Supervisory Support & Intergroup Collaboration – backing the trifecta for improved patient safety culture" (Presented Asia Pacific Congress ACHSM ACHSE, Melbourne October 2015)  
  Presentation 3: "Tribes or teams? The relationship between interprofessional collaboration, employee engagement and supervisor support on patient safety climate" (presented at International Safety and Quality in Healthcare Conference Tokyo 2016) |
| Chapter 5 | Changing the work environment  
  Paper 3: "Bricks-and-mortar, and patient safety culture" paper submitted to Journal Health Organisation and Management (accepted for publication)  
  Presentation: "Southport to Parklands - the patient experience" Health Service Management mini conference, Gold Coast November 2013  
| Chapter 6 | Developing workforce capacity  
  Paper 5: “Pixie Dust - the moderating effect of reflexivity on patient safety culture and quality patient care”, paper submitted for publication, under review |
| Chapter 7 | Discussion and conclusion |
Chapter 1 Introduction

Chapter 7 brings all the findings together with a discussion and final conclusions. Particular emphasis is given to the implications for practice and the unique contribution that this thesis makes to understanding the research endeavour. Figures and tables are used throughout the document as an aid to explaining key concepts and to summarise information and are numbered sequentially. The final Chapter 7 will bring the separate chapters together, discuss the various contributions of each paper and summarise key findings from this research. Lastly, an appendix includes relevant tables as referenced in the main document.

1.7 Conclusion

This chapter has provided an introduction the topic of patient safety culture in the context of the Australian Health Care System. Definitions of terms have been included to assist the reader and a summary of this thesis provided. The research aims and questions were presented, followed by the tabulation of an overview of the research approach.

The next chapter will present the underpinning philosophy and methodological approach to be used in this thesis in more detail.

“You're off to Great Places!

Today is your day!

Your mountain is waiting,

So... get on your way!”

Dr. Seuss (1997) Oh, The Places You'll Go!
Chapter 1 Introduction

References


Chapter 1 Introduction


Chapter 2 Philosophy and Methodology

“Speak English!’ said the Eaglet, ’I don’t know the meaning of half those long words, and I don’t believe you do either!’”

Carroll and Tenniel (1976), Alice in Wonderland

Preface

Chapter one laid out the road map for this thesis. In chapter 2 the researcher’s perspective is put forward, a conceptual framework articulated and the methodology to be used described. An overview of occupational therapy models is presented and a philosophical research paradigm discussed. This first part of this chapter provides an overarching framework for the papers to come. Content is included on ontology and epistemology, an essential component of a thesis submitted for a doctor of philosophy.

The second part of this chapter takes a pragmatic approach and presents the methodology to be used to answer the research question. A summary description of the approach used in paper 1, the literature review is provided. This theory paper is presented as a number of steps that include a bibliometric analysis and an analytical synthesis. The method used in the empirical papers (papers 2, 3 and 4) of this thesis is summarised and the data sources explained. Finally ethics and research method are discussed.

The goal of this chapter is to set the scene for the orchestration of the remainder of this thesis.
2.0 Introduction

In order to provide a perspective from which to view this thesis, this chapter presents the underlying philosophy to be considered and methodology to be employed. This research is informed by a lengthy career in healthcare, and the culmination of both professional and academic experience. Due to my extensive professional background in this research field, a professional framework of occupational therapy is given first to provide a backdrop to the philosophical research paradigm. The subsequent methodology section presents the structure of the thesis and overall method.

2.1 My professional “lens”

As an Occupational Therapist, my understanding of experience is underpinned by professional philosophy and constructs. A brief history of the profession provides the backdrop for where the topics for the remaining chapters of this Doctor of Philosophy emerge from. Occupational Therapy (OT) had its conception in the late 19th century with the Moral Treatment Movement (Reed, Hocking, & Smythe, 2013) when it was recognised that the use of occupation could assist in the recovery of patients with mental illness. By the early 20th century occupational therapy was used in a diversional arts and craft modality predominantly in the large mental institutions of the time. As society changed, so has the profession developed. It was following World War 1 that a more curative approach to occupational therapy emerged in response to enabling returning servicemen to achieve meaning and occupation in their damaged lives. The great depression and high unemployment affirmed that occupation was necessary not only for economic survival, but also for mental and physical wellbeing (Reed et al., 2013). “The philosophy of occupation therapy” was published by Meyer in 1922 (Reed et al., 2013) and showed a critical link between an individual’s level of activity and occupation with their physical and mental health. A more scientific paradigm emerged
after World War II, with an increasing biomedical approach to occupational therapy. This was accompanied by a loss of more holistic models of occupation. By the 60s and 70s, the major focus of the profession of occupational therapy was on understanding function and dysfunction in anatomical and neurological terms. I commenced my occupational therapy training in 1976. At this time OT had moved from a focus on diversion to an emphasis on function, fostering independence and resettlement of individuals to home or back to work. Gradually over the 80s and 90s OTs were challenged to demonstrate their worth as a recognised profession hence a number of philosophical and ontological models of occupational therapy emerged (Reed et al., 2013).

Occupational Therapy models aim to achieve occupational performance, recognizing that each individual both influences and is influenced by their environment. The model that guides my practice is the “Person Environment Occupation” (PEO) model founded by Law (1996). This model provides a framework to guide clinical reasoning in analysis and understanding of the interdependent interaction of the person, environment and occupation which interact to result in occupational performance. As dynamic elements, interactions change over the lifespan and vary in magnitude. A simple visual model is demonstrated in Figure 2.1.
As my career progressed I studied Business and was employed in more managerial roles. Ultimately this journey allowed me to become engaged in the safety and quality movement and come to question how patient safety and quality melded with an occupational perspective. Organisational culture is an important component of the environment for the person in an inpatient context (Willard et al., 2014). Organisational culture is symbolised by artefacts, beliefs, values and assumptions (Schein, 1985). The PEO model acknowledges that the person is not a passive recipient of the environment, but an essential ingredient (Law, 1996). The therapeutic environment includes the organisational culture as well as the patients input in influencing interactions that lead to independent outcomes in a health setting. Ecological models of Occupational Therapy draw on theories that describe person-environment interactions (Willard et al., 2014).

This thesis explores patient safety culture from an occupational perspective. If we accept that occupation provides meaning to humans, and an adverse event (or positive event) impacts on this outcome, then logically improving patient safety climate will lead to altered patient outcomes, and there in occupational performance. Human outcomes matter in that they disable, or enable, function (Willard et al., 2014).
2.2 Ontology

There are four philosophical assumptions that informed the choice of methodology and methods used in this thesis. These are ontology (what constitutes knowledge); epistemology (how knowledge is known); axiology (values brought to the enquiry); and methodology (the process used to gather data (Creswell, 2014). My philosophical stance is based on strong training in the sciences and a post positivist worldview. Creswell (2014, p. 11) says this lens is suitable for ‘truth is what works at the time; it is not based on a strict dualism between the mind and a reality completely independent of the mind’. This implies a focus on the ‘what and how’ (etic) rather than the ‘why’ (emic) approach (Creswell, 2014).

In the series of papers that comprise this thesis, I have taken a logical post positivist stance, exploring the links between cause and outcome. Using a reductionist approach, ideas are reduced into smaller sets of variables. These variables are tested through hypothesis that emanate from a stated theory. This research uses a post positivist paradigm with a focus on objectively demonstrating causality and explaining relationships between constructs. A deductive and organised approach has been used that aims to prove or disprove hypothesis (Neuman, 2014). In the context of discovery, this thesis uses a scientific hypothesis that follows a logical path of probability to assess findings.

What can be known is restricted to the observation of empirical phenomena. Implicit in this is that there may be counter evidence that was not discovered (Raines, 2013). The structure of the research questions articulated in this thesis seeks to test relationships and correlations (Tracy, 2013). This warrants the use of a descriptive correlational
method that tests a number of hypothesis that focus on the relationship between defined constructs (Raines, 2013).

### 2.3 Epistemology

A post positivist philosophy lends itself to realist ontology. It uses a collection of numbers to test a hypothesis, using inferential statistics to prove or disprove theory (Raines, 2013; Tracy, 2013). Traditional positivism asserts there is an absolute truth and that the researcher is distant and detached in order to ensure objectivity (Neuman, 2014). Epistemology through the worldview of post positivism considers the relationship between the researcher and that being researched (Creswell & Plano Clark, 2011). Inherent in this is a deeper understanding of the context in which certain phenomena are observed.

To ensure objectivity, all staff and patient data were collected and de-identified so as to mask the identity of the participants. Validated data collection tools were also used. I follow a constructionist position in that I believe there is a reality; however knowledge is contingent on human perception and experience. This is my reality which is reflected in my interpretation of findings in the final discussion chapter of the thesis. Other interpretations are possible. To provide a balanced view of the topic, and assist in understanding patient safety culture, a patient experience survey used a mixed methods approach. The juxtaposition of quantitative data with qualitative findings is inherent in a patient centred environment where the patient’s voice is purely subjective.

### 2.4 Method

This section will elaborate the research methods employed to answer the overarching research question. These include a literature review that forms the basis of Chapter 3 (paper 1) and the collection and analysis of data which contribute to the remaining
papers. Paper 2 (Chapter 4) is an empirical study using data collected in 2013. Paper 3 (Chapter 5) is an empirical paper based on quantitative data that compares survey data collected in 2013 and 2015 respectively. Paper 4 (Chapter 5) integrates both quantitative and qualitative data collected from a patient survey. Finally, paper 5 presented in Chapter 6 is an empirical paper using data collected in 2015. A deductive approach has been used where a theory is espoused and then tested through hypothesis. This is a key element of a post positivist approach (Creswell & Plano Clark, 2011).
2.5 Chapter 3, paper 1: “The effect of patient safety culture on patient outcomes: a review of the literature”

My research question “how can patient safety culture be improved in dynamic clinical settings?” is informed by the preceding definitions, my professional lens and a focus on outcomes from the patient’s perspective. In order to ensure the value of this question an extensive review of the literature was conducted with the goal of identifying our current knowledge on patient safety culture. There is an abundance of both theoretical and empirical research on patient safety culture; hence this literature review was developed in a staged process.

Step one was an iterative search of the literature and identified 14 literature reviews in relation to patient safety culture. Given the thorough nature of these reviews, and so to reduce duplication of effort, a second step was refined to build on these previous published works. The second step was a systematic search from 2011 – 2014. Chapter 3, Literature Review is presented in a number of sections. Section A describes the method used in steps 1 and 2; Section B provides a bibliometric analysis, Section C presents a narrative synthesis and Section D includes a suite of research questions emanating from the review of literature and a conclusion.

2.5.1 Search methods for identification of studies

A search protocol using key terms and defined parameters was used for all steps of the process to identify relevant papers. A data management tool with defined variables was used to categorise literature according to theme. Step 1 used a broad electronic search of the literature using the databases of Cochrane, Medline, Embase, Cinahl and psychinfo. An initial search for literature reviews in mid-2014 found 12 publications in relation to the research topic. An additional 7 literature reviews were identified in Step 2,
providing a total of 19 literature reviews. A summary of these reviews is provided in Appendix B1.

Because of the time lag from review to publication, the literature reviews published in 2014 had considered work published prior to 2011. A further search was conducted that included relevant publications from 2012 to 2014 to ensure currency of information. Step 2 used the same search terms, however broadened the search to the business literature for completeness. This included a search on health/business databases (which included the Informit Business Collection) and conducted on Business Source Premier. A summary of papers and findings is included in Appendices B3 – B6.

This chapter takes stock of what is known about patient safety culture and organises this information into a model for discussion. This PhD confirms our understanding of patient safety culture and adds to this knowledge by attempting to bring all the findings together. This is presented as a narrative discussion supported by a number of tables with summarised findings presented as an appendix, preceding the full reference list.

2.6 Empirical data collection

Three different collections of empirical data, each using a survey methodology, contribute to this thesis. Each paper begins with a theory, collects data using validated tools to test a number of hypothesis (Creswell, 2014). Construct validity has been defined as “the degree to which a data collection procedure (e.g., instrument, interview procedure, observational strategy) truly capture the intended construct that is being studied” (Teddle & Tashakkori 2009; p331). The initial items in the various questionnaires were developed and extended from previously validated scales. The sources of these are noted in the thesis. Generally the manner in which items are anticipated to load onto factors is provided by the authors. In the case of the analyses
undertaken here, factor analysis was undertaken in SPSS where the items were loaded onto the anticipated factors from prior studies and from the work of the scales' developers. Principal component analysis was the technique consistently used to extract the factor scores used in later analysis (Comrey & Lee, 1992). Internal consistency of the various items loading on the factors was examined and the overall reliability of the factor score in measuring the underlying construct in question. These alpha scores are reported in the various papers included in the dissertation.

For ease of interpretation Data A means a subset of data collected in 2013. Data B means a subset of data collected in 2015. Data C refers to data collected from a patient experience survey conducted 2013. Table 2.1 below summarises the approach taken and the chapters and papers using these data.

*Table 2.1 Data collection methods used for this thesis*

<table>
<thead>
<tr>
<th>Data set</th>
<th>Survey</th>
<th>Sample</th>
<th>Collection Method</th>
<th>Chapter / Paper</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Pre move survey of staff 2013 (CTP1)</td>
<td>306 staff</td>
<td>Validated survey tool On line and in hard copy 12 sections</td>
<td>Chapter 4 paper 2</td>
</tr>
<tr>
<td>B</td>
<td>Post move survey of staff 2015 (CTP2)</td>
<td>227 staff</td>
<td>Validated survey tool On line and in hard copy 13 sections</td>
<td>Chapter 6 paper 5</td>
</tr>
<tr>
<td>A and B</td>
<td>2013 Peri - move survey of patients (Patient Experience Survey)</td>
<td>40 patients</td>
<td>Assisted patient survey 10 questions plus free text</td>
<td>Chapter 5 paper 3</td>
</tr>
<tr>
<td>C</td>
<td>2013 Peri - move survey of patients (Patient Experience Survey)</td>
<td>40 patients</td>
<td>Assisted patient survey 10 questions plus free text</td>
<td>Chapter 5 paper 4</td>
</tr>
</tbody>
</table>
2.7 Data set A – staff surveys 2013

2.7.1 Method

Survey research provides a numeric description of perceptions of the sample of the population (Creswell, 2014). A survey has the benefit of rapid turnaround and collection of data from a large population and identifying attributes from respondents (Creswell, 2014). A survey was conducted within the Gold Coast Health Service of Queensland Health in August 2013 prior to the move of the Gold Coast Hospital to the new University Hospital. This project was known as the Culture, Transformation and Performance (CTP1) study. Survey respondents were invited through a targeted district-wide health service wide email broadcast (for the online survey) and by hard-copy in selected sites where availability of the internet was limited. This resulted in a non-random, convenience sample. A mixed methods methodology was used for this study, however only the quantitative data will be considered for my doctorate.

To capture the maximum amount of participants, hardcopies were distributed to those staff members who may not have on line access to the survey, or who prefer to complete a hard copy survey instrument. We received 250 surveys, a response rate of 10% of the approximately 2,500 employees in scope. This is consistent with similar response rates reported in the literature (Etchegaray, Gallagher, Bell, Dunlap, & Thomas, 2012). Of these 197 (79%) were female, consistent with the high proportion of females within the hospital workforce. Professional groups included nursing (45%), administration (24%), allied health (17%) and medical (7%). Additional detail regarding the sample demographic is included in each of the chapters.

The survey had 12 sections, plus a section for free text. Questions were based on validated tools and focused on recognised dimensions of a number of constructs.
including patient safety climate, employee engagement, supervisory support, reflexivity; inter professional collaboration and quality of care. The literature review outlined in Chapter 3, identified a range of validated surveys for assessing patient safety climate and culture. Flin, Burns, Mearns, Yule & Robertson (2006) stress the importance of content validity, factor structure, internal validity and concurrent validity in selecting surveys tools measuring patient safety climate. The survey of choice selected for this research is the Safety Organising Scale (SOS) by Vogus and Sutcliffe (2007). As the staff survey included 12 sections, the SOS was chosen for its reliability and brevity. A five point Likert scale was used for each question.

Appendix A1 lists the constructs included in this research and the reference tool used to measure each variable in order to answer the research questions. Chapter 4, paper 2 “Dynamic workplace interactions for improving patient safety climate” is based on this data set.

2.7.2 Chapter 4, paper 2: “Dynamic workplace interactions for improving patient safety climate”

The scope of paper 2 is to specifically analyse and develop models from data A. The questions in these sections were based on validated surveys and include: employee engagement (Spreitzer, 1995); supervisor support (Beugre & Baron, 2001); patient safety culture (Vogus & Sutcliffe, 2007); and inter-professional collaboration (Kenaszchuk, Reeves, Nicholas, & Zwarenstein, 2010). Inferential statistics and model generation was assisted by the use of SPSS. The questionnaire used includes an extensive list of constructs, however four specific bundles of questions were analysed in paper 2. A number of hypotheses were developed and tested to answer the overarching research question of this doctorate. The following Figure 2.2 illustrates the methodology.
Patient safety culture is used as the dependent variable. This paper was prepared prior to the second survey.

Figure 2.2 Methodology for informing Chapter 4, paper 2

Chapter 5, paper 3 “Bricks and mortar, and patient safety culture”, also uses a selection of data collected in 2013. This will be discussed in a section to follow.

2.8 Data set B - staff surveys 2015

2.8.1 Method

Using the same methodology as outlined above (CTP1) a second survey (CTP2) was conducted in 2015. The second survey was actively promoted at the Gold Coast University Hospital (GCUH) and Robina Hospital. The demographic of the workforce was consistent with CTP1 with seventy percent of employees in clinical roles (Gold Coast Annual Report). Distribution method was the same as CTP1, however with the knowledge that several other organisational wide staff satisfaction surveys had been conducted in the previous months, visible survey stands were positioned in staff café areas at GCUH and Robina Hospital over a two week period. These stands were attended by a research assistant and computers were available for immediate direct
entry. The total number of staff at this time had grown to 7,000 and 227 surveys were completed.

While the survey had the same 12 sections as in the 2013 survey, additional questions on patient safety outcomes and quality of patient care were included to capture perception of improved patient outcomes. These additional questions were sourced from Patterson and West (2005) and Sorra and Dyer (2010) and were included to elicit information on patient outcomes specifically for this thesis.

2.8.2 Chapter 6, paper 5: “Pixie Dust - the moderating effect of reflexivity on patient safety culture and quality patient care”

Paper 5 emanates from data B and aims to explore the relationship between patient safety culture and perceptions of two key outcomes- 1) quality of patient care, and 2) assessment of patient safety. In order to obtain contemporaneous information on patient quality and safety, items available in validated tools have been used. Paper 5 uses only 2015 data B and focuses on the specific construct of reflexivity. The methodology is shown in Figure 2.3.
Chapter 2 Philosophy and Methodology

2.9 Data A and B

2.9.1 Chapter 5, paper 3: “Bricks-and-mortar and patient safety culture”

Paper 3 uses both 2013 and 2015 data and treats patient safety culture as an independent variable. This paper provides the staff perspectives before and after a major hospital move. It also explores the difference in perceptions of patient safety culture from professional groups such as nursing, medicine, allied health and administrative staff across two time points. Splitting the data into clinical and non-clinical groups provides a further analysis and exploration of patient safety culture across two time periods. The model is shown in Figure 2.4.

Figure 2.4 Methodology informing Chapter 5, paper 3

2.10 Data set C - patient experience survey

2.10.1 Method

Patients who had experienced both the former and the new environment were asked to provide input on their experience of the two separate environments in the days following the move. Of the 219 patients moved, a potential 150 patients adult patients were defined as appropriate to interview. Excluded groups included maternity (due to
speedy discharge), and vulnerable populations unable to provide consent including patients in the intensive care unit, newborns and paediatrics. After exclusions, this resulted in a non-random convenience sample of 40 consenting adults who provided valuable information about their experience of the former and the new physical and cultural environments. A 10-item survey was constructed based on best practice principles and validated patient surveys (e.g. Picker Institute) found in the literature (Jenkinson, Coulter, & Bruster, 2002). Questions are based on themes including patient participation and involvement; the relationship between the patient and the healthcare professional (regardless of professional group) and the context where care is delivered (Kitson, Marshall, Bassett, & Zeitz, 2013). A search of existing surveys in the literature failed to find a survey that was suitable to the unique patient move setting that occurred in our situation (Beattie, Murphy, Atherton, & Lauder, 2015). A mapping exercise was undertaken to compare those domains presented in the scholarly literature with those identified in a review of hospital patient experience measurement conducted by the Australian government (Australian Commission on Safety and Quality in Health Care, 2012). The resulting list of items included the following relational and functional domains that are considered important by the patient: comfort, noise, privacy, visitor amenities, access to information, clinical care, staff attitude, getting assistance and overall impressions (Beattie et al., 2015; Doyle, Lennox & Bell, 2013; Jenkinson et al., 2002).

A list of questions and source is included in Table 3 in the appendix. The goal was to capture the patient’s perception of their experience “before” as an inpatient at Southport, and “after” the move to Parklands. A five point Likert scale was used for 8 items, and a 10 point scale used for 2 items. Patients were also asked if they had any other comments or feedback in relation to their hospital experience over the last week.
Chapter 2 Philosophy and Methodology

Additional detail on survey development is included in section 5.9. To ensure accuracy of reporting and encourage a high response rate, interviewers assisted the patients to complete the surveys.

2.10.2 Chapter 5, paper 4: “Bricks-and-mortar, and the patient experience”

The goal of paper 4 is to provide a patient perspective before and after the move and compliments paper 3 by providing a different perspective. The challenge in surveying patients before and after the move was approached from a quality improvement paradigm using a patient feedback approach. Findings from this process also informed an industry report which was presented to the hospital board and executive at the time. Figure 2.5 shows the methodology flow.

Figure 2.5 Methodology for informing Chapter 5, paper 4

In summary, as shown in Table 2.2, paper 2 uses data collected in 2013; paper 3 compares data from both 2013 and 2015; paper 4 uses patient data and paper 5 uses data from 2015 only.
2.11 Ethics and research merit

Surveying staff at a time of significant change warranted specific ethical consideration so as not to cause distress or discomfort to consenting participants. This is a specific requirement of the Australian Code for the Responsible Conduct of Research as articulated by the NHMRC. All data was anonymous and entered into a spreadsheet by a research assistant not employed by the hospital. This was a particular requirement as I was and remain a senior manager within the service. All surveys were returned in a sealed envelope to the university, and all information sheets dual branded to reinforce to staff that this was an approved research project. The degree of union activity and organisational change at the time had led to staff questioning the intentions of staff surveys. Case notes were de identified, and data kept secure and retained for a minimum of five years. No identifiable information will appear in reports or publications to protect the confidentiality of the participants. The potential merit of the research will be
the benefits gained in better understanding these phenomena. As a longitudinal study the capture of staff perceptions at two points in time is a unique situation. To contribute to a better understanding of patient safety culture over an extended period of time, and to enable focused exploration of constructs using empirical methods is also unique.

The Culture Transformation and Performance study complies with the National Statement of Ethical Conduct in Human Research, and has full ethics approval (PHH23/12/HREC) and site specific approval (SSA) for the GCHHS valid until May 2016. The ethical considerations in obtaining patient feedback in a dynamic environment are enormous. For this reason the patient experience data was structured not as pure research, but using a quality improvement clinical audit framework. Seeking patient feedback is an expectation of quality care and not a deviation from normal process. The benefits of this were to be able to obtain information quickly and provide immediate feedback to the organisation so as to effect immediate improvement. As a quality improvement activity the survey was recognised as a clinical audit by the Human Research Ethic Committee (HREC / 16 / QGC / 254).

2.12 Limitations

The use of surveys as a means of data collection is accompanied by a number of limitations. Questionnaires are however the most commonly used methodology in patient safety studies (O'Connor, Buttrey, O'Dea, & Kennedy, 2011). The benefits are that there are a variety of existing survey tools that have been validated and data published in the patient safety arena (Colla, Bracken, Kinney, & Weeks, 2005; Freeth et al., 2012; Hohwü et al., 2013; O'Connor et al., 2011). Questionnaires are inexpensive to administer, allow for statistical analysis and can be re administered at a later date to compare pre and post scores. This attribute was an important consideration of this
research, specifically demonstrated in Paper 3 where data collected in 2013 has been directly compared with data collected 2 years later in 2015.

Questionnaire methodology does have limitations. A low response rate may be predicted when questionnaires are administered to staff on nebulous concepts such as patient safety culture (Scott, Mannion, Davies, & Marshall, 2003). The examination of culture can be perceived as having a hidden agenda (Scott et al., 2003). Non-random response bias has been identified as a major consideration when using survey methodology (Chang, Witteloostuijn, & Eden, 2010; O'Connor et al., 2011). Methodologically, single site studies such as this that are based on a cross-sectional dataset gathered concurrently are at risk of common-method variance (Lindell & Whitney, 2001). For this reason a number of post hoc statistical tests have been employed to try and reduce this error. Post hoc tests including factor analysis were adopted and cumulative variance assessed (Harman; 1976). The participants in this research were all employees of a single large health service in Queensland. While it is proposed they represent a broader health workforce, findings need to be generalised with this in mind.

Being unable to accurately track participants from time 1 to time 2 is another limitation. Intervening factors such as the political environment and shifts in leadership can introduce bias.
Chapter 2 Philosophy and Methodology

2.13 Conclusion

This chapter has presented my professional lens, ontology and epistemological perspectives. A number of visual figures were included to assist in understanding the context of the research and how this will answer the research questions. The data collection method to be employed and the papers emerging from this research were also provided. This provides the backdrop for the remaining sections of this thesis which is presented as a series of papers.

“Would you tell me, please, which way I ought to go from here?”

“That depends a good deal on where you want to get to.”

“I don’t much care where –” “Then it doesn’t matter which way you go.”

Carroll and Tenniel (1976), Alice in Wonderland
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Chapter 3 Literature Review

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“I almost wish I hadn't gone down that rabbit-hole—and yet—and yet—it's rather curious, you know, this sort of life!”

Carroll and Tenniel (1976), Alice in Wonderland

Preface

An enormous amount has been published on patient safety culture and this chapter presents a literature review in a number of sections. Section A addresses the overarching method that was used to manage and appraise the scholarly papers. This included two distinct stages: Step 1 is a review of literature reviews (considering publications up to 2011); and Step 2 builds on these reviews through a systematic search of the literature published 2011 – 2014. Section B presents a bibliographic analysis of both steps to provide a better understanding of emerging themes and gaps within the literature. A narrative synthesis follows in Section C, discussing the literature under the headings of antecedents, phenomena and outcomes of patient safety culture. This synthesis includes findings from the published reviews and the systematic search. Finally, Section D outlines research questions emanating from the literature and summarises research opportunities for the future. A summary of the literature, (successfully peer reviewed) was presented at the International Safety and Quality Conference, Qatar in October 2015. Titled - “The meaning of patient safety culture for patient outcomes – is the glass half empty or half full?” a number of questions and discussion followed this presentation. The international audience suggested that maybe the glass was broken and perhaps the concept of patient safety culture needed a rethink. This chapter demonstrates what is known on the topic of patient safety culture, what is not, and refines the research questions to be considered in this thesis.
Chapter 3 Literature Review


3.0 Introduction

One in ten patients will experience an adverse event during their hospital stay (Australian Commission on Safety and Quality in Health Care, 2014; de Vries, Ramrattan, Smorenburg, Gouma, & Boermeester, 2008). The significance of patient safety, adverse events, high mortality and health costs are well documented in the health literature. Patients with adverse events stay about ten days longer, and have over seven times the risk of in-hospital death when compared with patients without these complications (Ehsani, Jackson, & Duckett, 2006). The estimated cost of adverse events is approximately 15.7% of total expenditure on hospital care (Ehsani et al., 2006). In addition to financial considerations, even more concerning are the concomitant impacts on patients relating to mortality, morbidity and sub optimal patient outcomes (Pronovost & Faden, 2009). Inquiries into adverse events, and more broadly health service failures have highlighted the importance of patient safety culture, or the role of an organisational culture that protects and reduces adverse patient outcomes (Casali & Day, 2010; McLean & Walsh, 2003; Salmon, 2013).

Patient safety culture. It is one of the most popular new phenomena of clinical research that has emerged over the last two decades. Such is the interest in patient safety culture, an initial screening using Pubmed and Cinahl identified over 171,000 publications using the search term “patient safety culture”. While this indicates an active interest in a very significant and important area, it also presents challenges for scholars trying to manage and make sense of what we really know about this important phenomenon.
Chapter 3 Literature Review

This literature review presents an attempt to bring this literature together in a more structured manner by looking at the antecedents of patient safety culture, the phenomenon itself, and its consequences as a dynamic and interactive phenomenon. It herewith aims at confirming key aspects of our understandings of patient safety culture. This chapter demonstrates what is known on the topic of patient safety culture, what remains to be better understood, and highlights the research questions to be considered in the remainder of this thesis.

This review of the literature was conducted in a number of sequential steps. Step 1 involved an initial review of literature reviews on the topic of interest. This step was useful in identifying themes in the literature and in developing a framework to assist in the narrative synthesis. Step 2 was a more comprehensive systematic search that built on Step 1 by reviewing literature from 2011 - 2014. The search process is explained in more detail in the methods section A of this chapter. Section B presents bibliometric cartography of the literature as preparatory work to make sense of what has already been published, and identify research gaps and research concentrations. Section C is an integrated narrative synthesis of literature reviewed in steps 1 and 2. Due to the passage of time an addendum has been added that summarises the most recent publications on the topic of patient safety culture and patient outcomes. The overarching literature review strategy is shown diagrammatically in Figure 3.1.
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Figure 3.1 Overarching strategies for sorting and reporting on the literature

It was found that although there has been a large amount of interest in the field of patient safety culture that has contributed immensely to our current knowledge, there remains much we don’t know. Findings are presented using a mix of text, graphs and tables with supporting information included in Appendix B.
Chapter 3 Literature Review

Section A

3.1 Method

This section describes the search method, data extraction, and model used for the identification and theming of the literature.

3.1.1 Search method

A preliminary scoping search of the literature identified an extensive amount of publications on the topic. An initial search of PubMed and Cinahl databases using the search term “patient safety culture” identified over 171,000 academic peer reviewed journal articles. Narrowing this field down to those published from 2003 – 2014 yielded over 141,000 papers. When adding “outcomes” and “patient outcomes”, 81,850 publications remained.

*Step 1: Literature review search 2003 – 2014*

The primary step was to identify published literature reviews on the topic of patient safety culture. A review of literature reviews is appropriate when the volume of research is exponentially high and the amount of literature reviews is substantial (Pautasso, 2013). So as not to duplicate the work of others, and to build on the existing knowledge base reviews from 2003 – 2014 were analysed. This review was conducted in September 2014. This exploration of the different reviews provided an overarching picture of research in the area of patient safety culture.

Electronic searches were conducted using databases of Cochrane, Medline, Embase, Cinahl and psychinfo. To be included, a literature review had to be in English, peer reviewed and published since 2003 - 2014. The search terms and this paper’s systematic approach was consistent with those used by existing systematic literature reviews in the field (Dicuccio, 2014; Morello et al., 2013; Weaver et al., 2013; Xuanyue, Yanli, Hao,
Similarly to previous reviews in the same research field, for completeness, a number of search terms were used in conjunction with the phrases “literature review” or “systematic review”. These search terms were “safety culture”, “safety climate”, “organizational culture”, “organizational climate”, AND “patient safety”, “hospital safety”, “safety climate”, AND “patient outcomes”, “hospital performance”, “adverse events”.

An initial iterative search of the literature identified 14 literature reviews in relation to patient safety culture. The most recent of these literature reviews were published by Dicuccio (2014), Morello et al. (2013), and Xuanyue et al. (2013). All considered publications up to 2011. An additional five reviews were found during the systematic review process (including two papers published in 2014) which were included bringing the total number of reviews to 19. As the most recent of these reviews included papers up until 2011, a second step was necessary to ensure a full and comprehensive review up until the year 2014.

**Step 2: Systematic search of the literature 2011 - 2014**

The second step included a systematic search of papers published between 2011 and 2014 with the intention of extending on the findings from Step 1. The most recent published review out of the 19 papers examined had included literature up to 2011; hence a more systematic search of the databases of publications between January 2011 and September 2014 was conducted to capture contemporaneous publications. A search protocol was developed (Hoffmann, Bennett, & Del Mar, 2013) and guided the process of the systematic search of the literature from 2011 – 2014. The National Health and Medical Research Council evidence hierarchy was used in narrowing down the scope of papers to focus on empirical studies (Merlin, Weston, & Tooher, 2009). This hierarchy (often depicted as an evidence pyramid as in Figure 3.2) defines the highest level of
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evidence as a systematic review or meta-analysis of randomised controlled trials and the lowest level as opinion and editorials (Hoffmann et al., 2013). While there is a larger quantity of publications at the lower levels of the pyramid, these papers are at high risk of bias, and generally of lower research quality. Those methods higher the level on the pyramid are considered to have higher research quality and lower risk of bias, however are less in quantity (Hoffmann et al., 2013).

Figure 3.2 Study types and levels of evidence

As organisational culture was identified as a search term in the initial review, the scope was extended to include the business literature. This included a search on health/business databases and included Informit Business Collection and Business Source Premier. To be included, studies had to be of an empirical nature, in the English language and published in a peer review journal. A psychometrically valid tool had to
be used to measure culture and qualitative studies had to include a defined ontological methodology. Quantitative studies included in the analysis incorporate randomized controlled trials, controlled clinical trials, controlled before and after studies and interrupted time series. The types of participants studied included hospital inpatients of any age, in acute and sub-acute hospital settings admitted under any medical specialty group.

Consistent with the process for a systematic review, a number of exclusions were established to narrow the focus of the papers considered (Hoffmann et al., 2013). Commentaries and editorials were excluded as these constitute a low level of evidence. Studies examining programs aimed at health students (e.g. medical, nursing), and those considering outcomes other than direct patient benefits were not considered as these were not within in the scope of the research aims. Distal benefits such as economic and effects on staff-wellbeing, and interventions aimed at staff outcomes (e.g. work place safety) were excluded. The care setting was restricted such that environments other than inpatient hospital care were not considered. The higher incidence of adverse events in the inpatient population guided this decision. Outpatients, nursing homes and community based services were out of scope. Papers presenting interventions or strategy with the goal to influence organisational safety culture and improve patient outcomes were included. Outcome measures comprised adverse events, clinical incidents, clinical outcomes, morbidity and mortality. Other patient outcomes included primary outcomes such as the absence of harm as the result of a clinical incident and secondary outcomes such as patient feedback, clinical outcomes and functional outcomes.

Applying the search criteria resulted in 281 articles of interest being closely reviewed. Fifteen duplicate papers were identified, indicating the overlap in the health and
business literature searches. This search discovered five additional literature reviews which were added to the review of reviews. Following exclusions, screening of the remaining publications resulted in 109 papers deemed “quantitative”, and 10 classed as “qualitative”. The remaining papers were lacking an articulated research framework or clearly identifiable method and were excluded from this review. Quantitative papers were appraised according to the PRISMA method for reporting systematic reviews (Moher, Liberati, Tetzlaff, Altman, & Group, 2010). Qualitative papers were attributed levels of evidence using the method described by Daly et al. (2007). Both analyses are presented by a series of graphs and tables. A PRISMA flow diagram (Figure 3.3) was created to summarise the review process (Shamseer et al., 2015).
Figure 3.3 Summary of literature search

**PRISMA Flow Diagram**

**Step 1:** Literature reviews identified through database searching 2004 – 2014 (n = 14 + 4 + 1 = 19)

**Step 2:** Records identified through database searching 2011 - 2014 (n = 245)

Additional records identified through business search (n = 36)

Records after 15 duplicates removed (n = 266)

Records excluded (n = 4) Literature Reviews added to Step 1

Records screened (n = 266)

Full-text articles assessed for eligibility (n = 262)

Full-text articles excluded, with reasons (n = 113)
  - Duplicates = 3
  - Commentary = 62
  - Case study report = 46
  - Off topic = 30
  - Repeat publication = 1
  - Literature Review = 1 (added to Step 1 above)

Studies included in quantitative synthesis (n = 109)

Studies included in qualitative synthesis (n = 10)
3.1.2 Data extraction and management

Bibliographic software (EndNote) was used to import citations and PDFs identified as relevant to the topic of patient safety culture (King, Hooper, & Wood, 2011). This enabled the removal of duplicates, consistent recording of details of reference sources and overall management of a large number of papers. A data management template enabled a systematic approach to collating information. The result is a series of tables collated in Appendix B.

3.1.3 Model used for thematic analysis

The model used to sift and sort the existing knowledge base is shown diagrammatically in Figure 3.4. This framework guides an understanding of what is known about patient safety culture and breaks a complex and complicated expanse of academic knowledge into distilled chunks of information. This approach identifies what leads into creating a culture of patient safety; what the characteristics of patient safety culture are; and explores the related outcomes of patient safety culture. While there have been numerous reviews of the patient safety literature, this paper takes stock of the evidence and presents a composite view of this intriguing phenomena.

Figure 3.4 Model for thematic analysis
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Managing the large volume of identified research was achieved by conducting the review in stages. Categorising articles under the headings of antecedent, patient safety culture and outcome provided a valuable organising structure. There are a number of ways to conduct a literature review and a mixed method approach has been used here (Baker, 2016).

**Bibliometric analysis**

Bibliometric mapping adds quantitative rigor into the subjective analysis of literature (Zupic & Čater, 2015). Aggregated bibliographic data is useful for identifying patterns, concentrations and gaps in an area of research, particularly where the quantity of publications is large (Zupic & Čater, 2015). The visual nature of the graphs provided in Section B present a summary of the research field without subjective bias (Zupic & Čater, 2015). This step is valuable partner to a narrative synthesis which has the risk of subjective bias (Ryan, 2013).

**Narrative synthesis**

A meta-analysis is not appropriate for this review as no one intervention or outcome is being evaluated (Pautasso, 2013). The heterogeneity of method, population and outcome measures is more suited to a systematic narrative synthesis (Ryan, 2013). A thematic analysis based on a theory model and the exploration of themes is provided to better understand the antecedents, phenomena and consequences of patient safety culture (Ryan, 2013). The synthesis of literature brings together key findings identified from all methods employed.
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Section B

3.2 Bibliometric analysis

The purpose of this section is to provide bibliometric cartography of the literature identified in Steps 1 and 2 of this review. It provides a visual representation of the research found and presents this through a series of graphs.

3.2.1 Bibliometric analysis of the literature reviews

While 19 papers were identified as being some type of review of literature around patient safety culture, the quality and specificity of these was variable. Several of the papers included in the initial analysis lacked a clear explanation of methodology, search terms and numbers of papers considered. Nine of the reviews were systematic, five were self-described as narrative, three were titled “literature review”, two were thematic analyses, two were meta-analyses and one had no stated methodology. Some papers used a combination of terminology and approaches such as “narrative systematic”, “systematic thematic”, and “literature review and meta-analysis”. The scientific merit and reproducibility of a number of the reviews is questionable and the findings are opinion based. One of the meta-analyses was qualitative and identified themes whereas the second utilized quantitative methods and declared insufficient power to come to any conclusions. Figure 3.5 summarises the types of literature review methods as described by the articles considered. The terminology is inconsistent in several of these.
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Figure 3.5 Review method used in 19 literature reviews

All 19 reviews were published in English, however, one paper also searched Chinese journals (Xuanyue et al., 2013) and one included Spanish journals (Pumar-Mendez, Attree, & Wakefield, 2014). Three of the papers confined their search to nursing (Dicuccio, 2014; Ring & Moody Fairchild, 2013; Stavrianopoulos, 2012), while one was restricted to radiation oncology and nursing (Patel & Mitera, 2011). The remaining papers considered all members of the health team.

Figure 3.6 displays the year of publication, demonstrating that the number of reviews has increased incrementally in the last four years. What the search revealed is the growing literature base in relation to patient safety culture and patient outcomes. The two papers in 2003 were by the same authors and very similar in content.
The breadth and depth of these reviews is considerable with many thousands of publications screened and approximately 762 closely reviewed. This is approximate and indicative as in some instances a paper may have been reviewed more than once by different authors. Where authors had a stated number of papers included in their final analysis, these have been portrayed below. As illustrated in Figure 3.7 below, the volume of literature in the patient safety arena has grown and is evidence of the momentum of interest in the topic.
The findings of these reviews are summarised in Appendix B1, and will be analysed in the narrative synthesis of this chapter. The next segment considers the papers identified in Step 2.

3.2.2 Bibliometric analysis of systematic search 2011 - 2014

Given the enormous volume of literature on the topic of patient safety culture, a summation of the 266 papers identified in the systematic search (2011 – 2014) is presented here (see Figure 3.8) so as to set the backdrop. This process was used to further refine and articulate the research questions. Abstracts of all 266 papers were screened identifying an additional four reviews. Where insufficient information was present in the abstract, the full text was evaluated. Using the evidence hierarchy (Hoffmann et al., 2013) an initial screen of 262 papers found 118 papers as potentially using quantitative methodology. This was amended to 109 with three duplicates, two commentary and four papers deemed out of scope with a focus on work place safety. In
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terms of qualitative papers, only those with a defined qualitative research methodology were included in the final review. Due to the variability of application of qualitative method, these ten papers have been summarised separately in section 3.2.4 of this chapter.

*Figure 3.8 Publication categories 2011 - 2014*

3.2.3 Description of the quantitative papers

Of the 109 quantitative papers 86 (78%) had a primary focus on the validation or application of questionnaires measuring patient safety climate or culture. This is consistent with the results of Xuanyue et al. (2013) who found 67.8% of their sample of papers had a main focus on measuring patient safety climate. The Hospital Survey of Patient Safety (HSOPS) was most commonly used (52) followed by the Safety Attitudes Questionnaire (SAQ) (15). The 20 remaining tools reported included the Safety Organising Scale (SOS) and various iterations of the HSOPS and SAQ adapted to measure patient safety culture in sub groups by patient category such as geriatrics (Steyrer, Latzke, Pils, Vetter, & Strunk, 2011) or professional affiliation such as
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surgical trainees (Bethune, Canter, & Abrams, 2012) and pharmacists (Herner, Rawlings, Swartzendruber, & Delate, 2014). A large number of papers reported language and cultural adaptations and were specific to a country of origin such as Canada (Ginsburg, Tregunno, Norton, Mitchell, & Howley, 2014), Switzerland (D. Ausserhofer et al., 2012), China (Gu & Itoh, 2011; Smith, Zhao, Wang, & Ho, 2013) and Finland (Reiman, Silla, & Pietikainen, 2013). One paper compared the SAQ and the HSPOS in the United States (Etchegaray & Thomas, 2012).

Figure 3.9 Thematic analysis of quantitative papers (n= 109)

![Thematic analysis of quantitative papers](image)

The full texts of the remaining papers were retrieved and individually reviewed so as to inform this thesis. As per the categorisation in Figure 3.9 above, papers have been summarised and are presented in a series of tables in Appendix B. The narrative analysis in Section C of this Chapter will explore these papers in more depth.
3.2.4 Description of the papers with qualitative methodology

Ten qualitative papers remained after excluding duplicates, commentaries and case study reports (refer to Appendix B2). To appraise these papers, a hierarchy of evidence for assessing qualitative health research was used (Daly et al., 2007). This approach describes four levels of a qualitative hierarchy of evidence for practice in health environments. Generalizable studies are considered level I; level II are studies based on a conceptual framework; level III are descriptive studies, and the lowest level IV are single case studies (Daly et al., 2007). Using these definitions the remaining ten papers were classified as shown in Figure 3.10.

*Figure 3.10 Classification of qualitative papers*

The critical appraisal skills program (CASP) tool (Hannes, Lockwood, & Pearson, 2010) was used to assess the quality of these studies. The findings have been integrated into the final synthesis of the literature and summarised in Appendix B2. This section provided a descriptive summary of the literature identified, publication patterns and area of research concentration. The next section provides a narrative synthesis of research found from both step 1 and step 2 and blends together a story from the literature reviewed.
3.3 Narrative Synthesis

What has been shown in the prior sections is the enormous amount of literature on the topic of patient safety culture. The set of organising “drawers” used to sort the literature comprised of antecedents of patient safety culture, patient safety culture, and outcomes of patient safety culture demonstrated in Figure 3.4. This structure is also used to present the discussion of the articles found. The following is a narrative synthesis (Ryan, 2013) of what is known and what is unknown on the topic of antecedents, dimensions and consequences of patient safety culture. This synthesis explores the findings from both the review of literature reviews (19 papers) and the systematic search of papers from 2011 - 2014 (119 papers) and has the primary objective of describing, analysing and synthesising the large body of research on patient safety culture (Pope, Mays, & Popay, 2007).

The guidelines for data synthesis and analysis have been used to develop this section (Ryan, 2013). These guidelines suggest four major steps for the narrative synthesis in literature reviews. These are develop a theory, conduct a preliminary synthesis of findings, explore relationships within and between studies and assess the robustness of the amount and quality of the evidence (Ryan, 2013). Hence supplementary references on patient safety theories have been used to provide background. This includes both seminal and noteworthy publications. Due to the broad heterogeneity of the methods used in patient safety culture research, and as recommended by Ryan (2013), results are presented in text and in a series of tables available in Appendix B.
3.3.1 Theories of patient safety culture

In order to provide a background for this literature a summation of patient safety definitions and theoretical models is provided. This includes both seminal and recent noteworthy publications. Definitions and models of patient safety have emerged over the last two decades and are discussed in chronological order so as to better understand the thematic emergence of the field.

The “Swiss Cheese Model” (Reason, 1997) proposed a systems approach, with slices of defences, barriers and safeguards to protect the individual from hazards. This is a very visual model, with graphics featuring slices of Swiss cheese and holes where errors occur. Strategies such as improved hand hygiene and the sterilising of surgical equipment are both good examples of systems designed to prevent harm to patients. This model remains the basis for many contemporary patient safety approaches such as human error theory, root cause analysis, six sigma and lean methodology (Stefl, 2001; Varkey, Reller, & Resar, 2007).

Human error theory (Stefl, 2001) came to prominence following the publication of the seminal work “To err is human: building a safer health system” that was published by the American Institute of Medicine in 1999. Developing a “safety culture” is referred to as enabling a blame free environment where mistakes are constantly monitored, discussed and improved on and is the product of underlying human behaviours. What is less known is which elements are important to target.

A multi-layered approach to patient safety culture is proposed by Reiman, Pietikäinen, and Oedewald (2010). This model includes the organisational dimension, psychological factors and social processes. Reiman et al. (2010) consider that management commitment is a central component of patient safety culture. A structuration theory of
safety culture was developed by Groves, Meisenbach, and Scott-Cawiezell (2011) who acknowledged that safety culture is not simple and identified a lack of theoretical frameworks to guide practice.

Chen, Ng, and Li (2012), for instance, proposed a multi-level model of patient safety culture and found that a perception of patient safety culture was positively associated with patient safety behaviour. Poor patient safety culture leads to a decreased compliance with safety behaviour which subsequently leads to an effect on patient outcomes (Chen et al., 2012). Using multilevel analysis, Chen et al. (2012) further showed that innovative workplace cultures had a positive influence on patient safety behaviours; whereas bureaucratic cultures had a negative effect, including in relation to compliance and participation. They make an interesting observation regarding workplace harmony and how maintaining this in some ethnic cultures (in this study Chinese) is paramount such that reporting a co-worker for non-compliance with safety practice is discouraged. Bureaucratic structures prohibit reporting of patient safety incidents for fear of disciplinary action. Chen et al. (2012) conclude that the creation of innovative and creative working environments facilitate learning from mistakes, increase voluntary reporting of incidents and view patient safety as a priority.

Singer and Vogus (2013) proposed a three-tiered model of safety culture that comprises enabling, enacting and elaborating processes. They suggest that reducing hospital errors requires a multifactorial approach that addresses a number of key activities. This model describes “enabling” activities as policies and practices that motivate the pursuit of safety. These include external actions such as accreditation and internal actions such as leadership and human resource (HR) processes. Enacting refers to frontline actions such as team work, incident reporting and handover. The third component of the Singer and Vogus (2013) model is “elaborating” which in essence includes learning, monitoring
and improvement activities used to reinforce safe clinical practice. Patient involvement receives a cursory mention as a way of enacting a safety culture. What is absent from this model (Singer & Vogus, 2013) is engagement which conceptually cuts horizontally across the three tiers. This model can be interpreted as a maturing of the “Swiss Cheese” model (Reason, 1997) which adds a linear representation of error.

A very recent iteration of patient safety has been published by Hollnagel (2014) called “Safety 1 and Safety 2”. Safety 1 is a model of risk management that tries to ensure that as few things as possible go wrong. It is reactive and sees accidents as the result of malfunctions. In Safety 1, humans are seen as a weak link. Safety 2 is proactive and suggests that we need to focus on what goes right (Dekker, 2014). This is akin to positive organisational behaviour in the business literature (Luthans, 2002). All of these models acknowledge the complexity of patient safety and recognise the limits of current empirical knowledge. We will now explore findings from the more comprehensive literature review. The next section will discuss the phenomenon of patient safety culture itself.

3.3.2 The phenomenon of patient safety culture

No literature reviews were identified that dealt specifically with the phenomena of patient safety culture. The phenomenon of patient safety culture has been defined in many different ways, however in dealing with the volume of literature on patient safety culture, two main sub-themes emerged. One comprised of a cluster of papers with a focus on measurement of patient safety culture, the other was papers reporting on interventions aimed at improving patient safety culture. The next cluster of papers will focus on measurement. Scrutiny of the literature shows a predominant interest in reporting case studies where surveys of patient safety culture assessment had been conducted, or reports of programs implemented to improve patient safety culture. This
is understandable as patient safety culture had been approached from a quality improvement framework such as that espoused by proponents of the quality cycle or Deming cycle (Varkey et al., 2007). The act of assessment (mostly by survey tools) has become a means of defining the phenomena, and in many cases used as an end-point (Singer & Vogus, 2013). That is by conducting surveys, organisations are seen to be doing something to address the issue of patient safety culture (Morello et al., 2013). Because of the emphasis of measurement of patient safety culture in the literature, a more thorough analysis of measurement is warranted.

**Measurement of patient safety culture**

The theme of measurement of patient safety culture consists of reports developing and validating survey tools; and case studies reporting the findings of the application of these tools. Three literature reviews are relevant to this section (Flin, Burns, Mearns, Yule, & Robertson, 2006; Pumar-Mendez et al., 2014; Scott, Mannion, Davies, & Marshall, 2003)

Scott, Mannion, Davies, et al. (2003) reviewed quantitative instruments to measure culture and cultural change and found that all of the tools examine employee perceptions and opinions about the work environment. Flin et al. (2006) published a systematic literature review studying the sample and questionnaire design, construct validity and level of analysis of psychometric tools designed to measure safety climate. Flin et al. (2006) examined twelve studies and found a lack of explicit theoretical basis for some questionnaires, and in some examples no reference to standard psychometric criteria. Flin et al (2006) point out that very few of the reviewed studies considered the mediation mechanism between safety climate and safety outcomes. The main contribution of this review by Flin et al (2006) is the discussion surrounding
amalgamation of questionnaire results at an organisational level and the need to analyse climate at an individual work unit level.

There are three areas of methodology that are important to safety culture research. These are categorized as research approaches, survey tools and level of aggregation (Pumar-Mendez et al., 2014). Consistent with findings of others (Flin et al., 2006; Scott, Mannion, Davies, et al., 2003) the HSOPSC is recommended as being one of two tools identified as being proven to be psychometrically sound. The second tool identified by Pumar-Mendez et al. (2014) and confirmed as standardized is the Safety Organising Scale (SOS) developed by (Vogus & Sutcliffe, 2007).

A search of the patient safety culture literature identified a focus on the development and validation of survey tools by many authors (Colla, Bracken, Kinney, & Weeks, 2005; Currie & Watterson, 2010; Etchegaray & Thomas, 2012; Kenaszchuk, Reeves, Nicholas, & Zwarenstein, 2010; Profit et al., 2012; Scott, Mannion, Davies, et al., 2003; Sexton et al., 2006; Vogus & Sutcliffe, 2007). Of the 109 quantitative papers screened as a part of the systematic review, 86 (78%) had a focus on the use of surveys. Due to the large number these were not further categorised or tabled. This was however useful information in informing the methodology to be selected for the current research.

The three most commonly cited tools are the Hospital Survey on Patient Safety Culture (HSOPSC), the Safety Attitudes Questionnaire (SAQ) and the Safety Organising Scale (SOS) (Scott, Mannion, Davies, et al., 2003). These findings are consistent with those of Xuanyue et al. (2013) who conducted a bibliometric analysis of the patient safety literature and found that 67.7% of 193 studies focused on the assessment of patient safety culture by questionnaire. The most frequently used tool was the Hospital Survey on Patient Safety Culture (HSOPSC) by the Agency of Health Care Research and
Quality (AHRQ) in the USA (Nieva & Sorra, 2003). The proliferation of papers using the HSOPSC tool is explained in that participation in surveys of patient safety culture is a patient safety indicator linked with payment schemes for health services in the USA (Nieva & Sorra, 2003).

Synthesis of the literature focusing on assessment of patient safety culture identified a common theme of a lack of agreement on what dimensions are core to patient safety culture. This has resulted in disparate measures which are difficult to compare and a dilution of the knowledge base on patient safety culture variability (Flin et al., 2006; Pumar-Mendez et al., 2014; Scott, Mannion, Davies, et al., 2003). Measuring patient safety culture provides a baseline for quality improvement activities within organisations. The next group of papers present studies of interventions with the goal to improve patient safety culture.

*Interventions aimed at improving patient safety culture*

Quality improvement cycles in health routinely have an assessment stage (plan) followed by an implementation or intervention strategy (do) as defined in the original Deming cycle (Varkey et al., 2007). A variety of interventions, such as team training, education and simulation have been trialled in attempts to influence patient safety culture, and subsequent patient outcomes. Intervention strategies aimed at changing patient safety culture will now be examined. Information gleaned from the systematic screen is presented under the headings of author, method, sample group, interventions and findings found in Appendix B4. In addition to this, three literature reviews (Morello et al., 2013; Parmelli et al., 2011; Weaver et al., 2013) had also considered the effect of interventions to improve patient safety culture. The following narrative references both sources of information.
Parmelli et al. (2011) report a very robust review methodology yielding 4,239 records that considered objective measures of professional performance and patient outcome. Parmelli et al. (2011) reviewed randomized control trials, controlled clinical trials, controlled before and after studies and interrupted time series set in any type of health care organisation. Outcomes were divided as those of professional performance (prescription rates, evidence based care) and patient outcomes such as mortality, condition specific measures of outcome, quality of life, functional status and patient satisfaction. Following full text assessment Parmelli et al. (2011) identified a mere two controlled before and after studies and concluded an absence of evidence that identifies effective and generalizable strategies to change organisational culture. Their focus was broad using the definition of organisational culture as proposed by Schein (1990). While both studies identified by Parmelli et al. (2011) reported positive effects on broad organisational culture, a number of methodological weaknesses were identified. Both studies used controlled before and after designs and delivered complex interventions aimed at improving handwashing and employee spirit at work. Parmelli et al. (2011) concludes by cautioning healthcare organisations from implementing interventions aimed at changing culture due to a lack of evidence based effective generalized strategies. They recommend the use of robust research design to strengthen the evidence regarding the effectiveness of strategies to change organisation culture and health care performance.

The same conclusion and recommendation was reached by Morello et al. (2013). With a narrower scope they conducted a systematic review of studies that measured the effectiveness of patient safety culture strategies using quantitative measures. Morello et al. (2013) screened over 2,000 papers published in the period January 1996 to April 2011, with 21 studies meeting the inclusion criteria. The summary of findings presented
by Morello et al. (2013) provides valuable information regarding the types of strategies being tried. These intervention strategies were: leadership walk rounds; structured education programs; team based strategies; simulation based training programs; multifaceted unit based programs; multicomponent organisational initiatives and other patient safety culture strategies such as surgical safety checklists. Only leadership walk rounds and multi-faceted unit based strategies were shown to have some effect for improving patient safety culture and patient outcomes. For example Huang et al. (2010), (cited by (Dicuccio, 2014; Morello et al., 2013) found that for every 10% decrease in perception of management, the odds ratio for mortality was 1.24 (p < .0001). Furthermore for every 10% decrease of positive scores for safety climate, length of stay increased 15% in the ICU units in their study.

The effect of walk rounds was restricted to nursing staff and time limited to three months. Morello et al. (2013) found a variety of strategies being implemented without any clear evidence of effectiveness, and warn organisations against implementing costly and resource intensive interventions in the absence of robust evaluation approaches.

A different perspective was used by Weaver et al. (2013) who considered the promotion of a culture of safety as a patient safety strategy. This systematic review (Weaver et al., 2013) included 12 years of publications from 2000 – 2012 and selected studies that targeted health care workers in acute settings and included data about change in patient safety culture before and after program implementation. The findings of Weaver et al. (2013) are consistent with those of Morello et al. (2013) and suggest that the best evidence to date (at the time of print) included multi-faceted programs to support team communication and executive engagement with front line staff by safety walk rounds. Weaver et al. (2013) also refer to a need to underpin research with sound theoretical models of patient safety culture and a focus on rigorous evaluation. Laugaland, Aase,
and Barach (2012) undertook a systematic review to identify interventions designed to improve patient safety during transitional care of the elderly. Interventions often focus on single groups such as nurses or doctors, and the recommendation that future initiatives should be multi component and multi-disciplinary is transferable to the acute hospital setting.

In addition to the above reviews, 17 empirical papers were identified in the window from 2011 – 2014 that considered interventions aimed at improving patient safety culture. These are presented in Appendix B4. Applying the levels of evidence for health care interventions (Hoffmann et al., 2013), only one randomised control trial was uncovered (Haugen et al., 2013). Of the remaining publications, fifteen reported a pre post quasi experiment and one was a retrospective study (Schwendimann et al., 2013). The predominant interventions used were team training, education and quality improvement. The majority of interventions had little detail on either the research method or implementation process which inhibits replication. The exception was the study by Haugen et al. (2013) who found a significant increase in patient safety culture scores between the intervention group (implementation of a surgical safety checklist) and control group (no surgical safety checklist group) within a Norwegian operating theatre. Specifically, Haugen et al. (2013) found a significant decrease in the reporting of adverse events and improved perceptions of teamwork in the intervention group however acknowledge that a shift in patient safety culture might require a longer gestation period.

In sifting through these papers, several things become apparent. Firstly there has been an enormous investment in team training and interdisciplinary approaches in the absence of an evidential link to patient safety culture. Secondly, there remain large challenges in trying to demonstrate a change in patient safety culture, and more
importantly there is a lack of longitudinal studies that monitor how change is sustained. This leads to the question, does patient safety culture change over time, and if so what stimuli triggers this change?

Those interventions that show promise include leadership rounds (Schwendimann et al., 2013), the use of surgical safety checklists (Haugen et al., 2013) and multifaceted strategies such as education and team training (Abstoss et al., 2011; K. J. Jones, Skinner, High, & Palmon, 2013; Mahoney, Ellis, Garland, Palyo, & Greene, 2012; Thomas & Galla, 2013). The role of inter-professional training and collaboration in improving patient safety has emerged as an area of interest in recent years (Manojlovich et al., 2014; Nagelkerk et al., 2014; Wallin et al., 2014). Collaboration and respect for team members are significant predictors of patient safety culture. Conversely, team conflict is an independent and significant inverse predictor of patient safety culture (Manojlovich et al., 2014). Having considered interventions aimed at improving patient safety culture, the next section turns to research studies centring on the antecedents of patient safety culture.

3.3.3 Antecedents of patient safety culture

The theoretical model (see Figure 3.4) illustrates numerous papers that considered what can be classified as the antecedents of patient safety culture. These antecedents included a range of organisational, environmental and circumstantial factors that influence patient safety culture. This section will consider antecedents in more detail so as to gain a deeper understanding of factors leading to aspects of patient safety culture.

Eight literature reviews had a focus on the precursors of patient safety culture. Antecedents of patient safety culture have been considered from an organisational level looking at the value-adding nature of hospital characteristics (Brand et al., 2012), board
oversight (Millar, Mannion, Freeman, & Davies, 2013) and manager engagement (Parand, Dopson, Renz, & Vincent, 2014) for patient safety culture. Staffing levels have been discussed by Patel and Mitera (2011) and sub culture elements rigorously examined by several authors (Goh, Chan, & Kuziemsky, 2013; Ring & Moody Fairchild, 2013; Sammer, Lykens, Singh, Mains, & Lackan, 2010; Stavrianopoulos, 2012).

The association between hospital characteristics and improved health care performance was investigated in a review by Brand et al. (2012). They divide hospital characteristics into factors of environment, structure, sub-culture and workforce and identified five domains of performance outcomes. These outcomes were broad and included patient healthcare; financial aspects; human resources; process of patient care; and multidimensional outcomes such as high quality and low cost. In relation to patient safety outcomes the feature with the highest positive association to patient outcomes was use of computerized physician order systems.

Hospital board oversight of quality and patient safety was the focus of a narrative review of empirical research conducted by Millar et al. (2013). Publications from 1991–2010 were considered with 122 papers included following screening, with a particular interest in exploring any evidence for improved performance and patient outcomes such as morbidity and mortality in relation to governing board factors. Using narrative synthesis, Miller et al. (2013) identified four story lines. These were “leading for safer care”; “measuring safe care”; “board oversight” and “external regulation”. Millar et al. (2013) discuss a number of key characteristics of boards associated with higher performing hospitals. Leadership is deliberated in the context of the board, with the key message that a strong and committed CEO and board are essential to the success of quality and safety programs. Empirical evidence suggests that boards that place a high priority on quality and safety are associated with higher performance. Boards that use
metrics to track performance are more likely to have better quality outcomes, as are those who have patient safety as an agenda item for discussion at board meetings. A weakness identified by this review was the lack of robust quantitative evidence, leading the authors to conclude that additional research and theoretical development is required. A similar finding was reached by Parand et al. (2014) who conducted a systematic review concentrating on the role of hospital managers in quality and patient safety. This review examined papers between 1983 and 2012.

Staffing models within radiotherapy and the relationship to quality and safety culture was the focus of a systematic scoping review by (Parand et al., 2014); Patel and Mitera (2011). Using the term Total Quality Culture (TQC) their purpose was to explore how outcomes may be used to plan workforce in contrast to traditional staff planning that use a ratio of staff per linear accelerator. In concluding they state: “there is a dearth of empirical studies, further weakened by a lack of objective outcome measure and little examination of actual actions undertaken” (Parand et al., 2014: p1).

Patel and Mitera (2011) identified nine studies in their review that discussed TQC in relation to organisational structure and found that a hierarchical structure (as present in most public hospitals) does not support total quality culture. A TQC improves patient safety as this approach employs continuous quality improvement in all facets of patient care. Patel and Mitera (2011) conclude that staffing models for radiation therapy are designed around machine workload and not patient focused or factored to enhance patient safety of staff satisfaction.

Consistent themes emerging are those of leadership and organisational structure and the role these constructs have on the phenomena of patient safety culture. Sammer et al. (2010) add much to the knowledge base by asking the question “what is patient safety
culture”, and through means of a qualitative meta-analysis generate a conceptual model and framework for safety culture. Seven themes are identified in the typology of the safety culture literature. These are leadership; teamwork; evidence based; communication; learning; just and patient centred. Including literature published from 1999 – 2007 and following robust inclusion and exclusion criteria, Sammer et al. (2010) reviewed over 200 journal articles. They further refined their focus to consider only US publications.

Sammer et al. (2010) conclude that patient safety culture must begin at the highest level of governance and leadership is a key element to designing, fostering and nurturing a culture of safety. While strong leadership is proposed as a key construct, there are no consistent strategies as to how leadership capacity can be grown to support a patient safety culture. Teamwork is identified by Sammer et al. (2010) as critical. This construct included literature that focused on horizontal team based communication as well as vertical communication and feedback loops between front line staff and management. The role of learning and the concept of learning organisations were identified by Sammer et al. (2010) as a further sub culture. The authors incorporate literature considering learning and education, data driven hospitals, and root cause analysis as techniques for inculcating a culture of learning. Sammer et al. (2010) highlighted the importance of patient-centred health care in nurturing a positive safety culture and make a strong link between patient centred culture and the vision of senior management. While adding much to the understanding of patient safety culture, Sammer et al. (2010) conclude stating that safety culture is a complex phenomenon which is not easily understood by hospital leaders, hence difficult to operationalize.

Goh et al. (2013) reviewed relevant literature on patient safety culture, organisational learning, teamwork and collaboration to develop a conceptual model to link these
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concepts. While the search methodology is not clear, they make a strong inference that organisational culture is important in health care, however identified an absence of empirical work. The conceptual framework proposed by Goh et al. (2013) suggests that organisational learning and teamwork and collaboration would directly affect patient safety culture. They found strong links in the literature between organisational learning and safety culture, which is preceded by teamwork and collaborative work environments. This leads to increased knowledge sharing, and a safe environment for reporting adverse events. While suggesting that such a patient safety culture will impact on employee outcomes such as job satisfaction and patient safety outcomes, Goh et al. (2013) were unable to find evidence of this effect.

Leadership and just culture feature much in nursing specific reviews (Ring & Moody Fairchild, 2013; Stavrianopoulos, 2012). However many of these are conceptually based and lack a robust methodology. A major observation is the preponderance of single discipline studies. This is at odds with the multidisciplinary nature of health care and the importance of inter-professional collaboration in achieving positive patient outcomes.

Step 2 of the review process showed that teamwork, leadership and communication attracted particular attention (Auer, Schwendimann, Koch, De Geest, & Ausserhofer, 2014; F. Jones, Podila, & Powers, 2013; Richter, McAlearney, & Pennell, 2014). A positive association between teamwork and patient safety was found by Li (2013); while others (F. Jones et al., 2013) have found that training on teamwork improves staff perceptions of patient safety culture. Perceived teamwork is a significant predictor of successful hand offs (Richter et al., 2014); and leadership openness supports error disclosure (Etchegaray, Gallagher, Bell, Dunlap, & Thomas, 2012; Zaheer, Ginsburg, Chuang, & Grace, 2013) and open reporting of clinical errors (Zaheer et al., 2013).
Additionally, higher hospital management support is related to increased perceptions of patient safety culture (Auer et al., 2014). Relationships between teams, supervisors and staff seem to have an influence on patient safety culture (Richter et al., 2014; Thompson et al., 2011; Zaheer et al., 2013). Summarising existing research on the antecedents of patient safety culture, studies mainly consider the roles and influence of the governance board, managers, supervisors, and teams (see also Appendix B3) on patient safety culture. Researchers that examined these various antecedents are in agreement that more empirical evidence on the organisational and managerial antecedents of patient safety culture is required. There remains much to be explored in specifying which antecedents are sensitive to change and how improvement of patient safety culture can be sustained over time. More importantly, what role does the supervisor play in supporting staff to work together harmoniously, engaging staff and delivering safe patient care?

The literature presents three high quality Level 1 (Daly et al., 2007) qualitative studies which add to the understanding of the complex phenomena of patient safety culture. Using a well described method of ethnography, Gillespie, Gwinner, Chaboyer, and Fairweather (2013) identified three themes in team work communications in surgery that create a patient safety culture. These themes were: “building shared understandings through open communication”; “managing contextual stressors in a hierarchical environment” and “intermittent membership influences team performance” (Gillespie et al., 2013). Hesselink et al. (2013) used a grounded theory method to explore aspects of organisational culture on safe patient discharge. Three themes emerged: “a fragmented hospital to primary care interface”; “undervaluing of administrative tasks to clinical tasks”; and “a lack of reflection or process improvement on the discharge process” (meaning handovers) (Hesselink et al., 2013). Using focus group methodology, Montgomery, Todorova, Baban, and Panagopoulou (2013) included doctors, nurses and
patients to enhance the understanding of the hospital safety culture, burnout and quality of care. Including patients in their focus groups provided some unique insights. Montgomery et al. (2013) conclude that improving quality of care requires a better understanding of the patients’ needs and literacy level. Understanding health workers motivations is not sufficed as health practitioners and patients view quality of care differently (Montgomery et al., 2013). The qualitative work frequently mentions the use of reflection as a means of improving clinical practice. This is interesting as reflection is a consistent skill taught in health professional curriculum (Ambrose & Ker, 2014), however, appears to be under researched in relation to patient safety culture. What these papers have in common, is a focus on developing workforce capacity.

In synthesising the qualitative literature, the importance of hierarchical and professional sub culture becomes evident. In summary, managers have different views of patient safety culture to clinicians (Garza Lozano, 2013; Grant, 2011); managers have a critical role in changing safety behaviours (Cunningham & Geller, 2012) and managers and clinicians have competing priorities that impede on learning from safety errors (Jeffs, Smith, McKernan, Hayes, & Ferris, 2013). Subcultures exist in health, and these act as a barrier to effective team communication (Grant, 2011; Ovseiko & Buchan, 2012; Sirriyeh, Lawton, Armitage, Gardner, & Ferguson, 2012). These findings have been based on point in time and case study methods. There is a gap in quantitative longitudinal studies that compare differences between clinical and non-clinical staff perceptions of patient safety over a longer period of time. The next grouping of research will explore the outcomes of patient safety culture.

### 3.3.4 Patient outcomes as a consequence of patient safety culture

The large interest in patient safety culture stems from the undeniable fact that one in ten patients is harmed during their hospital stay (Australian Commission on Safety and
Quality in Health Care, 2014; de Vries et al., 2008). Adverse clinical events are frequently attributed to failing patient safety culture. Considering the tide of publications on the topic of patient safety culture, the limited research on links between patient safety culture and patient outcomes is surprising. Of the 19 literature reviews closely examined three were identified exploring the relationship of organisational culture and patient outcomes (Dicuccio, 2014; Groves, 2014; Scott, Mannion, Marshall, & Davies, 2003). In addition to these, the systematic review found 12 publications as summarised in Appendix B5. Information from both sources will now be explored, showing a narrow suite of conclusive findings.

A comprehensive review of the literature on organisational safety culture and health care performance was conducted by Scott, Mannion, Marshall, et al. (2003). Firstly, the authors acknowledge the work done by Edgar H. Schein (1985) and his definition of levels of organisational culture as artefacts, beliefs and values and assumptions. Secondly, Scott, Mannion, Marshall, et al. (2003) pay homage to the corporate literature, and the assumption that cultural characteristics relate to excellence and high performance. Thirdly, causal relationships are explored in that performance may determine cultural traits rather than the reverse. The comment that “any examination of culture and performance should broaden its scope to looking beyond positive predicted effects and encompassing an examination of unintended and dysfunctional outcomes” (Scott, Mannion, Marshall, et al., 2003) (p107) is of interest as this publication preceded the era of widespread use of root cause analysis in health.

Scott, Mannion, Marshall, et al. (2003) reflect on the conventional view of an organisation’s culture as being a closed system which does not recognize the role of the patient. In summary Scott, Mannion, Marshall, et al. (2003) p115 conclude that while
there is some evidence to suggest a link between patient safety culture and performance in health, articulating the nature of the relationship is challenging.

Nurse sensitive indicators are a suite of care measures that are used to measure the quality and safety of patient care (Dicuccio, 2014; Groves, 2014). Due to the unavailability of suitable studies Groves (2014) conducted five narrow meta-analyses between patient safety culture and nurse sensitive indicators, pressure ulcers, falls, medication errors and post-operative outcomes. Groves (2014) found no significant relationships between outcomes on nurse sensitive indicators and patient safety culture, and identified an underdeveloped body of literature. Groves (2014) suggests that meta-analytic methods were more useful for generating a research agenda than drawing conclusions regarding patient safety culture and patient outcomes. This author also comments on the limited theory explaining how the two may be related and a possible indirect, nonlinear effect with unknown mediators. The reliance on outcome measurements based on reporting of adverse events is also suggested as a limitation of current methodological approaches.

Using a more complex research question, Dicuccio (2014) had the objective of determining if nurse sensitive patient outcomes correlated to safety culture. In addition, Dicuccio (2014) considered the tools used to measure safety culture in the studies identified. The conclusion made by Dicuccio (2014) echo their predecessors – a lack of evidence linking patient safety culture to patient outcomes, absence of robust interventional studies, a high level of enthusiasm for measuring patient safety culture by means of staff reported questionnaires and a reliance on the reporting of adverse outcomes to indicate patient outcomes.
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The following section presents findings from the empirical papers published between 2011 and 2014. From a patient perspective, the link between patient safety culture and patients assessment of care has been explored (Sorra, Khanna, Dyer, Mardon, & Famolaro, 2012). For instance, positive patient assessments of care are more likely in hospitals where staff have positive perceptions of patient safety culture (Sorra et al., 2012). These results, however, were not statistically significant. In the intensive care unit, family satisfaction with care and the relationship with safety culture have been explored. Here, finding reveal that the effect of culture on care delivery is more detectable in family members of the most seriously ill patients, and non survivors who spent at least 14 days in ICU (Dodek et al., 2012). In this study, the domain of teamwork was associated positively with family satisfaction of care p <.01. Intuitively this means that families who spend more time in the ICU environment are more likely able to comment on teamwork. This is the only paper identified throughout my literature review that touches on the positive impact of patient safety culture from the family’s perspective of care.

The outcome areas where patient safety culture has had some influence includes medication errors (Abstoss et al., 2011), blood stream infections (Vigorito, McNicoll, Adams, & Sexton, 2011), and the bundle of “nurse sensitive” indicators (Dietmar Ausserhofer et al., 2013; Taylor et al., 2012; Wang et al., 2014). The extensive list of specific clinical indicators provides a challenge to researchers in knowing which indicator to target. Evidence suggests that some indicators such as medication safety and infection rates, are more easily addressed through process improvements and broader system change (Singer & Vogus, 2013). A multi-pronged approach that aims to reduce clinical errors from a multi outcome perspective is warranted (Singer & Vogus, 2013). In conclusion, research in the area of patient safety and patient outcomes is
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complicated and complex. Appendix B5 summarises findings from the more recent (2011 – 2014) literature identified.

Ultimately, improving patient outcomes is the goal of all endeavours in the patient safety arena. Efforts to demonstrate this improvement have resulted in a dictionary of performance indicators developed to measure performance. Appendix B6 presents a collated summary of patient outcomes, patient population and references. This table was constructed in the development of the review of the literature and shows the complex nature of quantifying patient outcomes. What can be seen in Appendix B6 is that of all the outcomes listed, most focus on negative events such as morbidity and mortality; one (hand hygiene) is a process indicator; and three are based on satisfaction measures. There is an imbalance on measuring the bad (maleficence) versus the good (beneficence). There are very few publications that consider the patient experience.

3.4 Addendum

The initial literature search was conducted and written over the period 2013 – 2015. As with any search, the challenge is in remaining contemporaneous. Ongoing monitoring of the literature (using the same search strategy as in Step 2) shows a continued focus on the reporting of organisational wide patient safety culture surveys. This addendum adds knowledge to that already presented so as to reduce duplication. Recent emphasis in research studies is on leadership traits (Kristensen et al., 2016; McFadden, Stock, & Gowen, 2015), communication and handover (Lee, Phan, Dorman, Weaver, & Pronovost, 2016; O’Leary, Johnson, & Auerbach, 2016). The association between patient safety culture and employee engagement has been suggested as an area that warrants additional research (Daugherty, Paine, Murakami, & Herzke, 2016). Using secondary data analysis Daugherty et al. (2016) found moderate to strong correlations
between employee engagement and patient safety culture and recommend continued exploration of human resource interventions.

One new area of enquiry in relation to patient safety culture is the impact of the electronic health record (Ford, Silvera, Kazley, Diana, & Huerta, 2016). Ford et al. (2016) tried to quantify the effect of information technologies on patient safety culture but were unable to find any significant association. The authors (Ford et al., 2016) found some evidence that the early adoption of an electronic health record is negatively associated to the number of patient safety reports. The impact of organisational restructuring on safety culture is another new area of interest as published by Vifladt, Simonsen, Lydersen, and Farup (2016) who found that restructuring was negatively associated with change in patient safety culture within intensive care units. Comparing patient safety culture between restructured and not restructured intensive care nursing teams it was identified that restructuring had a significant negative effect on patient safety culture scores. Teamwork was particularly damaged by restructuring which had a flow on to patient safety culture (Vifladt et al., 2016). This is an interesting, but not unexpected finding as organisational restructure is a common feature of health care organisations.

On a clinical level, Fan et al. (2016) assessed the association between patient safety culture and surgical outcomes, specifically surgical site infections after colon surgery across seven hospitals in the USA. Overall safety culture was significantly associated with lower incidence of surgical site infections. Teamwork across units, organisational learning, feedback and communication about error were the most significant dimensions (Fan et al., 2016). A systematic review of interventions aimed at teamwork, communication and safety climate to improve surgical culture was published by Sacks et al. (2015). This recent review reported promising evidence for strategies to improve
surgical culture such as teamwork, communication and safety checklists. Sacks et al. (2015) were unable to determine which specific types of interventions were most successful in improving culture due to the wide variation of programs being implemented. A lack of longitudinal studies is a major limitation in making recommendations for sustainable culture change (Sacks et al., 2015). The next section will consider research questions emanating from the preceding review of the literature.
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Section D

3.5 Research questions emanating from the literature

The amount of literature available on patient safety culture has snowballed in the last decade such that the variety of possible research questions to be explored is enormous. If we want to improve patient safety culture, then first we need to understand it. Antecedents of patient safety culture include hospital characteristics; governance structures; leadership and team processes. Research considering the subculture elements of leadership and teamwork is predominantly nursing. There is a gap in research that considers the aggregate membership of the health care team. Discussion on the phenomena of patient safety culture is vast and varied, with very few papers focused on describing what it is. Much energy has been directed at looking at ways to measure patient safety culture; and the subsequent adaptation of patient safety scales to different language groups. This has spawned a large number of reports of case studies from organisations reporting their findings of patient safety culture as measured by these scales. This seems at odds with the limitations of information about what leads to patient safety culture and what the consequences are.

There is opportunity to develop studies that include a broader group of the health care team and overcome the limitations of single discipline samples. A challenge in generalising the findings from the existing literature base, is the very specific clinical settings that have been used. That is research focuses on a defined sub group (such as nurses), or select environments (for example the operating theatre). This begs the question, what is the role of inter-professional dynamics on patient safety culture, and how does a supervisor maximise positive relationships within the team? Workforce characteristics such as employee engagement and supervisor support are areas where
quantitative evidence is lacking. Additionally, the preponderance of single discipline studies opens the way to explore the nature of interdisciplinary collaboration and the relationship of this with patient safety culture. While there has been an enormous investment in team training and interdisciplinary approaches, there is an absence of an evidential link to patient safety culture.

Secondly, there remain large challenges in trying to demonstrate a change in patient safety culture, and more importantly there is a lack of longitudinal studies that monitor how change is sustained. Is patient safety culture a culmination of work force characteristics, or is it more than this? This leads to the question, does patient safety culture change over time, and if so what environmental stimuli triggers this change?

The professional interpretations of patient safety culture are fascinating, and the exploration of differences in perceptions of patient safety staff from clinical and non-clinical staff are worthy of further exploration. The heterogeneity of the contemporary health care team warrants further investigation of differences in perceptions of patient safety culture. This is information that will guide managers in deriving the best from a highly skilled and diverse workforce.

Interventional studies show proof of the benefits of leadership rounds, surgical safety checklist and multifaceted strategies such as education and team training in enhancing patient safety culture. Inter-professional collaboration and the importance of team learning and responding to lapses in patient safety is emerging as an area warranting further exploration. Curriculum of health professional training features the regular use of reflection as a means of improving clinical practice. As yet, there has been little published literature on the relationship between patient safety culture and a responsive
and reflexive health professional workforce. The extension of reflection to reflexivity opens up a new line of enquiry in the patient safety domain.

A range of clinical outcomes have been linked to patient safety culture. This includes reductions in medication errors, blood stream infections and a bundle of nurse sensitive indicators such as falls and pressure injuries. There is a notable absence of patient experience reports and limited consideration of the role that the physical environment has in patient safety culture. What is the patient’s experience of culture and the hospital environment, and what can we learn from the patient voice? The scarcity of publications that consider the patient experience presents some interesting questions. For example, what is the patient’s view of the safety culture aspects of clinical care? What are the elements of care that are important to the patient experience, and how can these factors be identified that require improvement? These questions have been clustered as improving workforce relationships, changing the work environment and developing workforce capacity.

The preceding literature review has provided a good understanding of the current status of evidence surrounding the antecedents, phenomena and consequences of patient safety culture. The narrative has also identified gaps in what is known. A number of specific questions emanating from this review will be addressed in the following chapters. While there are an enormous variety of potential research questions to ask, the focus of interest derived from the preceding literature review has been narrowed to some very specific areas as shown in Figure 3.11.
3.6 Conclusion

This concludes a lengthy and comprehensive review of the literature in order to get a good understanding of the literature on patient safety culture. This literature review assisted in identifying key studies that inform the overarching research question of “What effect does patient safety culture have on patient outcomes?” The review has
examined existing research in relation to antecedents, the phenomenon of defining and measuring patient safety culture, and outcome of patient safety culture. Section A described the methodology used including Step 1 which identified 19 literature reviews and Step 2 that extended these reviews by a systematic search of literature from 2011 – 2014. In section B of this chapter, a bibliometric analysis was provided including a suite of graphs summarising findings reported in the literature. A surprising finding was that about 80% of publications on patient safety culture had a focus on measurement of the phenomena. The remaining 20 percent of interest is spread across antecedents, interventions and patient outcomes.

Section C presented an analysis of themes and a synthesis of findings from the reviews, the quantitative and qualitative literatures studied. An addendum summarised more recent findings. Finally research gaps were discussed in section D and a table summarised the research questions and hypotheses to be tested. The following chapters have been written as standalone papers and will incorporate additional review of the literature specific to the topic under discussion and to support the development of theory and hypothesis. The next three chapters further develop our story of patient safety culture.

“There were many roads nearby, but it did not take Dorothy too long to find the one paved with yellow bricks. And while following it, with Toto soberly at her heel, soon she was walking briskly toward the Emerald City, her Silver Shoes glistened in the sun; tinkling merrily on the hard road bed.”

Baum (1966), The Wonderful Wizard of Oz
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Chapter 4 Improving Workplace Relationships

“flamingos and mustard both bite. And the moral of that is-- Birds of a feather flock together.”

Carroll and Tenniel (1976), Alice in Wonderland

Preface

In this chapter data from the first collection point in 2013 is analysed. The constructs of employee engagement, supervisory support and interprofessional collaboration are considered. Health care is characterised by teams and the exploration of the interaction of these constructs adds to the knowledge base. Birds of a feather do flock together, and the importance of interprofessional collaboration is highlighted. A modified version of this paper was presented at the Asia Pacific Combined Congress of the Australian College of Health Service Managers (ACHSM) and the Australian Council of Healthcare Standards (ACHS), Melbourne October 2015. The title of this presentation (and aligned to the conference theme of horse racing) was: “Employee engagement, supervisory support and intergroup collaboration – backing the trifecta for improved patient safety culture”.

A second modification, focussing on teamwork was presented at the International Safety and Quality in Healthcare Conference, Tokyo October 2016. “Tribes or teams? – the relationship between interprofessional collaboration, employee engagement and supervisor support on patient safety culture”. A third iteration, with a focus on interprofessional practice was accepted as a poster at the Asia Pacific Congress ACHSM ACHS in Brisbane, October 2016. “Tribes or teams? lessons for leaders on the importance of interprofessional collaboration in patient safety”.

Finally a modified version of this chapter was published in the peer reviewed Journal of health organisation and management (Brandis, Rice, & Schleimer, 2017).
STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper:


My contribution to the paper involved:


(Signed)  
(Date) 31st July 2017

Stephanie Schleimer: Editing of paper, provision of guidance on paper structure and discussion.

(Countersigned)  
(Date) 31st July 2017


(Countersigned)  
(Date) 31st July 2017

Supervisors: Dr Stephanie Schleimer and Professor John Rice
Chapter 4 Improving Workplace Relationships

Paper 2: “Dynamic workplace interactions for improving patient safety climate”

Abstract

Purpose: Employee engagement (EE), supervisor support (SS) and interprofessional collaboration (IPC) are important contributors to patient safety climate (PSC). We propose and empirically test a model that suggests the presence of a three-way interaction effect between EE, IPC and SS in creating a stronger patient safety climate.

Methods: Using validated tools to measure EE, SS, IPC and PSC data were collected from a questionnaire of 250 clinical and support staff in an Australian health service. Using a statistical package (SPSS) an exploratory factor analysis was conducted. Bivariate correlations between our derived variables were calculated and a hierarchical ordinary least squares analysis used to examine the interaction between our variables.

Findings: This research finds that patient safety climate emerges from synergies between employee engagement (EE), interprofessional collaboration (IPC) and supervisory support (SS). Modelling demonstrates that the effect of IPC with PSC is strongest when staff are highly engaged. While we expected SS to be an important predictor of PSC; EE has a stronger relationship to PSC.

Practical Applications: These findings have important implications for the development of patient safety programs that focus on developing excellent supervisors and enabling interprofessional collaboration.

Originality: This research provides quantitative evidence relating to three of the often mentioned constructs in the typology of patient safety and how they work together to improve patient safety climate. We believe this to be the first empirically based study that confirms the importance of IPC as a lead marker for improved patient safety.
Chapter 4 Improving Workplace Relationships

4.0 Introduction

The demands on government and private resources for healthcare spending in Australia and elsewhere are steadily increasing due to improved technology, an aging population and the burden of chronic disease (Biggs, 2013). Expenditure on healthcare in Australia was estimated to be 9.67% of gross domestic product in the year 2012 – 2013 (Biggs, 2013). Unfortunately, approximately one in ten patients will experience an adverse event during their treatment (Australian Commission on Safety and Quality in Health Care, 2014; de Vries, Ramrattan, Smorenburg, Gouma, & Boermeester, 2008). Hence, a substantial part of the national expenditures on health is allocated to responding to negative patient safety events (Ehsani, Jackson, & Duckett, 2006). Beyond these financial considerations, even more concerning are concomitant patients impacts relating to mortality, morbidity and other detrimental patient outcomes (Pronovost & Faden, 2009). In a seminal study by Wilson et al. (1995), it is suggested that 40 – 50% of adverse events in Australia were preventable.

Inquiries into health service failures have highlighted the importance of embracing a culture of safety and the value of this in preventing adverse patient outcomes. A culture of blame is a consistent theme in a number of inquiries into health system tragedies (Casali & Day, 2010; McLean & Walsh, 2003; Salmon, 2013), with recommendations aimed at developing a “no blame culture” (Stefl, 2001) where errors are considered as a “flaw” in the system. By focussing on peoples mistakes a culture of blame reduces trust amongst team members. This leads to reluctance to report errors for fear of reprisal (Dekker, 2012). While numerous inquiries (Alaszewski, 2002; Heyes, 2012; McLean & Walsh, 2003) have generated a multitude of recommendations, there is an absence of advice on how such a culture can be nurtured, and what components of culture need to be improved. It has been shown, however, that lapses in accountability, inadequate
supervision, poor managerial support, a lack of leadership and ineffective communication and teamwork have negative effects on organisational safety culture (McLean & Walsh, 2003; Van Der Weyden, 2005).

We propose an affirming model that hypothesises that strong supervisor support, engaged employees and collaborative teamwork will be associated with positive patient safety climate. Leadership, communication and teamwork are often mentioned in recommendations into health system failings (Faunce & Bolsin, 2004; Van Der Weyden, 2004). A central tenet of our argument is that staff who feel supported are more likely to be engaged and participate in patient safety activities. Interprofessional practice occurs when health professions from different disciplines (such as nursing and medical) communicate and make collaborative decisions about a patient’s healthcare (Kenaszchuk, Reeves, Nicholas, & Zwarenstein, 2010). We assert that if poor teamwork leads to adverse outcomes; then high interprofessional collaboration will be associated with higher levels of patient safety climate. Investigations of adverse outcomes typically focus on negative constructs (such as blame) or the absence of a particular cultural element (such as poor leadership). This paper aims to provide empirical evidence that positively mirrors the negative findings reported in case studies such as Bristol Royal Infirmary in the UK (Alaszewski, 2002) and Bundaberg Hospital in Australia (Casali & Day, 2010).

Using a multiple linear regression model we find statistical evidence that supervisor support (SS), employee engagement (EE) and interprofessional collaboration (IPC) are positive and significant predictors of patient safety climate (PSC). We then explore the interactive effects of these drivers in better understanding their cumulative effects, showing that a combination of these variables is a further significant predictor of heightened PSC. While qualitative studies (Hewitt et al., 2015; Lancaster,
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Kolakowsky - Hayner, Kovacich, & Greer - Williams, 2015; Leggat, 2007) propose such links; we confirm this through the development of quantitative models. This provides a robust, actionable model and is important in adding evidence to an area of knowledge mostly based on conjecture.

4.1 Conceptual background

To ground our research and align the phenomena of interest a conceptual framework (Ravitch & Riggan, 2012) has been developed.

4.1.1 Patient safety climate (PSC)

Patient safety climate (PSC) assesses employees’ perceptions of the presence or absence of important processes and values that underlie appropriate patient safety (Vogus & Sutcliffe, 2007). Examples include patient handover, collegial skills knowledge, a capacity to prioritise important patient factors and a willingness to face errors and problems when they occur (Vogus & Sutcliffe, 2007). Safety climate refers to organisational policies, practices and procedures (M. G. Patterson & West, 2005) and is viewed as a precursor to the establishment of safety culture (T. Scott, R. Mannion, H. T. O. Davies, & M. N. Marshall, 2003b). People care about fairness of outcomes, procedures and the treatment of others and construe this as organisational fairness or a “just culture”, where accountability for blameworthy acts is exercised and organisational justice is upheld (Dekker & Nyce, 2013).

We choose to measure climate as the behavioural aspects of patient safety culture have been well described in the literature (Ausserhofer et al., 2013; Colla, Bracken, Kinney, & Weeks, 2005). A search of the patient safety literature identified the development and validation of numerous survey tools designed to measure patient safety culture or climate (Colla et al., 2005; T. Scott, R. Mannion, H. Davies, & M. Marshall, 2003a;
Sexton et al., 2006; Vogus & Sutcliffe, 2007). To measure PSC we chose to use the Safety Organising Scale (SOS) a 9 item measure of self-reported patient safety behaviours indicative of systems organised for safety outcomes (Vogus & Sutcliffe, 2007). This tool has high internal reliability and is based on theoretical domains of patient safety culture (Vogus & Sutcliffe, 2007). Preventing adverse patient events relies on the enacting of safety behaviours by staff and we assert that a positive patient safety climate is a lead indicator for improved patient safety outcomes (Ausserhofer et al., 2013; El-Jardali, Dimassi, Jamal, Jaafar, & Hemadeh, 2011; Hofmann & Mark, 2006). We extend current knowledge of these behaviours by considering antecedents that culminate in the presence of such behaviour.

### 4.1.2 Employee engagement (EE)

Employee engagement (EE) assesses employees’ confidence in remaining engaged with organisational decision making, feeling informed about decisions and being empowered to participate in these decisions occurring around them (Fields, 2002; Spreitzer, 1995). There is a growing body of evidence that supports the relationship between EE and organisational outcomes (Simpson, 2009). Businesses (such as banking) with higher employee engagement show higher performance, and EE is linked with staff turnover and organisational outcomes (Harter, Schmidt, & Hayes, 2002). The opposite end of the engagement continuum is disengagement or burnout (Simpson, 2009) and staff turnover (Bae, Mark, & Fried, 2010; P. D. Patterson et al., 2010). In nurses, EE has been linked to organisational citizenship, job satisfaction and intention to quit (Collini, Guidroz, & Perez, 2015). A relationship between employee engagement, organisational citizenship behaviours, job satisfaction and intentions to quit have been shown by Saks (2006). Employee engagement assesses employees’ confidence in remaining engaged with
organisational decision making, feeling informed about decisions and being empowered
to participate in these decisions occurring around them (Fields, 2002; Spreitzer, 1995).

Low employee engagement has attracted attention in healthcare where nursing turnover
is reported at 14% (Collini et al., 2015). Staff turnover has an effect on teams and
directly impacts on the quality of patient care (Collini et al., 2015); and work group
cohesion impacts on patient satisfaction (Bae et al., 2010). Nursing units with lower
turnover are likely to have less patient falls and fewer medication errors (Bae et al.,
2010). Team instability due to turnover interrupts the effective implementation of
programs in mental health services where staff attrition is estimated at between 25 –
50%. Castle, Engberg, and Men (2007) show that turnover is costly, diverts dollars from
care; interrupts continuity of care; affects team experience; weakens standards of care,
causes distress to the patients and increases workloads for the remaining staff.
Extrapolating the findings on EE we propose a direct link to patient safety culture.

_Hypothesis 1 – There is a direct and positive effect of employee engagement on patient
safety climate._

4.1.3 Supervisory support (SS)

Supervisor support (SS) is an important determinant of job satisfaction and has been
shown to be positively related to care adequacy and quality of patient care (Brunetto,
Farr-Wharton, & Shacklock, 2012; Galletta, Portoghese, Penna, Battistelli, & Saiani,
2011). Brunetto et al. (2012) considered the impact of supervisor relationships in
nursing professionals and concluded that SS, patient role clarity and autonomy
significantly predict job satisfaction. Using leader member exchange theory, Brunetto et
al. (2012) suggest that high quality supervision provides employees with meaningful
feedback, and the delegation of decision making. Supervisory support encompasses
employees’ perceptions of their supervisor’s kindness and consideration, respect and dignity, sensitivity, truthfulness and concern for rights (Beugre & Baron, 2001).

In hospitals, the hierarchical structures necessitate that staff have a direct line supervisor that oversee day to day activity. Perceived SS has been found to be a predictor for the work satisfaction and psychological health in health professionals (Moreau, 2012). It has been reported as a marker for intention to leave (Bakker & Dollard, 2010; Brunetto et al., 2012; Moreau, 2012) and associated with higher perceived patient safety and teamwork across units (Ammouri, Tailakh, Muliira, Geethakrishnan, & Al Kindi, 2015). Both supervisors and team members impact on employee engagement and work outcomes (Moreau, 2012). Supervisors have a normative effect on the team and leader communication and commitment to safety influence the safety behaviour of staff (Mattson, Hellgren, & Goransson, 2015).

Management commitment to safety is a common theme within both the industrial safety and patient safety literature (Agnew, Flin, & Mearns, 2013; Nielsen, 2014). The role of the supervisor and supervisory practices has been studied using case studies in industrial plants (Nielsen, 2014) as well as in health organisations. Employee behaviours mediate the relationship between leadership and organisational outcomes (Mattson et al., 2015). Nielsen (2014) argues that supervisory practices relate to the priorities that supervisors give to safety and contends that supervisor support will effect safety climate. Leaders have a role in communicating the organisational mission, values and goals and in articulating the priorities and values held by management (Mattson et al., 2015). Supervisor support encompasses expectations, feedback and communication about safety errors and performance (Ammouri et al., 2015). Given this, then our reasoning leads us to the following hypothesis.
Hypothesis 2 – There is a direct and positive effect of supervisory support on patient safety climate

4.1.4 Interprofessional collaboration (IPC)

Interprofessional collaboration (IPC) within the health service assesses employee confidence that their occupational group engages effectively with other groups (Kenaszchuk et al., 2010). IPC looks at the relationship between different professional and occupational groups within a health service. It encompasses effective communication, ongoing cooperation and appropriate dissemination of information between these groups (John, Yan, & Hoffman, 2010).

Collaborative healthcare is where numerous health professionals conjointly manage the care of patients and is the central premise of patient centred care (D'Amour, Ferrada-Videla, San Martin Rodriguez, & Beaulieu, 2005; Thiele & Barraclough, 2007). Employees need to be able to collaborate within a group and between groups. In order to work collaboratively, groups of professionals must communicate effectively and recognise each other’s strengths and unique skills that they bring to the team (D'Amour et al., 2005). A qualitative study of inter-professional collaboration (Nugus, Greenfield, Travaglia, Westbrook, & Braithwaite, 2010) used a negotiated order perspective and defined power within teams as “collaborative power” and “competitive power”. Using observations of formal meetings and informal events it was found that despite a commitment to interdisciplinary care, doctors assumed the majority of responsibility for patient management (Nugus et al., 2010). This is supported by a recent qualitative study (Lancaster et al., 2015) which noted that most of the time, professional groups of nurses, physicians and assistant’s barely spoke to each other. Lancaster et al. (2015) findings support the notion that doctors see themselves as the primary decision makers and identified hierarchical and subservient relationships across professional groups.
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Misunderstandings and conflict interferes with interprofessional communication and collaboration (Lancaster et al., 2015; Leggat, 2007; Nugus et al., 2010; Pape, Thiessen, Jakobsen, & Hansen, 2013). Groups are professional specific (e.g. doctors and nurses), and interprofessional teams working together provide safer and more effective healthcare with better outcomes (England, 2014). Improving patient safety requires addressing hierarchical barriers and reducing fragmentation of care which contributes to medical error (Thiele & Barraclough, 2007).

Effective teamwork requires a collaborative culture where health professionals feel their input is valued. Effective patient care is a team function, and not the result of an isolated individual (Leonard & Frankel, 2011). In the health context, team membership is role bound, and professional boundaries are an important part of organisational structure and professional regulation (Goh, Chan, & Kuziemsky, 2013; Hewett, Watson, Gallois, Ward, & Leggett, 2009). This raises the issue of the importance that IPC has in achieving positive team outcomes.

In orthopaedics a significant reduction in length of stay of patients having total hip replacements was reported following the introduction of daily interprofessional team meetings (Pape et al., 2013). The promotion of positive and collaborative communication within the team resulted in a reduction in communication failures leading to more efficient patient care planning and discharge. By forming a daily interprofessional team meeting, the hierarchy between professions moved from autonomous medical decision making to a shared team responsibility (Pape et al., 2013). Collaborative practice is a key component of safe and quality healthcare (John et al., 2010). Healthcare is characterised by an increasing reliance on the multidisciplinary team and shared decision making (Leonard & Frankel, 2011). An understanding of other disciplines and a respect for the contribution they make to good patient outcomes
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is fundamental to interprofessional collaboration (Gillespie, Gwinner, Chaboyer, & Fairweather, 2013). When individuals feel they are part of the team, they are more likely to absorb responsibility for team outcomes.

Hypothesis 3 – There will be a direct and positive effect of interprofessional collaboration on patient safety climate.

4.1.5 Combined effects of variables

Previous research has focused on the linear effects of SS on EE (Jose & Mampilly, 2015); SS on nursing staff turnover (Galletta et al., 2011); EE on staff turnover (Collini et al., 2015; Daugherty, Paine, Murakami, & Herzke, 2016); EE on patient safety culture (Daugherty et al., 2016); and IPC on team communication (Pape et al., 2013). Single discipline studies (mainly nursing) prevail (Ammouri et al., 2015). By using a three-way interaction approach we can better understand our dependent variable of interest – patient safety climate. We speculate that if staff are engaged in their work; have high supervisor support and high interprofessional collaboration; then high levels of patient safety climate behaviors will be enabled. We argue that high levels of SS empower staff to feel comfortable with collaborating with other groups. As IPC is dependent on other teams or groups also demonstrating the will to collaborate; we predict that IPC will moderate the relationship between engaged employees and patient safety climate. Hospital employees who are highly engaged are more conscientious with their work, and more likely to follow prescribed clinical guidelines therefore we predict that EE will be magnified by high SS and lessened by low SS. Logically, employees with low scores in all three independent variables will be less likely to engage in safety behaviors. The effect of IPC may enhance EE and could potentially replace low SS. We predict that the combination of EE, SS and IPC with impact on PSC. This reasoning
supports the development of our fourth hypothesis. *Hypothesis 4 – There will be a three-way interaction among IPC, EE and SS in predicting PSC.*

### 4.2 Method

#### 4.2.1 Participants

The non-random sample was recruited from an existing staff establishment of approximately 5,000 employees from an Australian health service including a large tertiary hospital, a medium sized hospital, and numerous sub-acute, community and mental health services.

#### 4.2.2 Procedure

The research received full human research ethics and site specific approval from the health service. Participation in the research was invited by a number of methods including health service wide email broadcasts, promotion via the monthly health service newsletter, and advertising at a number of staff forums. Hard copies of the survey tool were provided in de-identified envelopes with postage paid for return to the university. This was an important consideration to ensure that staff confidentiality was maintained. Staff from security and food services were included in the survey sample with dissemination of the survey-questionnaire to senior staff to pass the non-identifiable surveys on to others via a snowball recruitment method. Staff who chose to answer the survey-questionnaire online could access the non-identifiable survey via announcements through the intranet system or a direct link sent to their email.

#### 4.2.3 Measures

The 9 item Safety Organising Scale (Vogus & Sutcliffe, 2007) was used to assess patient safety climate. While this tool is validated for use with nurses and clinicians (not...
specifically non-clinical staff); it was chosen as being more likely to yield a higher survey completion as other tools were considerably longer (Flin, Burns, Mearns, Yule, & Robertson, 2006; Scott et al., 2003a). In health care, non-clinical staff are viewed as members of the extended team. Perceptions of supervisor support were collected using 9 items adapted for use across broad industry groups (Fields, 2002). The construct of interprofessional collaboration was assessed using 13 questions from a scale developed for use with both nurses and medical officers (Kenaszchuk et al., 2010). Employee engagement contained 4 items selected from Spreitzer (1995) as published in the management literature.

4.3 Results

We received 250 surveys, a response rate of 10 % of the approximately 2,500 employees in scope. This is consistent with similar response rates reported in the literature (Etchegaray, Gallagher, Bell, Dunlap, & Thomas, 2012). Of these 197 (79%) were female, consistent with the high proportion of females within the hospital workforce. Professional groups included nursing (45%), administration (24%), allied health (17%) and medical (7%). Our number of medical staff is small, however our sample was consistent with workforce breakdowns as published in the organisation’s annual report, with no significant variance on key demographic measures of gender, age and occupation between respondents and the wider organisational workforce.

Responses from the surveys were entered into SPSS a statistical analysis package. First an exploratory factor analysis was conducted using the scale items discussed in the previous section to derive factor scores for the four focal variables used in the analysis, namely (a) patient safety climate, (b) employee engagement, (c) supervisor support and (d) interprofessional collaboration. Following Comrey and Lee (1992), factor loadings
for most items exceeded 0.55 (good), 0.63 (very good) or 0.71 (excellent). Due to missing responses on some items, the number of responses included in the factor analyses was 182.

Table 4.1 presents the bivariate correlations between our derived variables. Patient safety climate is significantly correlated with interprofessional collaboration (Pearson r = .420, *p < .001), employee engagement (Pearson r = .428, *p < .001) and with supervisor support (Pearson r = .391, *p < .001). We had expected the three variables to be positively and significantly correlated with one another. Of our control variables used in our later regression, male staff feel that they are less supported by managers than female (Pearson r = -.119, *p < .01), which is something shared with staff with longer tenure (Pearson r = -.133, *p < .05). Duration in role indicates experience, and this finding may be an artefact of employee’s perceptions of a supervisory focus on new graduates, interns and early careers practitioners. Otherwise, as would be expected, age and duration in current role strongly correlate (Pearson r = .476, *p < .001).

Table 4.1 Bivariate correlations with alphas on the diagonal in brackets

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>SD</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gender (Male = 2)</td>
<td>1.21</td>
<td>0.41</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Age^</td>
<td>3.93</td>
<td>1.06</td>
<td>.037</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Duration in Role #</td>
<td>4.83</td>
<td>1.83</td>
<td>.020</td>
<td>.476***</td>
<td>.881</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Safety Climate</td>
<td>0.00</td>
<td>1.00</td>
<td>.016</td>
<td>.041</td>
<td>035</td>
<td>.974</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Supervisor Support</td>
<td>0.00</td>
<td>1.00</td>
<td>-.085</td>
<td>.391***</td>
<td>.677</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.119†</td>
<td>.133**</td>
<td></td>
</tr>
<tr>
<td>6. Employee Engage</td>
<td>0.00</td>
<td>1.00</td>
<td>-.057</td>
<td>-.048</td>
<td>-.053</td>
<td>.428***</td>
<td>.597***</td>
<td>.885</td>
</tr>
<tr>
<td>7. Interprofessional</td>
<td>0.00</td>
<td>1.00</td>
<td>-.065</td>
<td>.068</td>
<td>.087</td>
<td>.420***</td>
<td>.273***</td>
<td>.348**</td>
</tr>
<tr>
<td>Collaboration</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Notes: All derived variables (4 – 7) have a mean of 0 and an SD of 1.

† *p < .10, * *p < .05, ** p < .01, *** p < .001
± Age Categories - 2 = Under 30, 3 = 31-40, 4 = 41 – 50, 5 = 51-60, 6 = Over 60;
# Duration in Current Occupational Discipline – 1 = Less than a year, 2 = 1 to 2 years, 3 = 3 to 5 years, 4 = 6 to 10 years, 4 = 11 to 15 years, 5 = 16 to 20 years, 6 = More than 20 years.
The correlation between predictor variables raises the possible problem of multicollinearity. To assess this, we calculated variance inflation factors for each variable. These varied from 1.02 to 1.63: comfortably under the generally accepted benchmark of 5.00 (Mason & Perreault, 1991). These predictor variables were then introduced into hierarchical ordinary least squares analyses to examine whether the three independent variables predicted linearly and in combination the dependent variable of safety climate. The results of these analyses are presented in Table 4.2. In our fully specified model (Model 2) we can observe that all hypotheses are supported – namely that heightened employee engagement, supervisor support and interprofessional collaboration all predict improved safety climate within our sample.
Table 4.2 Hierarchical Regressions – direct, two and three way interactions

<table>
<thead>
<tr>
<th></th>
<th>Model 1</th>
<th>Model 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-.12</td>
<td>-.19</td>
</tr>
<tr>
<td>SE</td>
<td>0.32</td>
<td>0.32</td>
</tr>
<tr>
<td>Gender</td>
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</tr>
<tr>
<td>SE</td>
<td>0.15</td>
<td>0.15</td>
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<tr>
<td>Age</td>
<td>-.06</td>
<td>-.04</td>
</tr>
<tr>
<td>SE</td>
<td>0.07</td>
<td>0.07</td>
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<tr>
<td>Duration in Role</td>
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<td>0.04</td>
</tr>
<tr>
<td>SE</td>
<td>0.04</td>
<td>0.04</td>
</tr>
<tr>
<td>Employee Engagement (EE)</td>
<td>0.20***</td>
<td>0.25***</td>
</tr>
<tr>
<td>SE</td>
<td>0.01</td>
<td>0.08</td>
</tr>
<tr>
<td>Supervisor Support (SS)</td>
<td>0.15†</td>
<td>0.16†</td>
</tr>
<tr>
<td>SE</td>
<td>0.07</td>
<td>0.08</td>
</tr>
<tr>
<td>Interprofessional Collaboration (IPC)</td>
<td>0.29***</td>
<td>0.32***</td>
</tr>
<tr>
<td>SE</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>EE * SS</td>
<td>0.05</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>0.07</td>
<td></td>
</tr>
<tr>
<td>EE * IPC</td>
<td>0.02</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>SS * IPC</td>
<td>-.19**</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>0.08</td>
<td></td>
</tr>
<tr>
<td>EE * SS * IPC</td>
<td>-.11†</td>
<td></td>
</tr>
<tr>
<td>SE</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>182</td>
<td>182</td>
</tr>
<tr>
<td>F</td>
<td>10.847 ***</td>
<td>7.41***</td>
</tr>
<tr>
<td>Adj. R2</td>
<td>0.25</td>
<td>0.28</td>
</tr>
<tr>
<td>R2</td>
<td>0.27</td>
<td>0.30</td>
</tr>
</tbody>
</table>

Notes: † p < 0.10, * p < 0.05, ** p < 0.01, *** p < 0.001

Figures 4.1 - 4.3 graph the significant interactions, and illustrate the interaction between employee engagement, supervisory support and interprofessional collaboration.
This first figure represents the bottom 20% of employees by level of engagement. Here we see the upward direction of all lines shows the positive linear effect of supervisory support and interprofessional collaboration within this group. The relatively parallel nature of the lines also illustrates the fact that there is no interaction evident within the group of employees who are least engaged.

To confirm this effect statistically, a Johnson-Neyman moderation probe using Hayes and Matthes (2009) was conducted. This confirmed the zones of significance for the interaction effect as -0.44 SD of engagement which represents the point between the lowest 34.62% engaged employees and the rest. In other words, for the 65.38% most engaged employees, a significant three way interaction exists between engagement, supervisory support and interprofessional collaboration in predicting patient safety climate.
Figure 4.2 Average engagement group

This effect is illustrated in Figure 4.2. For this group (namely employees reporting approximately average engagement, or the third quintile by engagement) we note a strong compensatory effect of interprofessional collaboration and engagement for low supervisory support. This is evidenced by the slope of the lowest line in the above figure representing very low supervisory support. The convergence of point estimates of safety climate around 0.8 standard deviations above the mean of interprofessional collaboration is demonstrated. At this point, high IPC completely compensates for low supervisory support in anticipating safety climate estimates by employees. At this point, this group of employees report safety climate at around 0.25 standard deviations above the mean of the overall sample in our study.
Figure 4.3 Very high engagement group

Figure 4.3 illustrates our third group considered here – namely those among the top quintile for engagement. Notable here, in comparison with Figure 4.2, are the sustained higher rate of improvement and compensation for low supervisory support for by higher engagement and interprofessional collaboration and also the generally higher point estimates in the figure. We can note, for example, that at the 0.8 standard deviations above the mean of interprofessional collaboration for this final group generates a point estimate around 0.5 to 0.7 standard deviations above the mean of safety climate.

The optimum outcome is provided when engagement and interprofessional collaboration are high, even when supervisor support is low. When interprofessional collaboration is low, higher engagement interacts with supervisor support complimentarily such that the lines diverge. This shows that supervisor support can compensate for low interprofessional collaboration for highly engaged employees. This
makes intuitive sense as health is often characterised by professional silos or tribes (Weller, Boyd, & Cumin, 2014).

Taken together, these analyses show that all three of our predictor variables matter in determining safety climate. Employees who experience high levels of supervisory support, engagement and interprofessional collaboration generally also report higher levels of safety climate.

These findings also show that low levels of supervisory support can effectively be completely mitigated when both employee engagement and interprofessional collaboration are high. This points to the importance of supervisory support within organisations, but also the importance of interprofessional collaboration as a buffer and support for highly engaged employees lacking such supervisory support.

4.4 Discussion

This study aimed to test the relationship between the independent variables of supervisor support, employee engagement, interprofessional collaboration and the dependent variable of patient safety climate. Three way interactions among EE, SS, and IPC in predicting PSC were examined. Firstly, statistical modelling showed that all three of the independent variables predict PSC. While SS was expected to be an important predictor, this analysis showed that high EE has a stronger relationship to PSC when other variables are held constant. The findings of this study provide evidence of correlations between SS, EE, and IPC on PSC. More importantly we demonstrate how a combination of variables can generate enhanced PSC, with the absence of any one of our predictors generally compensated when the other two are strongly present. Although the results of the first three hypotheses are important, the key contribution of our paper is the findings around interprofessional collaboration and employee
engagement. A highly engaged employee who feels they work in an environment of high interprofessional collaboration can strive to deliver safe care in the face of poor supervisor support.

Especially in the healthcare context, motivation and engagement comes from a combination of intrinsic and extrinsic motivators and contextual influences, all of which are unique in their effects for individual employees. All employees, to a greater or lesser degree, have an innate engagement with their roles, often associated with the strong vocational nature of healthcare work (Chandler, Chonya, Mtei, Reyburn, & Whitty, 2009). The individual combinatory effects of personal values and motivations, and peer support within the team environment, can often go some way in compensating for a lack of organisational or supervisory support provided to workers. These effects will tend to reinforce a distribution of engagement, even with difficult work environments, whereby some workers maintain strong engagement even in the face of difficulties, while others fall victim to cynicism, helplessness or burnout. It is important to note that even though highly engaged employees can strive in the short term under poor supervision due to their high intrinsic motivation, in the long term organizational support must be present in order for the employee not to feel helpless and eventually lose his/her drive.

These findings suggest that the challenge to improving patient safety climate is in discovering ways to optimise employee engagement. EE is much more than reducing staff turnover (Collini et al., 2015), it is a critical factor in creating safe clinical environments. While our model demonstrates a positive interaction between EE, IPC and PSC; we can only speculate as to why. The concept of “enthusiasm” for work features in nursing care models such as Magnet ® (Drenkard, 2010) and Transforming Care at the Bedside (TCAB) (Lavoie ‐ Tremblay et al., 2014). Employee engagement (EE) is described as the “individual’s involvement and satisfaction as well as
enthusiasm for work” (Harter et al., 2002) p269. Our interactions suggest that working in a positive inter professional environment brings the best out of highly engaged employees to deliver safe and quality care.

This paper provides empirical evidence that efforts to improve IPC will have flow on effects to improving PSC. Current curriculum of training health professionals defines competencies and training for inter-professional collaboration (Bainbridge, Nasmith, Orchard, & Wood, 2010). Interprofessional collaboration is described as having a good understanding of each other’s professions roles and responsibilities. This includes consideration for others clinical skills and co-operative practice to ensure the provision of safe patient care. It also highlights the role of shared accountability, and collaborative leadership as effective patient care is a team function (Leonard & Frankel, 2011).

Goh et al. (2013) explored staff perceptions of patient safety culture and the impact of this on employee job satisfaction and were unable to find evidence of this effect. Our study helps bridge this gap and provides quantitative evidence of an association between IPC and PSC. Furthermore, we provide evidence of the important role of EE in strengthening patient safety climate when combined with high IPC. The conceptual framework proposed by Goh et al. (2013) suggests that organisational learning and teamwork and collaboration directly affect patient safety culture. The literature reports strong links between organisational learning and safety culture, which is preceded by teamwork and collaborative work environments (Goh et al., 2013). This leads to increased knowledge sharing, and a safe environment for reporting adverse events.

This research gives quantitative support for the sub components of leadership and teamwork so frequently referred to in the typology of patient safety climate (Sammer, Lykens, Singh, Mains, & Lackan, 2010). A consistent theme in the safety literature is
the role of leadership and management commitment to safety and the effect these constructs have on the phenomena of patient safety culture (Ring & Moody Fairchild, 2013). Strong leadership is proposed as a key construct, however there are no consistent strategies as to how leadership capacity can be grown to support a patient safety culture. Our findings suggest that supervisors and managers would do well to ensure they engage staff in organisational decision making and empower staff to participate in decision making. From this positive organisational citizenship behaviours and positive patient safety climate is most likely to emerge.

The strong association of SS with PSC may in part explain the effectiveness of leadership walk rounds (Schwendimann et al., 2013) which have been shown to be an effective strategy to improve patient safety climate. Units with high exposure to walk rounds have improved safety climate scores and higher levels of risk reduction (Schwendimann et al., 2013). Whether this is as a result of compliance by staff in response to managerial visits or the result of less defined safety culture phenomena is unclear. While a positive association between PSC and SS was found, additional research is required to identify ways of providing this support in a cost effective, genuine and reproducible manner. A systematic review by Morello et al. (2013) identified published interventions designed to improve PSC. Interventions included leadership walk rounds; structured education programs; team based strategies; simulation based training programs; multifaceted unit based programs; multicomponent organisational initiatives and other patient safety culture strategies such as surgical safety checklists (Sacks et al., 2015). Only leadership walk rounds and multi-faceted unit based strategies were shown to have some effect for improving patient safety culture and patient outcomes. The “multi-faceted unit based strategies” quoted by Morello et al. (2013) could possibly be an artefact for interprofessional collaboration.
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which may partly explain these findings. The effect of walk rounds was restricted to nursing staff and time limited.

Published research predominantly focuses on safety culture within nursing and is conceptually based (Ring & Moody Fairchild, 2013). This research has addressed some of these gaps by testing the relationship between patient safety climate, employee engagement, supervisory support and interprofessional collaboration. It also addresses the limitations of single discipline studies by including all members of the health team as study participants.

4.5 Limitations

Methodologically, single site studies such as this that are based on a cross-sectional dataset gathered concurrently are at risk of common-method variance (CMV) (Lindell & Whitney, 2001). To address this potentiality, both ex ante and ex post strategies were applied. First, the design of this study focuses on third order interaction effects. Chang, Witteloostuijn, and Eden (2010) note that studies that include second and third order effects are far less susceptible to CMV than would be the case with a model that focuses on linear effects alone.

Post hoc tests are also available. Harman (1976) recommended a strategy that has been widely adopted that loads all items onto a single factor, with an assessment of this single factor then assessed for cumulative variance (or lack thereof). Harman suggested that when this single factor explains 50% of the cumulative variance, CMV is deemed present. In the current analysis this test returned a result well under that benchmark of 38.91%.

A limitation of this study is that all the groups surveyed have been aggregated. The sample is very heterogeneous including clinical staff such as doctors and nurses and
non-clinical staff such as administration. The imbalance of professions is characteristic of teams in health care, and resembled staffing ratios as published in the organisation’s annual report. As the sample was a very diverse group of people working in a complex health service across acute, sub-acute and community services, transfer of our findings to specific health services requires caution. The low return rate in each occupational grouping precludes us from coming to any conclusions regarding specific types of health teams. While a number of standardised and validated tools have been used, the sets of items measuring supervisor support and employee engagement have been developed from non-health organisations (Fields, 2002). Specific tools to measure these constructs in health are required and this is one area that future research may consider. The hierarchical nature of traditional health organisations places special importance on the role of the supervisor and the concept of clinical leadership (Parand, Dopson, Renz, & Vincent, 2014). Given the important role these constructs have in interprofessional practice, this aspect requires further investigation.

Patient safety climate and interprofessional participation were measured by items from nursing centric tools. As 55% of the sample was from non-nursing backgrounds, these results may have some undefined inherent bias. Although it has been asserted that a safety climate supporting safe patient care also ensures worker safety (Agnew et al., 2013), this was beyond the scope of the enquiry. Finally, findings only go so far in understanding the antecedents of patient safety climate.

4.6 Practical applications

Health care professionals are under increasing pressure to ensure that the care they provide is safe and of a high standard. While not dismissing the importance of individual accountability, the findings presented here support the theories that efforts to
improve employee engagement, inter group collaboration and supervisory skills will yield positive improvements in patient safety climate, and ultimately patient outcomes. These constructs are components of a “just culture”, where an incident is viewed not as a failure but as an opportunity to learn (Dekker & Nyce, 2013). Research designs that test the effectiveness of interventions on improving specific aspects such as SS, IPC and EE warrant further exploration. The hierarchical nature of traditional health organisations places special importance on the role of the supervisor and the concept of clinical leadership. Given the important role these constructs have in interprofessional practice, this aspect requires further investigation. These findings affirm the importance of IPC as being positively related to higher levels of PSC.

4.7 Conclusion

The link between EE, SS, IPC and PSC to date has lacked an empirical base. Findings show a positive relationship between all three independent variables and patient safety climate. Furthermore a cumulative effect on PSC that is statistically significant was identified. The concept of interprofessional practice is currently gaining momentum as a way of reducing the risk of adverse events in healthcare. The findings of this research support this direction. Future research is required to identify ways that EE, SS and IPC can be targeted and strengthened in dynamic clinical settings and ultimately improve patient safety outcomes.

“You can't stay in your corner of the forest waiting for others to come to you. 

You have to go to them sometimes.”

Milne and Shepard (1927) Winnie-the-Pooh
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Chapter 5 Changing the Environment

“The worst surroundings in the world can be tolerated if the people in them are interesting and kind.”

Snicket and Helquist (2007), The Bad Beginning

Preface

This chapter builds on the previous chapters where patient safety culture was defined and antecedents of patient safety culture were explored. This section includes two papers providing different perspectives and using different paradigms. Paper one is an empirical paper from the staff perspective and paper two is a quality improvement report of the patient’s experience. Both papers link to the theme (as articulated in section 1.3) of changing the work environment.

In paper one, the hospital has moved and there are now two data sets - 2013 before the move of the hospital and two years later in 2015 when staff were settled at the new greenfield hospital site. Data from before the move to after the move of the hospital is studied using analysis of variance to test a number of hypotheses. The impact of bricks and mortar and organisational change on patient safety culture is explored. Things become “curiouser and curiouser” as the impact of surroundings on patient safety culture are not shown to be significant. The concept of ‘clinical capital’ is introduced and the patient safety perceptions of clinical and non-clinical staff compared. This paper was accepted by the Journal of Health Organization and Management, 24th June 2017.

The second part of this chapter reports a quality improvement project conducted two days after the hospital moved. It includes patient feedback on the physical and cultural environment collected from 40 inpatients who moved from the old to the new hospital. “The patient experience – Southport to Parklands” was an on the spot patient survey and as a quality improvement activity, this report provides unique patient insights. A modified version of the patient survey titled “Southport to Parklands – the Patient Experience” was presented at the Griffith University Health Service Management Alliance Mini Conference, November 2013. An industry report was provided to the executive and hospital board at the time of the move. Together these papers focus on the impact of changing the physical environment on patient safety culture.
STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper:


My contribution to the paper involved:

**Susan Brandis:** Co-ordination of ethics and site specific approvals. Research planning, data collection and analysis. Statistical analysis. Review of the literature and development of hypothetical models. Writing of the paper and exploration of models. Journal submission and review.

(Signed)

(Date) 31st July 2017

**Stephanie Schleimer:** Editing of paper, provision of guidance on paper structure and discussion.

(Countersigned)  
(Date) 31st July 2017

**John Rice:** Editing of paper. Development of empirical models and assistance with statistical analysis.

(Countersigned)  
(Date) 31st July 2017

Supervisors: Dr Stephanie Schleimer and Professor John Rice
Paper 3: “Bricks-and-mortar; and patient safety culture”

Abstract

**Purpose:** Building a new hospital requires a major investment in capital infrastructure. This paper investigates the impact of bricks-and-mortar on patient safety culture before and two years after the move of a tertiary hospital to a greenfield site. The difference in patient safety perceptions between clinical and non-clinical staff is also explored.

**Methods:** This research uses data collected from the same workforce across two time periods (2013 and 2015) in an Australian health care service. Validated surveys of patient safety culture (n = 306 and 246) were analysed using descriptive and inferential statistics.

**Findings:** Using two-way analysis of variance we found a) that perceived patient safety culture remains unchanged for staff despite a major relocation and upgrade of services and b) different perceptions of patient safety culture between staff groups remains the same throughout change.

**Practical applications:** A dramatic change in physical context, such as moving an entire hospital, made no measurable impact on perceived patient safety culture by major groups of staff. Improving patient safety culture requires more than investment in buildings and infrastructure. Understanding differences in professional perspectives of patient safety culture may inform organisational management approaches, and enhance the targeting of specific strategies.

**Originality:** The authors believe this to be the first empirically based paper that investigates the impact of a large investment into hospital capital and a subsequent relocation of services on clinical and non-clinical staff perceptions of patient safety culture.
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5.0 Introduction

Patient safety has emerged as one of the most important aspects for healthcare providers across the world. One in ten patients will be harmed during their hospital stay (Kohn, Corrigan, & Donaldson, 2000). Efforts to reduce adverse events have had mixed success. Interventions that have reduced harm to patients include protocol-driven strategies that target hand-washing, and the use of surgical checklists, and medication safety guidelines (Abstoss et al., 2011; Haugen et al., 2013). While the collected knowledge of medical science is enormous, occasional calamities in healthcare remain the norm rather than exception (Dunbar, Reddy, Beresford, Ramsey, & Lord, 2007). Shortcomings in organisational culture have been ascribed as a consistent contributor to these system failures. Common labels of such cultural failings are “culture of blame”, “negative ethos”, “silo mentality” and “culture of neglect” (Heyes, 2012; McLean & Walsh, 2003; Van Der Weyden, 2004).

Patient safety culture is defined as the product of individual and group values, attitudes and perceptions, competencies, and patterns of behaviour that determine commitment by an organisation to health and safety management (Sammer, Lykens, Singh, Mains, & Lackan, 2010). It is a sub-component of organisational culture and an extension of the seminal work of Schein (1990) who proposed a three level model of culture that includes artefacts, values and underlying assumptions. Artefacts are tangibles including amenities, furniture and the physical environment (Schein, 1990). The physical environment is a crucial part of ensuring safe patient care (Gurses & Pronovost, 2011). The physical environment and artefacts provide valuable clues about organisational culture and the physical setting is a key driver of cultural change (Kallio, Kallio, & Blomberg, 2015). In particular, the physical environment we work in affects how we feel mentally, physically, socially and spiritually and also influences stress levels.
(Stichler, 2007). As a result of these, evidence-based design aims to reduce staff stress and fatigue and improve patient safety and patient outcomes (Ulrich et al., 2008).

Extending these ideas, our assumption was that moving from an old site to a new hospital with a modern physical environment would positively influence the perceived organisational culture for all service staff. In particular, we expected that perceived patient safety culture would improve after the move due to the better physical environment that had new buildings and infrastructure (Stichler, 2007). It has long been argued by key stakeholders in health care that the state of the physical health care environment is associated with patient outcomes, including patient safety incidents (Gurses & Pronovost, 2011; Stichler, 2007). The literature, however, is comparably scant about the safety benefits of capital investment in new hospitals. Some studies have started to explore these potential benefits. For instance, reductions in hospital acquired infections are one safety indicator that has shown to be improved by the relocation from one location to another (Heddema & van Benthem, 2011; Ishida, Nakano, Nakatani, & Gomi, 2006). Also, safe hospital design aims to reduce latent conditions for adverse events (Joseph & Rashid, 2007). For example, designs to improve air quality, improve ergonomics and hand washing facilities have achieved measurable success (Stichler, 2007). However, we are not aware of a study that has investigated the potential impact of moving from an old physical infrastructure to a state-of-the-art infrastructure on perceived patient safety culture.

This research took place in Australia when an entire hospital workforce was moved to a greenfield university hospital site. This was an opportunity to examine “patient safety culture” before and after a major service relocation that has been noted as the largest patient transfer in Australia’s healthcare history (Capper, 2013). Approximately 4,000
staff from professional, clinical, administrative and operational streams was involved in the move. The new site was a purpose built hospital that had been architecturally designed to enhance patient safety and privacy. With over 170,000 square metres of floor space and seven core buildings, the new facility (costing AUD $1.8B), was considerably larger than the former facility. The old hospital had 54,000 square metres of floor space in one central building (Capper, 2013). In the period between the two data collections a change in hospital executive brought a renewed focus on patient safety and care quality with a large injection of funding aimed at enhancing clinical services. Staff numbers increased from 5,000 in 2013 to over 7,000 in 2015. While a change of this magnitude offers many research openings, we were particularly interested to see what the impact of the “move and grow” strategy would have on patient safety culture.

Based on these arguments, we propose: \textit{H1 There will be a statistically significant improvement in perceived patient safety culture from before the move (old facility) compared to after the move (new facility).}

The second structural element we were interested in was the effect of the move on different stakeholder groups of the healthcare organisation. We define clinical staff as medical, nursing and allied health professionals who provide patient care services. Non–clinical refers to managerial and administrative staff including finance and informatics. Organisational culture is comprised of underlying assumptions and defined roles or subcultures (Handy, 1993). We explored how the move would differentially impact the perceived patient safety culture of clinical and non-clinical groups. While differences in professional perspectives of patient safety culture have been previously explored, these have been either collected via cross-sectional data or through qualitative methodologies.
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(Gallego, Westbrook, Dunn, & Braithwaite, 2012; Lin, Foster, Chaboyer, & Marshall, 2016; Parand et al., 2011).

Studies commonly differentiate between frontline (or direct staff) and managerial (or indirect) staff (Aboul-Fotouh, Ismail, Ez Elarab, & Wassif, 2012; Parand et al., 2011). For instance, one study reported that managers view patient safety and quality initiatives more favourably than frontline staff (Parand et al., 2011). This finding is supported by others (Aboul-Fotouh et al., 2012) who find higher composite patient safety culture scores for indirect hospital workers when compared with direct workers such as doctors and nurses. A different study identified lower perceptions of patient safety culture in administration and middle management, revealing gaps between safety culture perceptions between leaders and subordinates (Vlayen et al., 2013). Yet other studies report that managers have a higher view of patient safety than clinicians - particularly in relation to perceptions of teamwork across units, non-punitive responses to error and management support for safety (Richter, McAlearney, & Pennell, 2014).

Variations in perceptions of patient safety culture have also been recognised between different groups of health professionals such as doctors and nurses. In emergency departments it has been reported that medical staff perceive higher grades of patient safety than do nurses (Verbeek-Van Noord, Wagner, Van Dyck, Twisk, & De Bruijne, 2014). These positive views have been interpreted to indicate that doctors were less likely to perceive a need for change of practice. This same study (Verbeek-Van Noord et al., 2014) stated that nurses reported more errors than doctors and opined that nurses may take patient safety more seriously. Other researchers (Listyowardojo, Nap, & Johnson, 2012) have compared the perceptions of patient safety culture across several professional groups (physicians, nurses, clinical workers, and laboratory and managers) finding that physicians and managers rated safety culture more positively than nurses.
Safe hospital design includes investing in clinical facilities aimed at improving patient safety and outcomes. As clinicians are the main users of medical technology we expected the new amenities to have an impact on the patient safety culture of these key stakeholders. We also expected that the safe design would enable clinicians, (as frontline providers of care) to enact safety behaviours and impact on perceptions of patient safety culture in the organisation (Vogus, Sutcliffe, & Weick, 2010). In summary, studies report variations in attitudes towards patient safety across organisations, between service types and when comparing discipline groups. These studies tend to be cross-sectional in nature. In this study, we aim to extend our current knowledge by not only exploring whether the perceptions of patient safety culture differ between different groups of staff; but also whether moving location and improving infrastructure has any impact on these perceptions. We add to previous research as we present data at two time points from the same organisation.

Our second hypothesis is - *H2a: Perceived patient safety culture will be higher in clinical staff than non-clinical staff; and H2b: A move from an old to a new purpose built hospital will have a greater impact on perceived patient safety culture of clinicians compared to non-clinicians.*

### 5.1 Methodology

This research has full ethics and site specific research governance approvals (PHH 23/12/HREC). A survey was conducted in a large health service in August 2013 and repeated in September 2015. Respondents were invited through a service-wide email broadcast (for the online version of the survey) and by hardcopy in staffrooms where availability of the internet was limited. Hardcopies were also distributed to those staff members who did not have computer access, or who preferred to complete a hardcopy
survey instrument. The initial survey had 13 sections and a free text area. This research used section 9 “About my workgroup and patient care”, and used validated questions from the ‘Safety Organising Scale’ (SOS) (Vogus & Sutcliffe, 2007). The SOS suite of questions is a theory-based tool which has been shown to be methodologically valid measure of patient safety culture (Vogus & Sutcliffe, 2007). It has nine questions which together form a self-reported measure of behaviours that underpin patient safety culture. A five-point Likert scale was used for each question for both time series, and data was entered and coded into an Excel spreadsheet. De-identified data was uploaded into SPSS for descriptive and statistical analysis. A composite patient safety score was calculated by adding all the item scores and dividing by the number of items (9).

The 2013 survey was made available to approximately 5,000 staff. By 2015, staff numbers had grown to over 7,000. The staff spanned all categories including support staff (e.g. catering, maintenance), clinical staff (healthcare professionals) and management. Discipline categories were identified by entitlement groups as defined by government award classifications. We use the broad meaning of clinician to mean a healthcare professional with direct responsibility in the assessment and provision of healthcare. For our analysis, the nursing group includes enrolled, assistant and registered nurses, and midwives. Allied health disciplines included occupational therapy, physiotherapy, speech pathology, social work, medical imaging, pharmacy, psychology, nutrition and dietetics. Medical staff included senior and junior medical officers. Contemporary healthcare is delivered by a team and we have amalgamated the responses of these clinical team members. The non-clinical group was comprised of administrative and professional categories such as management, legal, information services, administrative support staff, finance and human resource personal.
5.1.1 Survey response

A total of 306 completed surveys were received in 2013 and 246 were received in 2015. While 46% of the second sample indicated participation in the first survey, we were unable to match these 115 participants over both time periods due to de-identification of data. Removing surveys with missing classifications resulted in sample characteristics for the two time periods as shown in Table 5.1. While all other groups had a similar response rate across the two periods, nursing responses were much lower in 2015. The lower response in 2015 may have been a result of a magnet hospital survey and a government health service survey that were conducted over the same time period resulting in “survey fatigue”. The approximate proportion of clinical staff reported in the organisation’s annual report was 70%.

Table 5.1 Final sample

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Administration</th>
<th>Allied Health</th>
<th>Medical</th>
<th>Nursing</th>
<th>Professional</th>
<th>Total Clinical</th>
<th>Total Non-clinical</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013</td>
<td>238</td>
<td>53</td>
<td>39</td>
<td>19</td>
<td>121</td>
<td>6</td>
<td>179</td>
<td>59</td>
</tr>
<tr>
<td>2015</td>
<td>145</td>
<td>48</td>
<td>30</td>
<td>13</td>
<td>49</td>
<td>5</td>
<td>92</td>
<td>53</td>
</tr>
</tbody>
</table>

5.2 Findings

Analysing both groups of stakeholders reveal that there were no significant changes in perceived patient safety culture despite the major physical infrastructure relocation of the sampled hospital. In particular, post-hoc comparisons using Tukey HSD revealed that the means of the clinical group for 2013 (M = 3.66, SD = .718, p > 0.10) were not significantly different from the 2015 clinical group (M = 3.68, SD = .706). Similarly, the mean patient safety score of the non-clinical group in 2013 (M = 3.31, SD = 1.00, p >
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0.10) was not significantly different from the non-clinical group in 2015 (M = 3.39, SD = .796).

We therefore reject our first hypothesis, as we were unable to detect any change in patient safety culture between 2013 and 2015 for either group of clinical and non-clinical staff. The model is shown diagrammatically in figure 5.1. For both time periods the plot graph demonstrates higher levels of patient safety culture for clinical groups when compared with non-clinical staff. While there has been a slight upward movement of the slope in 2015, this is not significant.

Figure 5.1 Difference between clinical and non-clinical staff over two time periods

While there were no changes in patient safety culture between the two time points, there were significant disparities between perceptions of patient safety culture between
clinical and non-clinical staff, and this difference was unaffected by the move. Our samples met the assumptions for parametric analysis a one-way between groups analysis. We conducted an analysis of variance to explore the impact of professional affiliation on patient safety scores as measured by the Safety Organising Scale (Vogus & Sutcliffe, 2007). For both time periods participants were divided into two groups - aggregated according to their discipline and service roles - of clinical (allied health, medical, and nursing), and non-clinical (administration and professional). There was a statistically significant difference p < .05 in patient safety scores for both time periods with time-one (2013) F (1,235 = 8.6 p = .004) and time-two (2015) F (1,143 = 5.1 p = .025) such that clinical employees at all times reported higher patient safety scores than non-clinical staff.

The effect size calculated using eta squared was .035 for time-one and .035 for time-two. Post-hoc comparisons using Tukey HSD test showed that the mean score for clinical staff (M = 3.66, SD = .718) was significantly different from non-clinical staff (M = 3.31, SD = 1.00). A similar pattern was observed in our second time period. In 2015 the mean score for clinical staff was (M = 3.68, SD = .706) and non-clinical staff was (M = 3.39, SD = .796).

We therefore accept H2a: Perceived patient safety culture will be higher in clinical staff than non-clinical staff.

Hypothesis 2b had anticipated greater change in patient safety in period 2 for clinical staff than for non-clinical staff. This was due to the change in tangible health environment available for clinical staff in 2015 in comparison to 2013. Despite some subtle differences, we must reject our hypothesis: H2b: A move from an old to a new
purpose built hospital will have a greater impact on perceived patient safety culture of clinicians compared to non-clinicians.

To further explore the impact of discipline on patient safety scores across the two time periods, we conducted a two-way between group analysis of variance across the four discipline groups. Results were merged in SPSS to create one file maintaining clinical and non-clinical group definitions, splitting our clinical group into medical, nursing and allied health. The interaction effect between year and group was not statistically significant $F (3,375) = .467$ $p = .705$. There were also no significant differences between the three clinical disciplines of allied health, medical and nursing. When merging the 2013 and 2015 data, post-hoc comparisons using Tukey HSD indicated that the means of each of the clinical discipline groups of allied health ($M = 3.71$, $SD = .700$); medical ($M = 3.93$, $SD = .623$) and nursing ($M = 3.60$, $SD = .725$) were significantly different from the administration group ($M = 3.35$, $SD = .908$). The relative probability of these differences between administrative staff and each clinical group was medical $p = .001$; allied health $p = .013$; and nursing $p = .035$, hence these results are all significant at $p < 0.05$ or less.

This finding adds support for hypothesis 2a. Furthermore we find no difference in patient safety culture scores between clinical groups of medical, nursing and allied health. Figure 5.2 shows that of all groups, medical had the largest difference in scores between time periods. This was not significant, although it should be noted that this may be an effect of the smaller number of medical participants in both time periods ($2013 = 19$; $2015 = 13$). The groups of allied health, nursing and nonclinical administrative staff remained constant. We reject hypothesis 2b.
5.3 Discussion

Surprisingly, our first hypothesis: *There will be a significant improvement in patient safety culture between time one (before the move) and time two (after the move)*; was not supported.

Our findings did not demonstrate any significant impact on patient safety culture coincident with a change in physical context. This was despite an enormous upheaval and significant investment in clinical equipment and facilities. Given the major changes within the organisation our study shows that patient safety culture persists over time. The space of two years between time one and time two was considered ample for change to occur and to become evident and enacted. As shown by our empirical model, there was no significant difference in patient safety culture between these periods of
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time. While the mean scores of medical staff decreased, this was not significant. Closer inspection of the data showed that the gender balance of medical staff remained relatively equal for both time periods. However, analysis of the demographic data of medical level showed that when compared with junior medical staff, there was a larger proportion of senior medical staff in 2013 (86%) than in 2015 (71%). This can be interpreted as a less experienced group of doctors in the 2015 sample which may explain the difference in patient safety scores. Subtle differences in patient safety scores between junior and senior doctors have been reported by Durani, Dias, Singh, and Taub (2013).

An explanation of our inability to detect change is that the tool we used (the SOS) lacked measurement sensitivity (Colla, Bracken, Kinney, & Weeks, 2005). This tool has been validated on clinical staff, and yet we were unable to detect any significant changes in any of our discipline specific tests. In addition, our findings reiterate that patient safety culture is not an end in itself, but must be considered in alignment with patient outcomes (El-Jardali, Dimassi, Jamal, Jaafar, & Hemadeh, 2011). Another explanation links to the concept of cultural entrapment (Weick & Sutcliffe, 2003), a process whereby people get “locked” into a way of thinking and behaving. Sense making leads to a situation where actions are justified and change is slow to occur (Weick, Sutcliffe, & Obstfeld, 2005). In this context, the move was irrelevant due to the entrenched subcultures and embedded patterns of behaviour.

The second goal of this study was to confirm differences in patient safety culture between clinical and non-clinical staff, and demonstrate greater improvements in clinical staff following the move. Our results found a significant difference (p < .05) between these groups at both time intervals (2013 and 2015) in the same organisation. When exploring the contribution of each clinical group of medical, nursing and allied
health staff we found consistent scores. Furthermore we demonstrated that for both
groups of clinical and non-clinical staff, patient safety-culture scores remained constant
over a two year time period. Our model shows that differences between clinical and
non-clinical staff remain significant two years apart in the same health care service.

While supporting our hypothesis 2a, our findings also show that clinicians have a
stronger view of patient safety than do non-clinicians. Alternatively, this may be an
artefact as the tool was developed for clinical staff and not specifically for non-clinical
staff. Our findings support the original work of Vogus and Sutcliffe (2007) who
proposed that behaviour is shared at a unit level and patient safety culture is the result of
action by the team rather than the individual.

Our model provides empirical evidence of the “stocks” of patient safety culture which
we call “clinical capital”. Like other forms of capital, clinical capital can be stored.
Such a stock adds to the organisations ability to manage risk and leads to ultimately
better patient outcomes. Social capital has been explored in health in relation to risk
management behaviours in nurses (Ernstmann et al., 2009) and knowledge sharing in
nurses (Chang, Huang, Chiang, Hsu, & Chang, 2012). Like social capital, we theorise
that clinical capital is the culmination of good will that clinicians bring to patient care.
The term “capital” initially referred to assets such as buildings, plant and equipment
(Hodgson, 2014). The term “social capital” was promulgated to become a familiar term
by the work of Marx who viewed capital not as a thing but rather a process (Desan,
2013). Social capital refers to a set of resources that resides in relationships and leads to
prosocial behaviour where staff go above and beyond the expectations of role
descriptions. This is about doing good, and is similar to acts of beneficence enshrined in
clinical ethics (Andersson et al., 2010). We prefer to use the term “capital”, as this has
positive connotations and implies a phenomenon that is an asset to the organisation.
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This line of thinking is consistent with the idea of a “just culture” (Dekker & Nyce, 2013). Theories of patient safety have a preoccupation with failure and can distance clinicians who come to work with a sense of altruism to do good. Understanding and appreciating this asset that clinicians bring to an organisation may impact on safe patient outcomes.

Using quantitative methods we show the difference in patient safety culture between clinical and non-clinical staff as reported by others (Aboul-Fotouh et al., 2012; Parand et al., 2011). The accumulated stock of patient safety culture was different at the p < .05 level.

Our model also partly explains why increases in patient safety culture scores triggered by quality improvement programs are often short-lived or difficult to detect. The literature shows an emphasis on measuring patient safety and testing interventions at a single point in time. No reports of before and after a major hospital move have been published.

While we describe a broad model of clinical capital, a longer term plan of improvement is required that addresses the underlying components of patient safety culture. Enhancing social networks, developing cohesive teams and improving communication and information flow may feed patient safety culture. Other important initiatives would identify ways of motivating people to work together for a common good (Sammer et al., 2010). Potential strategies would consider recruitment and selection processes and mechanisms for recognition and reward.

5.4 Limitations

There are a number of limitations with this study. The small sample size is recognised, however we found surprisingly consistent findings at two points in time. Our findings
may be clouded by the degree of organisational change that occurred between our first survey in 2013 and our second survey in 2015. While considering the major change during these two years, there was no significant change in patient safety culture in our two data sets. Our chosen tool, the SOS, was developed for use in nursing groups. Our sample was non-randomised and heterogeneous, with a smaller proportion of medical staff than the wider workforce would require. Our sample ratios of the clinical and non-clinical groups were, however, reflective of the staff mix published in the organisation’s annual report. While the sample was drawn from the same staff members across two time periods, less than half of the participants completed the survey at both time points.

Our study provides a baseline for future assessment; differences do exist and persist in the same organisation. We found significant differences in patient safety culture between discipline groups of clinical and non-clinical employees. While this explains an important co-relation with patient safety culture; we can only imply this influences patient outcomes. We were unable to match the staff group to direct patient outcomes during this period due to incomplete data. With a larger more comprehensive sample this would be a valuable adjunct to our findings.

5.5 Practical applications

Our findings challenge the idea that organisational culture occurs in a physical location. This supports the learnings from research in virtual firms, where “shared imagined communities” have been shown to have a shared organisational culture (Plavin-Masterman, 2015). Changing the physical environment has been suggested as one way to improve patient safety; for example by providing designs that foster communication and teamwork (Gurses & Pronovost, 2011). In our clinical and non-clinical groups, perceptions of patient safety culture differed; however they remained consistent within
groups at two time points. We were unable to demonstrate any significant impact on changes in perceptions of patient safety culture between the same workforce in an aging and cramped hospital to those in a new purpose built and designed facility. The construct of professional groups, such as what it means to be a clinician may be the result of a “shared imaginary community” of doctors or nurses that have been socialised into particular patterns of safety behaviours. Person-organisation fit theory (Chatman, 1991) may also explain why patient safety culture remained static. Organisations have the opportunity to articulate values of patient safety, and select employees who best fit these organisational values. In addition, actively promoting safety values may activate a conscious choice by the individual to join or leave the organisation. In building new hospitals and relocating services, an associated revamp of organisational values can support positive change in organisational culture. There is much than needs further exploration.

5.6 Conclusions

The move of a hospital to a greenfield site is a major undertaking. Our findings suggest that while packing the goods and chattels, the organisational patient safety culture also moves. We were unable to detect any significant change in patient safety culture between the two time points in the same organisation collected two years apart. The new bricks-and-mortar had no measurable impact on staff perceptions of patient safety culture. Our data shows that clinical groups of medical, nursing and allied health staff have higher patient safety scores than non-clinical staff, and this pattern perpetuates at two time points; in 2013 before the move and in 2015 after the move. This corroborates others findings by providing empirical evidence of the significant difference in patient safety culture between clinical and non-clinical staff.
These findings imply that managers explore ways of increasing the stock of clinical capital; consider context; and look at ways of enhancing these discretionary behaviours in the workforce. Our experience indicates that patient safety culture persists over time and that significant differences occur between clinical and non-clinical staff. Investment in bricks-and-mortar alone is insufficient as we conclude that not only did the hospital move; but so too did the culture.

“They were going round and round the island, but they did not meet because all were going at the same rate.”

Barrie and Byron (1973), Peter Pan and Wendy
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STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper:


My contribution to the paper involved:

**Susan Brandis:** Ethics application and site approvals. Research planning, data collection and analysis. Statistical analysis. Review of the literature and development of hypothetical models. Writing of the paper and exploration of models. Journal submission and review.

(Signed)

(Date) 31st July 2017

**Stephanie Schleimer:** Editing of paper, provision of guidance on paper structure and discussion.

(Countersigned)

(Date) 31st July 2017

**John Rice:** Editing of paper. Development of empirical models and assistance with statistical analysis.

(Countersigned)

(Date) 31st July 2017

Supervisors: Dr Stephanie Schleimer and Professor John Rice
Abstract

**Purpose:** To measure and compare the patient experience before and after the move of a large tertiary hospital to a greenfield site.

**Methods:** A patient experience survey (n = 40) was conducted within four of days of moving 219 patients from an aging hospital to a new purpose built, architecturally designed facility. Survey items included functional and relational domains of the patient experience. This included comfort, noise, privacy, visitor amenities, access to information, clinical care, staff attitudes, getting assistance and overall impressions.

**Findings:** The patient experience showed significant improvements in the functional domains of comfort, privacy and general environment (p < .001), and noise, visitor amenities and nurse call system (p < .05). There was no significant change in the relational aspects of access to information, clinical care and staff attitude.

**Practical applications:** The patient survey showed that moving to a new facility improved the patients experience and satisfaction with the physical environment. Relational domains that link to organisational culture remained the same. Relocation of services needs to include a cultural change management component to close the gap between the patient experience of physical environment and that of the cultural environment.

**Originality:** The authors believe this to be one of the first studies that use quantitative data to explore the patient experience during a major hospital move.
5.7 Introduction

The previous paper considered the staff’s response to a change in physical environment. This chapter looks at the same move, but considers the patient experience of moving to a new hospital. In recent years, a lot has changed in the design of public hospitals. Today, hospitals are built and designed to look more like art galleries or five star hotels rather than hospitals (Gesler, Bell, Curtis, Hubbard, & Francis, 2004). The traditionally long corridors and wards lined with patients are gone. These have been replaced by private rooms, aesthetic décor and modern technology such as electronic menus, patient entertainment systems and state of the art medical equipment (Theodore, 2016). But does the patient experience also improve in response to the increased investment in capital bricks and mortar? There is only limited evidence in the literature on the effects of physical improvements for patient outcomes (with the notable exception of Siddiqui et al. (2015), who explored changes in patient satisfaction related to a move to a new clinical building.

This paper reports on a patient survey conducted to elicit patient feedback on their experiences before and after the relocation of an acute hospital from aging buildings to new, state-of-the-art purpose built, architecturally designed premises. Using a survey methodology a quality improvement initiative was conducted within days of the move from a 580 bed tertiary teaching hospital to a 750 bed facility located on a greenfield site, 5 kilometres away from the original premises. The situation provided a cohort of patients who had experienced care “before” as an inpatient at the old hospital premises and “after” the move to the new university hospital premises. The study is structured as follows: First, a background to the survey is provided, followed by the method used to collect patient data. After that, descriptive and inferential statistics are presented and the
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findings are discussed in relation to the patients’ perceptions of before and after the move.

5.8 Background

On the 28th and 29th of September 2015, a purpose built new university hospital opened its doors. At a cost of $1.8B AUD, the new facility boasted spectacular architectural design and state of the art medical technology (Capper, 2013). The new buildings included 70% of private rooms, (compared to a national average of 25%) with an emphasis on patient privacy and enhanced visitor amenities such as rest rooms and waiting areas. The new hospital featured approximately 8,330 rooms with a significant expansion in floor space. This publicly funded and owned facility was the culmination of years of planning to ensure that the move of patients to a world class facility was safe. The relocation of 219 patients from the old hospital, to the new university hospital occurred over two days. Some 104 people moved on a Friday, and another 115 followed the next day. These 219 patients experienced inpatient care within the same week at the two separate sites and provided a unique opportunity to conduct a one-off assessment of the relative patient experience before and after the move. As observers, their view of the changes between the old and the new environments add a patient perspective to what was occurring during the move.

Patient experience represents the events that happen to people and the extent to which people’s needs are met during a hospital stay (Beattie, Murphy, Atherton, & Lauder, 2015). In the last decade patient experience has emerged in the literature responding to growing consumer involvement in shaping health services. Quality health care is increasingly associated with individualised, patient centred care (Berger, Flickinger, Pfoh, Martinez, & Dy, 2014). Patient experience matters greatly as it is positively associated with clinical effectiveness and clinical safety (Doyle, Lennox, & Bell, 2013).
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The patient experience of being involved in a hospital move provides a rare insight into some of the domains of artefacts, values and assumptions that are oft mentioned as contributing to organisational culture, and patient safety culture (Kallio, Kallio, & Blomberg, 2015; Schein, 1990). This paper provides the patients experience before and after a major hospital move, and during the settling in period. Consistent with quality standards, patient feedback gives valuable insights into how services can be better shaped to improve the patient experience (Australian Commission on Safety and Quality in Health Care, 2012).

Dimensions of patient experience are delineated as functional and relational (Doyle et al., 2013). Functional aspects include environmental considerations such as cleanliness and being able to get assistance when required. Relational aspects refer to interpersonal components of care, the ability of staff to empathise and provide information. These dimensions are also referred to as facility related and non-facility related aspects of the patient experience (Siddiqui, Zuccarelli, Durkin, Wu, & Brotman, 2015). Relational aspects rely on provider level interventions and are a component of the human capital of the workforce delivering care (Hofmeyer & Marck, 2008). Functional aspects are linked to the bricks and mortar, and reflected in art works, healing gardens, décor, room design and personal amenities available to patients and their visitors. The physical environment is a very important part of ensuring safe patient care (Gurses & Pronovost, 2011). It is also important to staff as how they feel mentally, physically and socially is impacted on by the physical surroundings (Stichler, 2007). Hospital administrators often justify low scores in patient experience due to poor amenities and aging infrastructure (Siddiqui et al., 2015). Based on these arguments, we predicted the move to have a positive impact on the relational and functional aspects of the patient experience.
5.9 Method

Data on the patient perspective was collected by a series of standardised patient surveys, which were administered by trained patient liaison and patient safety staff, in the days immediately following the move. Interviewers guiding both the quantitative and qualitative parts of the survey were external to the ward and included health service staff from the Clinical Governance Unit, (patient liaison, patient safety officers and the researcher) assisted by a member of the academic research team. The survey used here was developed using a quality improvement paradigm (Varkey, Reller, & Resar, 2007) with the intent to inform potential improvement of the patient experience for the identified patient cohort. The survey included both quantitative and qualitative sections. This project was reviewed and approved by the organisations Human Research Ethic Committee (HREC / 16 / QGC / 254).

Patient experience surveys are typically conducted one month after discharge and are mailed to the patients to complete and return (Beattie et al., 2015). Retrospective patient surveys are regularly conducted at six monthly intervals to inform executive of trends in patient feedback. The aim of the survey reported here was different. We aimed at collecting information from inpatients at a point in time specifically related to the move from the former hospital to the new campus. Surveying patients whilst being inpatients ensured minimization of potential retrospective biases (Lawton et al., 2015) and also offered a nimble response to issues that needed to be addressed during the first days in the new building.

A 10-item survey was constructed based on best practice principles and validated patient surveys (e.g. Picker Institute) found in the literature (Jenkinson, Coulter, & Bruster, 2002). A search of existing surveys in the literature failed to find a survey that was suitable to the unique patient move setting that occurred in our situation (Beattie et
A mapping exercise was undertaken to compare those domains presented in the scholarly literature with those identified in a review of hospital patient experience measurement conducted by the Australian government (Australian Commission on Safety and Quality in Health Care, 2012). The resulting list of items included the following relational and functional domains that are considered important by the patient: comfort, noise, privacy, visitor amenities, access to information, clinical care, staff attitude, getting assistance and overall impressions (Beattie et al., 2015; Doyle et al., 2013; Jenkinson et al., 2002).

A five-point Likert scale was used for 8 of the questions, and a 10-point scale used for the last two questions. For questions 1 to 8 patients were asked to rate on a five point scale where 1 - not at all satisfied, 2 - slightly satisfied, 3 - moderately satisfied, 4 - very satisfied, and 5 - extremely satisfied. It is recommended that patient surveys also include a global or “overall” impressions question (de Silva, 2013; Doyle et al., 2013). For question 9, patients were asked: “On a scale of one to ten, where one is the worst environment imaginable and ten is the best environment imaginable, how would you rate the healing environment at the old hospital?”; and question 10 asked the respondents to rate: “on a scale of one to ten, where one is the worst environment imaginable and ten is the best environment imaginable, how would you rate the healing environment here at the new university hospital?”.

As recommended by existing researchers in patient experience (de Silva, 2013; Jenkinson et al., 2002), patients were lastly asked if they had any other comments or feedback in relation to their hospital experience over the last week. This enabled a triangulation of quantitative and qualitative information to gain a broader perspective of the patient experience (Creswell, 2014; Raines, 2013). Comments were transcribed and then grouped according to themes used in the survey instrument. Collation of qualitative
data was used to help in understanding the quantitative findings. All interviewers were provided a script which guided the introduction, explanation, confidentiality and consent requirements of the survey to the patients. Where carers were present, their input was also included. In addition to the research purposes, the intent of the survey was to provide speedy feedback to hospital management so as to respond to any immediate concerns in the first days after the move.

Given the narrow window of opportunity, a convenience sample of inpatients was interviewed on the 2\textsuperscript{nd}, 3\textsuperscript{rd} and 4\textsuperscript{th} of October 2015. Respondents were only included if they had been inpatients at the old facility and moved across to the new hospital. The sample was identified from a patient list generated from the hospital’s information system. A number of areas were excluded due to quick discharges (maternity) or defined as inappropriate to survey (intensive care, newborns and paediatrics). Nurse Unit Managers assisted in identifying patients who had capacity / were well enough to participate. This left a potential 150 adult patients who were transferred and suitable for interview. The average length of stay for a hospital inpatient was 2.8 days in 2014 – 2015 (Australian Institute of Health and Welfare, 2016). Given the short lengths of stay, and the narrow window of opportunity a total of 40 people were interviewed prior to discharge. This was approximately 26\% of patients that were moved from the old hospital to the new amenities and were representative of various speciality areas. As a bed side survey, patient consent was requested and confidentiality assured. The final number of patients’ surveyed and clinical areas they were admitted to is listed in Table 5.2.
What Table 5.2 shows is a spread of patients across clinical areas, including four patients from mental health. Rehabilitation was well represented (8 patients) reflecting longer lengths of stay of these patients. Our group included 15 females, 19 males and 7 not stated. The age of our patients spread from 17 years to over 70 years, with 36 of the 40 patients being over the age of 40. The age distribution of most respondents can be explained due to the exclusion of maternity and paediatrics patients. Information regarding age is provided in Table 5.3.

**Table 5.3 Age of patients**

<table>
<thead>
<tr>
<th>Age group</th>
<th>Number of Patients Surveyed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under 21</td>
<td>1</td>
</tr>
<tr>
<td>21 - 30</td>
<td>0</td>
</tr>
<tr>
<td>31 - 40</td>
<td>3</td>
</tr>
<tr>
<td>41 - 50</td>
<td>7</td>
</tr>
<tr>
<td>51 - 60</td>
<td>10</td>
</tr>
<tr>
<td>61 – 70</td>
<td>8</td>
</tr>
<tr>
<td>Over 70</td>
<td>10</td>
</tr>
<tr>
<td>Not stated</td>
<td>1</td>
</tr>
</tbody>
</table>
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In relation to type of room, almost half of the respondents (19 patients) experienced a room upgrade from a shared room in the old hospital to a single room in the new hospital. The shared rooms in the old hospital accommodated six patients in an open bay with central ward communal bathrooms. Shared rooms in the new hospital were limited to two beds. So while 12 patients were moved from a shared room to another shared room, the new room was shared with only one other inpatient and incorporated a separate bathroom for the two people in each room. Table 5.4 provides room types and numbers of patients.

*Table 5.4 Patients room type*

<table>
<thead>
<tr>
<th>Item</th>
<th>Old Hospital</th>
<th>New Hospital</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single room</td>
<td>7</td>
<td>26</td>
</tr>
<tr>
<td>Shared room</td>
<td>31</td>
<td>12</td>
</tr>
<tr>
<td>Not stated</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>

Note a shared room at the old hospital = a 6 bed bay, whereas as the new hospital a 2 bed bay

5.10 Findings

Descriptive statistics were prepared to inform the hospital executive team of the patient experience and are shown in Table 5.5. In addition, inferential statistics were calculated using SPSS. Table 4 looks at the percentage of responses in the “very satisfied or extremely satisfied” categories for both sites. This is referred to as “percent top-box” scores and used for reporting patient survey results to hospital management (Siddiqui et al., 2015). Top-box scores are used to benchmark hospitals and are a performance indicator that can be linked to health insurance payments and accreditation (Giordano, Elliott, Goldstein, Lehrman, & Spencer, 2010).

What can be seen in Table 5.5 is that top-box performance was highest for privacy, followed by noise and comfort. These items can be categorised as functional elements
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of the patient experience and are directly related to the physical environment (de Silva, 2013; Doyle et al., 2013). The qualitative comments in relation to functional elements were less supportive. Several patients commented that the new hospital was noisier than the old premises and that they felt cold in the new environment. There were mixed responses to the single rooms. While some patients liked the privacy, and appreciated having their own bathroom; others preferred the open plan of the old hospital, specifically the open verandas, a physical feature not provided at the new premises. Also, two patients that moved from a shared to a single room mentioned finding it very lonely in a single room. Loneliness and isolation are disadvantages of single rooms (Maben et al., 2016). Surprisingly, relational aspects of the patient experience did not score as well in the top-box analysis. Patient responses showed that they believed that access to information and education about their condition was worse than previously, and that there had been no change in the attitude of staff, or in the clinical care received. We explore these responses on the functional and relational aspects in the discussion section.

Table 5.5 Descriptive statistics, percentage of patients very satisfied or extremely satisfied

<table>
<thead>
<tr>
<th>Item</th>
<th>Old Hospital</th>
<th>New Hospital</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Comfort</td>
<td>49%</td>
<td>78%</td>
<td>29%</td>
</tr>
<tr>
<td>2. Noise</td>
<td>32%</td>
<td>66%</td>
<td>34%</td>
</tr>
<tr>
<td>3. Privacy</td>
<td>29%</td>
<td>79%</td>
<td>50%</td>
</tr>
<tr>
<td>4. Visitor amenities</td>
<td>31%</td>
<td>56%</td>
<td>25%</td>
</tr>
<tr>
<td>5. Education / information</td>
<td>56%</td>
<td>49%</td>
<td>-7%</td>
</tr>
<tr>
<td>6. Nurse call (buzzers)</td>
<td>44%</td>
<td>61%</td>
<td>17%</td>
</tr>
<tr>
<td>7. Clinical care</td>
<td>71%</td>
<td>73%</td>
<td>2%</td>
</tr>
<tr>
<td>8. Staff attitude</td>
<td>73%</td>
<td>73%</td>
<td>=</td>
</tr>
</tbody>
</table>
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In relation to the two global impression questions, the average response score for the old hospital 6.6, while the new university hospital average was 8.4. This does demonstrate a large shift in the overall experience of the patients in the sampled group and is shown graphically in Figure 5.3 below.

*Figure 5.3 Global environment score before and after the move*

Next, paired samples t-tests were conducted to evaluate the impact of the move on the patient’s experience according to all functional and relational aspects reviewed. There was a significant increase in scores p < .001 for comfort, privacy and general environment, and p < .05 for noise, visitor amenities, and the nurse call system. There was no significant difference reported for access to information, clinical care or staff attitude. Of all of the domains measured, staff attitude showed the least change with the pre-move experience (M = 4.30, SD = .97) and post-move experience (M= 4.19, SD = 1.33), having a non-significant t-score (36) = .598, p = .554. Table 5.6 provides a list of results for all of the domains surveyed.
In addition to the quantitative data, patients were asked if they had any comments or feedback about their overall hospital experience over the days of the move. Thirty-six of the 40 patients surveyed provided additional feedback. The research team grouped their comments according to emerging themes. This feedback identified shortcomings with the new hospital, including issues with hot water, air conditioning, food ordering systems and access to chairs. These problems were all addressed in response to the survey.

### 5.11 Discussion

As would be expected in a move from an aged facility to a brand new hospital, there was a significant positive change in the patient’s perceived experience scores on the functional domains of comfort, noise (quiet), privacy, nurse call and visitor amenities all exceeding the alpha threshold of p < .05. Surprisingly the relational domains of patient
education, information, clinical care and staff attitude failed to show a significant difference in the statistical tests of before and after the move.

Moving from shared rooms to single rooms had a significant impact on the majority of respondents in relation to their experience of perceived comfort and privacy. Inspection of the responses of the 12 patients who remained in a shared room, (but were transferred from six bed bays to a two bed shared room) also showed a similarly positive trend. Research on single versus shared rooms for inpatients in hospitals is inconclusive with both advantages and risks reported (Maben et al., 2016). Research on the benefits of single room design has predominantly focused on patient safety issues such as infection control (Reiling, Hughes, & Murphy, 2008) where single rooms are used to reduce cross contamination (Heddema & van Bentheim, 2011).

Other studies highlight that in addition to increased privacy and preserving patient dignity, single rooms enable patients to reduce noise and external interruptions by being able to close the door (Maben et al., 2016; Webster & Bryan, 2009). The effect of this has been shown to improve sleep which is linked to healing and recovery (Gellerstedt, Medin, Karlsson, & Sophiahemmet, 2014). However the effect of improved sleep is not only linked to the physical aspects of care, but also to nursing staff bed side manner. Qualitative findings show that the interpersonal aspects of the patients experience elicit a sense of security and reduce feelings of abandonment (Gellerstedt et al., 2014). In relation to the web of papers within this thesis, this adds to the findings regarding the importance of staff relationships, interprofessional collaboration and patient safety culture identified in paper 2. Additionally, the patient perspective is consistent to that of the staff (presented in paper 3) where no change in relational constructs or patient safety culture was evident before and after the move. Together they enhance our understanding
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of some of the antecedents and consequences of patient safety culture in dynamic clinical settings.

In the patient feedback collated in relation to the move, creature comforts where also frequently mentioned. For example, one patient commented that there was no waiting for a toilet, and no pressure to talk with other patients. Other studies, however, argue that single rooms promote social isolation and may be counter to therapy goals in patient groups such as paediatrics, palliative care and rehabilitation (Jackson & Jones, 2010; Maben, 2009; Maben et al., 2016; Morgan, 2010; Stall, 2012). This may explain the negative responses of two patients of our study in relation to the single patient rooms after the move. Being accommodated with others also increases observation; whereas patients in single rooms are at risk of not being noticed should they require urgent attention (Jackson & Jones, 2010). Patients with high risk of falls are one cohort of patients that may be better managed in an open ward environment (Ugboma, Drahota, Higgins, & Severs, 2011).

The full exploration of single rooms was beyond the scope of this project, however raises some interesting research opportunities to investigate the most appropriate allocation of single rooms; particularly in organisations where these are a costly commodity (Stall, 2012). Comfort scored high among participants of the survey with a significant change of p < .001. Comfort is associated with privacy, but also reflects physical aspects of care such as the amenities and furniture. Early mobilisation and participation in activities of daily living promotes patient independence, supports early discharge and is known to reduce hospital acquired complications such as deep vein thrombosis (Parry, 2016). The comfort of the hospital bed, mattress and chairs is associated with the risk of skin tears and decubitus ulcers or pressure injuries (Fowler, 2003; Jonsson et al., 2005). Comfort is an important domain from the patient’s
experience, but also from an organisational patient safety perspective. For example, several patients in the survey mentioned the close access to the toilet as an improvement in the new environment in relation to their perception of safety and reduced risk of falls. The question relating to the patient experience of the nurse call system has elements of both domains of functional (the buzzer must work) and relational (a person must respond in a timely manner). In our study, there was a significant (p < .05) improvement from the former to the latter premises. Responsiveness is a key quality indicator of health care and is a critical part of the “process” of delivering timely care (Donabedian, 2005).

Analysis of the data shows that those domains showing least change were the relational aspects of access to patient education and information provided by staff, clinical care and staff attitude. There are several possible explanations for these findings. Firstly, the move represented a time of significant change not just for the patients under investigation but also for the staff caring for them. The insignificant change on relational aspects could be interpreted as a positive outcome (that is of a maintained standard of care) during the move period despite the huge environmental changes. Another explanation for the perceived lack of change on these aspects is that the relational elements, which also represent key elements of the organisational culture, do not improve at the same speed as the functional elements. Put differently, changing functional elements does not necessarily mean that relational elements of an organisation improve. The qualitative data of the survey supports this notion, as one patient stated – “same staff different building” when complimenting the staff. Another patient when asked about his clinical care commented - “...they haven't fixed me yet despite the new environment”.
Chapter 5 Changing the Environment

Moving hospitals is an enormous change for staff and places them in a new and unfamiliar environment which they need to adapt to (Lin, Foster, Chaboyer, & Marshall, 2016). One can assume that moving a hospital is stressful for staff and it is quite possible that this may have influenced staff attitudes during this period. A number of the patients commented on this. For example some patients articulated that while the staff seemed happier, some clinical staff couldn’t find things and kept getting lost. One participant said - “there are teething problems, but in time the staff are sorting themselves out”. Other patients had less positive feedback regarding staff attitudes. These included comments about not feeling listened to and delays in getting clinical attention.

The raw data shows that the patients felt that access to education and information about their condition had declined. While this change was not statistically significant (p = .292) it does warrant discussion. The old hospital wards had an array of cluttered notice boards, pamphlet stands and posters tacked onto walls. In the new hospital, the building warranty specifically prohibited any-thing being put on the walls hence there was a lack of visible information. The plan was to have information streamed through the patient entertainment system, however activation of this system was delayed due to a focus on the immediate priority of patient safety. Patients made the following comments: “I can’t see any involvement of allied health (at the new hospital)”, ‘great variation of nursing”, and “new hospitals care has gone backwards”.

The observation by some patients that the staff seemed happier, may reflect the excitement of arriving at the new place. While cultural change is slow to occur, the move was a symbolic milestone in the history of the health service. It remains, however, unknown, as to how long it takes for cultural change to occur and how long it takes for the “newness” factor to diminish (Smith, 2003). In the study by Siddiqui et al. (2015),
which was the only study the authors were able to find that studied the effects of a hospital move, the authors report that the move to a renovated new clinical building was associated with improved room- and visitor-related satisfaction. Siddiqui et al. (2015) note further that there was no significant improvement in satisfaction with clinical providers and only one of the four domains in their measures improved. This domain included décor, visitor accommodation, noise and comfort. The authors conclude that patients respond to pleasant surroundings, but are able to discriminate between their experiences with environment and those with clinical providers (Siddiqui et al., 2015). These findings generally parallel those found in our study; changes in functional or facility related domains were significantly improved after the move, while relational or non-facility related domains remained relatively constant.

5.12 Practical applications

The implications for managers are valuable. We know that by changing from old to new premises we can significantly improve the patient experience. By focusing on functional elements managers can make a large impact on the patient experience. However, the patients’ perceptions of clinical care, interactions and staff relationships do not necessarily improve with better physical surroundings. In order to improve the relational aspects of the patient experience, more than new bricks and mortar is needed. Implicit in the relational aspects of care is the important role that team work and patient safety culture play (Weller, Boyd, & Cumin, 2014). The physical geography of a hospital and the geographical location of patients within the hospital can affect team communication (Weller et al., 2014), however a strong team identity and scheduled meetings can overcome physical barriers (Kipnis, Rhodes, Burchill, & Datner, 2013; Sacks et al., 2015). Patient satisfaction and compliance with treatment orders has been shown to be positively correlated with the patient’s perception of team work, and staff
attitude (Kipnis et al., 2013). Staff relationships do not change because of a new environment and future research would explore the gestation period of cultural change in more depth. Team structure and staff development may have a role here. The fact that there were no significant deteriorations in the patient experience is evidence of routines. These routines are slow to change as staff cared for patients both before and after the move.

The patient survey had the specific goal of identifying shortcomings in the immediate post move period. A summary of findings was escalated to the executive management team to ensure that issues raised by the patients were addressed in a timely manner. Our study showed that a patient view of care at a critical time such as moving a hospital provided valuable insights into important factors from the patient perspective.

5.13 Limitations

This project aimed to measure the patient experience between an old hospital and a new hospital built on a greenfield site within days of the patient transfer. It also had the goal of adding to what is known about the effect of changing the environment on patient safety culture. Given the newness of this approach, an absence of validated surveys measuring patient safety culture and the patient experience of a major hospital move was identified. While the survey questions were based on validated patient experience surveys, the application in this paper to a move scenario is novel and to be interpreted with caution.

As patients provided a retrospective assessment of their experience at the old hospital, this may have been clouded by their experience at the new premises. Patient surveys are commonly fraught with different types of biases including retrospective respondent bias, social-desirability bias, and non-response bias (Perneger, Chamot, & Bovier, 2005). Also, as patients had only been in the new premises for a maximum of 4 days, their
assessment on all items are based on initial impressions only (staff settled in during this initial period also and may not have reflected a potentially new routine yet). Although patients were asked to report on their experiences at two different places, the survey data was collected only after the move to the new premises. This presents a retrospective bias in relation to their perceptions in our survey. Future research would endeavour to do a before and after survey comparison in order to obtain longitudinal data. Also, patients that participated in the survey were a convenience sample and patients representing other wards, such as maternity and paediatrics, were not included. Our numbers are small as informed consent eliminates patients who do not have capacity, are too ill or are in a post – operative state of lessoned awareness. Our total population of patients moved was 219, with 150 of these deemed suitable for inclusion, yielding 40 consenting participants available in the 2 day window. We urge future research to adopt longitudinal studies that include a larger sample of the hospital patients as well as staff populations in order to get a more rounded idea as to the different stages of a major physical move of a healthcare provider.

It is quite possible that patients were also reluctant to comment on additional relational issues of care that are not meeting their needs for fear of retribution (Iedema & Angell, 2015). This means that feedback on structural elements is more forthcoming, and may be easier to address than feedback on relational aspects such as clinical care and staff attitude. A further consideration is sustainability of improvements over a longer period of time. In the case reported here, patients had experienced both the old and the new hospitals within the previous week and were able to make a stark comparison. With time, the patient experience will be limited to the new environment. Therefore one could predict that the patient experience will plateau, reinforcing the need to focus on the relational and cultural aspects of patient care.
Chapter 5 Changing the Environment

5.14 Conclusion

This study set out to explore the impact of a major physical move on the perceived experience of patients before and after this move. Additionally it aimed to provide a more complete picture of the impact changing the work environment has on the antecedents and consequences of patient safety culture within a dynamic clinical setting. The previous chapter explored the impact of changing environments on staff perceptions of patient safety culture and this paper provides a glimpse of the patients’ perspective. The patient survey indicated that the new environment had improved the patient experience of specific functional domains of care, however, the relational aspects of the patient experience remained unchanged. The implication of this is that the relational aspects of care need different enhancements and may not have anything to do with the standard of the physical environment of an inpatient healthcare institution. This paper therefore is one of the first to provide an insight into the patient experience before and after a major hospital move. This is a valuable adjunct to what is known regarding staff experiences of similar situations. We would like to note that the results of this survey were immediately translated into action by hospital management, which is a key priority for quality improvement surveys.

“Unless someone like you cares a whole awful lot,
Nothing is going to get better. It's not.”

Dr Seuss (1972), The Lorax
References


Chapter 5 Changing the Environment


Chapter 5 Changing the Environment


Chapter 6  Developing Workforce Capacity

“All the world is made of faith, and trust, and pixie dust.”
Barrie and Byron (1973), Peter Pan and Wendy

Preface

The previous chapters explored patient safety culture from a number of perspectives. This included the comparison of staff survey data collected in 2013 and 2015. This next chapter contains the 5th and final paper of this thesis, “Pixie dust” - the moderating effect of reflexivity on patient safety culture and quality patient care”.

Using data collected in the 2015 staff survey which included an additional domain of quality patient care, a number of hypotheses are tested. This chapter uses patient safety culture as an independent variable and explores the relationship between reflexivity, patient safety culture and quality patient care. Just as pixie dust is a magical ingredient, reflexivity is shown to have a moderating effect on the relationship between patient safety culture and patient quality care. This is important in developing workforce capacity.

This is a unique and focused study that explores domains not previously considered in the patient safety literature. The goal here is to gain a better understanding of patient safety culture and inform the development of strategies aimed at improving quality of patient care. Using empirical modelling, this paper shows that when combined, reflexivity and patient safety culture lead to positive levels of quality patient care. Implications for practice extend to professional issues and organisational approaches to teams and change management.
STATEMENT OF CONTRIBUTION TO CO-AUTHORED PUBLISHED PAPER

This chapter includes a co-authored paper:


My contribution to the paper involved:

**Susan Brandis:** Co-ordination of ethics and site specific application. Research planning, data collection and analysis. Statistical analysis. Review of the literature and development of hypothetical models. Writing of the paper and exploration of models. Journal submission and review.

(Signed)

(Date) 31st July 2017

**Stephanie Schleimer:** Editing of paper, provision of guidance on paper structure, discussion and theoretical models

(Countersigned) [Signature]

(Date) 31st July 2017

**John Rice:** Editing of paper. Development of empirical models and assistance with statistical analysis.

(Countersigned) [Signature]

(Date) 31st July 2017

Supervisors: Dr Stephanie Schleimer and Professor John Rice
Chapter 6 Developing Workforce Capacity

Paper 5: “Pixie dust - the moderating effect of reflexivity on patient safety culture and quality patient care”

Abstract

**Background:** Creating a culture of patient safety and developing a skilled workforce are major challenges for health managers. However, there is limited information to guide managers as to how patient safety culture can be improved. Here we explore the concept of reflexivity, and develop a model for magnifying the effect of patient safety culture and demonstrating a link to improved perceptions of quality of care.

**Purpose:** To test the moderating effect of reflexivity on patient safety culture and quality patient care. To gain a better understanding of patient safety culture and inform the development of strategies aimed at improving quality of patient care.

**Method:** This research employed a correlational case study design with empirical hypothesis testing of quantitative scores derived from validated survey items. Staff perceptions of patient safety, reflexivity and quality of patient care were obtained and analysed using inferential statistics. The non-random sample included 227 health service staff from clinical and non-clinical designations working in a large Australian health service delivering acute and sub-acute health care.

**Results:** Both patient safety culture and reflexivity are positively correlated with perceived quality of patient care at the p < 0.01 level. The moderating role of reflexivity on the relationship between patient safety culture and quality of care outcomes was significant and positive at the p <.005 level.

**Conclusions:** Our model shows that when combined, reflexivity and patient safety culture lead to positive levels of quality patient care.

**Practice Implications:**
Implications for practice extend to: a) professional issues such as pre professional curriculum content and postgraduate licencing and registration requirements; and b) organisational management approaches to teams and change management.
Chapter 6 Developing Workforce Capacity

6.0 Introduction

Since the publication of the seminal report “To Err is Human” (Stefl, 2001), researchers have investigated ways of creating a safer health care system. Creating a culture of safety and developing a skilled workforce are suggested as ways to improve quality of health care and ultimately patient outcomes (Vivekananda-Schmidt & Sandars, 2016; Weaver et al., 2013). While progress has been made in the patient safety arena, the link between safety culture, workforce training and improved patient outcomes remains elusive. Furthermore, there is little information to guide managers as to what ingredient (or pixie dust) they can use at an organisational level to make the most of what “patient safety culture” they have. This is the cake made without a raising agent. In the search for this mysterious ingredient, we turn to the organisational and educational literature and explore the concept of “reflexivity”. For those who have confused self-raising flour with plain flour, reflection and reflexion are similarly confusing. This paper aims to clarify what reflexivity (with an x) is and presents an examination of the relationship between reflexivity, patient safety culture and quality patient care in a dynamic hospital environment.

We propose building on the existing practices of reflection (with a ct) to develop health organisations that are reflexive to patient safety. Reflection is a practice familiar to health professionals, built into curricula and the extension of these reflective skills to become reflexive practitioners may have beneficial impacts on the quality of care.

While there is an emergence of qualitative papers that consider the role of reflexivity on patient safety, we were unable to find any evidence of the link from a quantitative perspective. When an organisation is reflexive, a positive safety culture is enabled, which leads to an environment supporting quality patient care. We extend this theory by considering how reflexivity as a moderator variable (or pixie dust), amplifies the
strength of the relationship between patient safety culture (as the dependent variable) and quality of patient care (as the dependent variable). Our ultimate goal is to discover what reduces the impact of adverse events in order to enhance safety climate and to improve quality of patient care. To set the backdrop a conceptual framework that underpins our research questions follows.

6.1 Theory

6.1.1 Reflection and reflexivity

Reflective practice has been the cornerstone of nursing education for decades (Caldwell & Grobbel, 2013). Social workers and psychologists have a long acceptance of the use of reflection to improve professional practice (Mann, Gordon, & MacLeod, 2009). Reflective practice now transcends across a broader group of health disciplines and is effective in training medical students (Ambrose & Ker, 2014); junior medical staff (Ahmed, Arora, Carley, Sevdalis, & Neale, 2012); pharmacists (Pezzolesi, Ghaleb, Kostrzewski, & Dhillon, 2013); physiotherapists and occupational therapists (Morley, Smith, & Petty, 2011). Reflective practice can occur on an individual basis (Alley, Jackson, & Shakya, 2015), or as a team process (Schippers, West, & Dawson, 2015). Exercises in reflection feature in curricula of health care professionals and have been applied as a means of improving clinical practice skills (Mann et al., 2009). Records of reflection are required evidence for the registration and licencing of medical, nursing and allied health staff and may contribute to professional development points. Common tools for reflection include journal keeping, video recordings and feedback from teachers, peers or patients (Iedema, 2011).

The terms “reflective practice”, “objective mindfulness” and “mindful reflective practice” are used in the health care literature. The assorted nomenclature generates
confusion in separating the concepts of reflection and reflexivity. Mindfulness or mindful reflective practice has shown to be effective in reducing medication errors by pharmacists (Pezzolesi et al., 2013). Looking back and changing practice based on experience is effective when practitioners set up systems or change behaviour to reduce the risk of repeating a mistake. Reflexivity is the individual’s capacity to monitor events as they occur and adjust actions to ensure a positive outcome (Iedema, 2011). The literature on reflexivity emanates from scholars in organisational psychology and management (Knippenberg, Hartog, Schippers, & Koopman, 2008; Schippers et al., 2015); and education (Cunliffe, 2004). This research stems from the earlier work of Mezirow (1981) and Schön (1983).

Group reflexivity is defined as “the extent to which group members overtly reflect on and communicate about the group’s objectives, strategies and processes and adapt these to current or anticipated circumstances” (Knippenberg et al., 2008, p. 1595). It has been attested that critical reflexivity leads to more collaborative, responsive and ethical management of organisations (Cunliffe, 2004). By examining assumptions we become less prone to complacency or ritualistic thoughts and actions (2004). From an organisational perspective, reflexivity is linked to learning and innovation (Jain, Hallensleben, & Manger, 2013). Akin to quality improvement, reflexivity is characterised by a feedback loop (Jain et al., 2013) and the desire to improve and innovate the way work tasks are performed (Urbach, Fay, & Goral, 2010). Reflexivity draws on different ways of thinking such as existential thoughts, relational phenomena, and praxis and has been explored as a tool in the knowledge translation process (Alley et al., 2015). Team reflexivity is the deliberate process of discussing team goals, processes and outcomes (Schippers, Edmondson, & West, 2014). Transformational leadership may motivate group members to be reflexive (Knippenberg et al., 2008) and
reflexivity is related to both subjective and objective measures of team performance (Schippers et al., 2015). Research has explored the usefulness and feasibility of a “reflexivity method” to enable change and improve clinical handover and concluded that reflection alone does not lead to change, as this is deliberation without action (2007). Reflexivity is an iterative process comprised of a) reflection, b) planning, and c) action, all of which depend on “atmosphere” or “culture” to support active learning (Broekhuis, 2007).

To summarise, reflectivity or the act of reflection is the looking back and making sense of prior action (Iedema, 2011; Mezirow, 1981). A reflective practitioner examines their actions retrospectively, solicits feedback with the goal of continually improving their clinical practice in the future. A reflexive practitioner has in-situ awareness and introspection. While looking inward (as in reflection), a reflexive practitioner responds proactively to evaluate and adapt for immediate impact (Moreland & McMinn, 2010; West, 2000). Reflexivity is the personal view of the past, and the understanding of cause and effect and how practitioners react to a current situation. It is “reflection in action” (Iedema, 2011). A reflective practitioner changes their actions in the future; a reflexive practitioner changes their actions concurrently.

6.1.2 Patient safety culture

Culture aims to address deeper values and assumptions and is a socially constructed phenomenon symbolised by artefacts, beliefs, values and assumptions (Schein, 1985). Patient safety climate assesses employee’s perceptions of the presence or absence of important processes and values that underlie appropriate patient safety (Vogus & Sutcliffe, 2007). Examples include patient handover, collegial skills knowledge, a capacity to prioritise important patient factors and a willingness to face errors and
problems when they occur (Vogus & Sutcliffe, 2007). For consistency, we use the term “culture” as this incorporates both constructs of climate and culture.

One in ten inpatients will experience an adverse event during their hospital stay and health managers are constantly searching for programs that will improve patient safety and safety culture (Australian Commission on Safety and Quality in Health Care, 2014). The literature abounds with theoretical models which describe the complex phenomena of patient safety culture. The model that links well with the ideas of reflexivity and quality of patient care is that proposed by Vogus, Sutcliffe, and Weick (2010) who described patient safety culture as “enabling, enacting, and elaborating”. Reducing hospital errors requires a multifactorial approach that addresses a number of key activities. “Enabling” activities include policies and practices that motivate the pursuit of safety. Enabling is characterised by directing attention to patient safety and secondly by creating environments where clinicians feel able to speak up and feel psychologically safe (2010). Actions that enable staff to practice safely include open and candid discussions, safety forums and walk arounds (Weaver et al., 2013).

“Enacting” is the translation of safety ideas into safe action and examples include frontline actions such as teamwork, incident reporting and handover. Enacting a safety culture requires identifying safety risks and the implementation of guidelines for safe clinical practice (Vogus et al., 2010). The concept of “elaborating” includes learning; monitoring and improvement activities used to reinforce safe clinical practice, and is a similar idea to “reflexivity” (Ahmed et al., 2012; Vogus et al., 2010). Elaborating involves the rigorous reflection on safety outcomes and the use of feedback to modify practices and enable processes.
Chapter 6 Developing Workforce Capacity

The practice of reflection and reflexivity are methods to develop clinicians who are self-aware and active learners. Publications on reflexivity and patient safety present plausible models, but lack empirical testing (Hu & Little, 2015; Iedema, 2011). We argue that reflexivity supports a positive culture of patient safety. Where employees working in teams are reflexive, they are better able to respond to patient safety incidents. The benefits of reflection include the making meaning of complex situations; stimulating learning from experience; and helping with complex clinical problem solving (Mann et al., 2009). We accept this to be true, however extend the benefits to a direct impact on patient safety culture. Our reasoning is that the ability to reflect and be reflexive is not a passive element of clinical competence but rather has a direct positive relationship with patient safety culture. The reason we are concerned with patient safety culture rests on our second assumption being that patient safety culture is related to the quality of patient care. We now explore the concepts of quality of patient care more closely.

6.1.3 Quality of Patient Care

Quality of patient care is an important factor in the assessment of the value of health services and is a key driver of systems reform (Australian Commission on Safety and Quality in Health Care, 2014). While improving quality and safety in health care is a major priority for health care providers, the challenge is in finding ways to achieve improvement. Quality standards are variable, and often context specific. Good care is becoming increasingly associated with individualised, patient-centred care (Australian Commission on Safety and Quality in Health Care, 2014). Our argument follows that reflexivity, or the ability to discuss team goals, processes and outcomes and adapt these to the situation will support a philosophy of patient centred care. Reflexivity is
described as “reflection in action” (Iedema, 2011) and we propose that when patient safety culture and reflexivity combine, the result is “quality improvement in action”.

The central defining principles and practices of quality improvement include customer focus, continuous improvement, and team work to solve a problem (Lemieux-Charles et al., 2002). Safety and quality can be measured by many things from process indicators that consider waiting times and access; outcome measures such as mortality and morbidity rates to experience based measures such as patient satisfaction and experience. Quality theories prevail and the most commonly applied model is the plan, do, check, act (PDCA) model as promulgated by Deming (Varkey, Reller, & Resar, 2007). Comparable to reflexivity, the PDCA model is active and contributes to a continued cycle of learning and improvement. We know that reflexivity leads to enhanced safety behaviour in medical students, nurses and pharmacists (Ahmed et al., 2012; Caldwell & Grobbel, 2013; Pezzolesi et al., 2013). Based on these findings we propose that reflexivity may be a special ingredient (or pixie dust) that moderates the relationship between patient safety culture and quality of patient care. The act of reflexivity stimulates patient safety into action and consequently leads to better quality of patient care. From this background, we articulate the following hypothesis to be tested.

\[ H1a: \text{Patient safety culture is positively related to the perceived quality of patient care} \]

\[ H1b: \text{Reflexivity is positively related to the perceived quality of patient care} \]

\[ H2: \text{Reflexivity amplifies the positive relationship between perceived patient safety culture and quality of care outcomes.} \]
6.2 Method

This research received full human research ethics approval and met all of the research governance requirements of the institution under study.

A survey was conducted within a large Australian health service in September 2015. The health service delivers acute and sub-acute healthcare to a population of approximately 600,000. At that time, the health service employed approximately 7,000 staff. The staff spanned all categories including support staff (catering, maintenance etc.), clinical staff (health care professionals) and management. Survey respondents, were invited through a targeted district-wide health service email broadcast (for the online survey) and by hard copy in selected sites of the district-wide health service where availability of the internet was limited.

Culture is behaviourally oriented; hence, research frequently uses questionnaires that assess behaviour (Patterson & West, 2005). The survey focused on recognised dimensions of patient safety culture. This research used a domain specific approach to allow a more precise and targeted collection of information that enables the testing of discrete relationship between variables (Patterson & West, 2005). Four standardised questions were asked to measure organisational reflexivity (2005). Nine patient safety items included were from the Safety Organising Scale (SOS) developed by the authors of the “enabling, enacting, elaborating” model of patient safety culture (Vogus et al., 2010). Our dependent variable, quality of patient care was assessed by validated questions based on the Deming model of PDSA and the emphasis given to quality procedures (Patterson & West, 2005).

A five point Likert scale was used for each question and data entered and coded into an excel spreadsheet by an external research assistant to ensure that all information
remained confidential. The data was uploaded into SPSS for multivariate analysis. We cleansed our data and checked assumptions to ensure suitability for parametric statistical analysis. Teamwork has an important role in delivering quality patient care, and we amalgamated results across disciplines. A score for each construct of patient safety, reflexivity and quality of patient care was calculated by totalling the responses for each set of questions and dividing by the number of items.

6.3 Results

The survey respondents (n = 227) were broadly representative of the staff profile in the annual report of the health service being studied with nurses under represented. The demographic of our sample is shown in Table 6.1.

<table>
<thead>
<tr>
<th>Table 6.1 Demographics of sample</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant number</td>
</tr>
<tr>
<td>Nursing</td>
</tr>
<tr>
<td>Administrative staff</td>
</tr>
<tr>
<td>Allied Health</td>
</tr>
<tr>
<td>Medical</td>
</tr>
<tr>
<td>Operational (kitchen, cleaners, porters)</td>
</tr>
<tr>
<td>Professional (legal, finance, library)</td>
</tr>
<tr>
<td>Other (volunteers, chaplains)</td>
</tr>
<tr>
<td>TOTAL employees</td>
</tr>
</tbody>
</table>

To test Hypothesis 1a and 1b: *perceived patient safety culture and reflexivity are positively related to quality of patient care*; we conducted a preliminary analysis for correlation. The relationships between the three variables of patient safety culture, reflexivity and quality of patient care were tested using the Pearson product-moment correlation coefficient. Preliminary analysis was performed to ensure no violation of the
assumptions of normality, linearity and homoscedasticity. As shown in Table 6.2, there was a strong positive correlation between our three variables that was significant at the p< 0.01 level.

Table 6.2 Bivariate correlations, means and standard deviations of variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>SD</th>
<th>QPC</th>
<th>PSC</th>
<th>RFX</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quality of Patient Care (QPC)</td>
<td>3.8027</td>
<td>0.68141</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Patient Safety Climate (PSC)</td>
<td>3.5576</td>
<td>0.74455</td>
<td>0.392**</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>Reflexivity (RFX)</td>
<td>2.9679</td>
<td>0.89226</td>
<td>0.572**</td>
<td>0.461**</td>
<td>-</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level

We then conducted an initial linear model to ascertain the significance of the two independent variables of patient safety culture and reflexivity in predicting quality of patient care. Consistent with Table 6.2, we noted that these variables positively and significantly predicted the quality of patient care. This is shown in step one of Table 6.3. While we predicted a relationship between our variables, our next step was to test for an interaction and explore the strength of reflexivity as a moderating variable as stated in our second hypothesis.

H2: Reflexivity amplifies the positive relationship between perceived patient safety culture and quality of care outcomes.

We derived three scores; one for patient safety climate (as the primary independent variable), one for reflexivity (as the moderator) and one for quality of patient care (as the dependent variable). In order to explore the strength of a moderating effect we used the PROCESS tool for SPSS by Andrew Hayes (Hayes & Ebscohost, 2013). The advantage of this tool is that it centres predictors, computes the interaction of the variables and does simple slope analysis. Our findings support our second hypothesis that Reflexivity amplifies the relationship between perceived patient safety culture and
quality of care outcomes. Moderation is shown by the significance of our interaction term \((b = .1149, p < 0.05)\). This indicates that the relationship between patient safety culture and quality of patient care is positively moderated, or magnified, by reflexivity. We then assessed the moderating effect at five levels of reflexivity, namely the 10\(^{th}\), 25\(^{th}\), 50\(^{th}\), 75\(^{th}\) and 90\(^{th}\) percentiles. These values are shown in Table 6.3.

**Table 6.3 Regression models – DV = quality of patient care**

<table>
<thead>
<tr>
<th></th>
<th>Step 1 – Linear Only</th>
<th>Step 2 – Linear plus Interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE B</td>
</tr>
<tr>
<td>Constant</td>
<td>2.120</td>
<td>0.232</td>
</tr>
<tr>
<td>RFX</td>
<td>0.371</td>
<td>0.056</td>
</tr>
<tr>
<td>PSC</td>
<td>0.162</td>
<td>0.068</td>
</tr>
<tr>
<td>RFX * PSC</td>
<td>0.115</td>
<td>0.780</td>
</tr>
</tbody>
</table>

\[R^2 = 0.352, \; p < 0.001\] \[R^2 = 0.370, \; p < 0.001, \; \Delta R^2 0.018^*\]

* p < 0.05, *** p < 0.001

Our model demonstrates that when reflexivity is low, there is a non-significant relationship between PSC and QPC. At the 10\(^{th}\) percentile of reflexivity, which equates to an average response of 2 on the 5 point Likert scale, there is no significant interaction effect evident \((p > 0.10)\). As reflexivity increases, however, its conditional effect becomes greater and more significant. We note in Table 6.4 that at mean levels of reflexivity, the conditional effect is 0.2063 \((p < 0.01)\) and at the 90\(^{th}\) percentile of reflexivity, which equates to a mean response of 4, the effect is greater still \((0.3212, p < 0.01)\). We conducted tests to ensure that the data met the assumptions relating to collinearity. These tests indicated that multicollinearity was not present \((RFX, Tolerance = .811, VIF = 1.233; PSC, Tolerance = .811, VIF = 1.233)\). These were both well within accepted benchmarks.
We present our fully specified model in step 2 of Table 6.3, and provide an illustration of this model’s point estimates in Figure 6.1. While the upward slope of the lines presented and the increased height of these lines illustrate the direct effects of PSC and RFX on QPC, the divergence of these lines further illustrates the significant interaction of these predictors within our dataset. As such, and evidenced in Table 6.3 and Figure 6.1, we find support for our hypothesis that reflexivity positively moderates, or enhances, the relationship between patient safety culture and quality of patient care, which is significant at the $p < .05$ level.

There is a significant relationship between patient safety culture and quality of patient care such that when reflexivity is high, the relationship is significant and positive as evidenced by the lines diverging. The optimum level of quality of patient care is when both reflexivity and patient safety are high. While patient safety on its own leads to quality of patient care, a reflexive workforce will amplify these benefits.
Questionnaires are the most commonly used methodology in patient safety studies (O'Connor, Buttrey, O'Dea, & Kennedy, 2011) however they have limitations where constructs are assessed from the same sample. Non-random response bias is a major consideration when using survey methodology (Chang, Witteloostuijn, & Eden, 2010; O'Connor et al., 2011). Analysing survey data based on the same respondent groups has the risk of common method variance. For this reason, a number of post-hoc statistical tests were conducted to try to reduce this error. As our study focuses primarily on assessing the significance of third order effects, there is less susceptibility to common variance bias than would be the case for studies examining only primary or secondary effects (Chang et al., 2010). All items were loaded onto a single factor as per Harman’s test (Morrison, 1961). Our results provided a result of 43% which is under the benchmark of 50%.
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6.4 Discussion and implications for practice

This paper provides empirical evidence of the relationship between patient safety culture, reflexivity and quality of patient care. Furthermore, we demonstrate that when combined, reflexivity and patient safety culture lead to heightened levels of quality patient care. The moderating effect of reflexivity is significant at the p < .05 level; our “pixie dust” has a measurable effect. The first finding, that patient safety culture is related to quality of patient care is reassuring, as many improvement projects have been delivered with this one goal in mind. Demonstrating that reflexivity is related to quality of patient care is tangible evidence that reflexivity is worth studying and that it requires further attention as a phenomenon in the patient safety arena. We consider the implications of our findings and make suggestions under the themes of a) professional issues and b) organisational approaches.

a) Professional issues

The review of patient safety curriculum guidelines to include concepts of reflexivity and a link to patient safety and quality of patient care warrants consideration (Vivekananda-Schmidt & Sandars, 2016). We interpret our findings to indicate that training health professionals in reflexivity techniques may improve patient safety culture and benefit quality of patient care. The current practice of using reflection activities in undergraduate training programs should be extended to include skills in reflexivity. We are not dismissing the importance of reflection; but suggesting that adding a reflexivity component may lead to improved benefits.

Despite the widespread use of reflection as a method of assuring clinical competence, there is limited empirical evidence linking the act of reflection with patient care outcomes. For some health professionals, records of reflection are vital evidence for
continued licencing and registration. Our findings suggest an opportunity to expand this process to recognise reflexive practice. Investigating methods of capturing reflexivity requires further research. Our model shows that while patient safety culture relates to higher perceptions of the quality of patient care, this association strengthened when reflexivity is high.

**b) Organisational management approaches**

Attempts to improve patient safety culture rely heavily on change management methods. Future efforts to develop team skills should consider targeted interventions aimed at stimulating reflexivity. Additional research would assist in a better understanding of the context and types of teams that are reflexive, and identify an effective reflexivity “dose”. To date efforts aimed at improving reflection and subsequently reflexivity have focused on direct learning outcomes for the clinicians. We propose that there is more to this, and that a reflexive workforce will lead to better outcomes for patient care by enabling broader organisational change. Teams are critical and effect quality improvement by internal processes and by output. Teams that use quality improvement have been found to be more effective (Lemieux-Charles et al., 2002).

We have previously defined reflexivity as reflectivity in action; and view this as an activity that happens on a group or team level. Reflexivity is more than contemplation; it includes an active response or adaption (West, 2000). We describe it as the continued calibration of team behaviours in the delivery of patient care. The level of patient safety culture will set the tone within which patient care is delivered. A reflexive work force will respond nimbly as events unfold and adjust care behaviours to achieve better patient outcomes.
Teams have been described as information processing systems, and reflexivity reduces information-processing failures (Schippers et al., 2014). An information processing error is a failing of communication and communication errors contribute to a disproportionate number of clinical errors and adverse events. Schippers et al. (2014) present a framework whereby teams high in reflexivity are more likely to have reduced errors and failures. We provide empirical evidence of a significant relationship between reflexivity and patient safety culture. Furthermore, our findings show that patient safety culture on its own is not enough as the moderating role of other phenomena such as reflexivity leads to magnified perspectives of patient quality of care.

The notion of pixie dust may appear naïve, but reflexivity offers a simple theory to improving patient outcomes. Clinicians and managers face a veritable smorgasbord of programs aiming to enhance clinical practice and improve patient care. Such programs target teamwork, communication skills, compliance models and accreditation. A simplification of theories and approaches to patient safety and quality might yield cost effective benefits, and better inform practice. An enhancement of reflexivity skills may lead to better results across a number of areas. Organisational culture is pervasive, and not quickly adjusted. We argue that the act of reflexivity enhances the influence of patient safety culture and is positively related to better quality of patient care. Our findings also raise the prospect that reflexivity is a marker for quality improvement. To use our pixie dust analogy, patient safety culture exists, and when reflexivity increases, perceptions of quality outcomes are improved. There is an interaction that we have identified in an empirical model, and demonstrated in a graph. This figuratively magical effect requires further exploration.
6.5 Limitations

A practitioner’s personal value system and habitus are essential parts of reflexivity and we have not explored the importance of these in our research. Our method used survey methodology and as such derived a score for each of our variables of patient safety culture, reflexivity and patient care outcomes. These scores are based on participants’ perceptions collected from a survey tool. Safety culture surveys give a broad measure of the safety climate at the organisation at a particular point in time. While self-administered tools are widely used in patient safety research, they can be affected by non-random error (O'Connor et al., 2011). This is one argument for the triangulation of quantitative and qualitative methods for assessing safety climate (O'Connor et al., 2011). Our study relies only on quantitative data. The aggregation of data from all participants inhibits the ability to stipulate what type of team and in what circumstances reflexivity is aroused.

6.6 Conclusion

This paper finds a significant moderating effect of reflexivity on the relationship between patient safety culture and quality of patient care that is significant at the p < .05 level. We believe that these findings provide evidence of the importance of developing a health workforce that is nimble and reflexive to patient safety events. This research adds further to the understanding of organisational factors that may enhance the quality of patient care, and ultimately lead to better patient care outcomes.

“The moment you doubt whether you can fly, you cease for ever to be able to do it.”

Barrie and Byron (1973), Peter Pan and Wendy
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“Tut, tut, child!” said the Duchess. "Everything's got a moral, if only you can find it."

Carroll and Tenniel (1976), Alice in Wonderland

Preface

The previous 6 chapters have all been instrumental in addressing the overarching research quest of antecedents and consequences of patient safety culture.

Chapter 1 provided an introduction to the topic of patient safety culture in the context of the Australian Health Care System. The research aims and questions were presented, followed by an overview of the research approach. Chapter 2 presented the underpinning philosophy and methodological approach used in this thesis. Chapter 3, the literature review, examined existing research in relation to antecedents, the phenomenon of defining and measuring patient safety culture, and outcomes of patient safety culture. This incorporated a number of sections including a description of the methodology, a bibliometric analysis, and a synthesis of findings from the literature reviewed. Chapter 4 looked at workplace relationships and identified a positive relationship between employee engagement, supervisor support, interprofessional collaboration and patient safety culture. Chapter 5 explored the effect of changing environments on patient safety culture. Using the setting of a major hospital move, two perspectives were explored: that of the staff and the other from the patients’ experience. Chapter 6 considered workforce capacity and tested reflexivity as a moderator in improving patient safety culture and subsequent quality of patient care.
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The previous chapters have all addressed the research question from different angles and have provided a discussion specific to the paper topic. Together, they have revealed several new and interesting insights; however, there remain many important questions and future research opportunities in relation to patient safety culture. This final chapter therefore has the role of highlighting the key research findings of this thesis in an effort to discuss their importance and also to make recommendations for future research. Finally, this chapter discusses the moral of the story and how the findings of this thesis can be translated into practice.
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7.0 Introduction

This thesis aimed at developing a better understanding of the antecedents, phenomena and consequences of patient safety culture based on a meta-analysis of the literature and four empirical papers. While the empirical papers of this thesis were able to address some of the knowledge gaps revealed in the literature review, there are still many questions that remain in relation to patient safety culture. This final chapter will assemble the learnings, explore the key findings of the previous chapters and finally discuss future directions in this intriguing area of research.

Paper 1, the literature review, looked at what we know about the phenomena of patient safety culture, its antecedents as well as related outcomes. Managing a large literature base on patient safety culture required a two-step process. Step 1 included a review of the literature reviews and step 2 built on this through a systematic search of the literature from 2011 – 2014. This review considered the work already done and distilled this information to summarise key findings by way of a bibliometric analysis and a narrative synthesis. Reviewing the literature, I found that while a lot is known on the topic of patient safety culture, there remains much to be further explored. Several research questions and opportunities were identified from this review and the empirical papers of this thesis aimed at addressing some of these. In particular, I selected three areas to focus my attention on: improving workplace relationships, changing environments and developing workforce capacity. These themes and the empirical papers resulting from my research are shown diagrammatically in Figure 7.1.
Chapter 1 provided an overview of patient safety, safety culture and the context that influenced the research questions. Chapter 2 discussed the philosophy and methodology underpinning the thesis. A timeline of events and research data with a synopsis of each of the papers was provided. Chapter 3 explored the topic of patient safety culture and patient outcomes through means of a systematic literature review. The taxonomy and complexity of patient safety culture was identified and literature considered under the headings of antecedents, patient safety culture phenomena and consequences. Chapter 4 focused on the relationship between patient safety culture, employee engagement, supervisor support and inter-group collaboration. Chapter 5 examined the impact of a hospital move on patient safety culture from the view of staff, as well as from the patient experience in the form of two empirical papers. The first paper of Chapter 5 also analysed the perspectives of clinical and non-clinical staff comparing data between staff groups and across two time periods (2013 before the move and 2015 after the move).
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The second paper in Chapter 5 considered the patients experience of functional and relational aspects of care before and after the hospital move. Chapter 6 explored the moderating effect of reflexivity on patient safety culture and quality of patient care.

This final chapter will integrate these findings and discuss the application in the context of the research questions asked. Strengths, limitations and the implications for theory and practice will be explored. Finally, suggestions for future research will be made.

7.1 Contribution of each paper

7.1.1 Chapter 3, paper 1: “The effect of patient safety culture on patient outcomes: a review of the literature”

Paper one (the literature review) found an enormous quantity of publications on the topic of patient safety culture. Using a framework of antecedents, phenomena and outcomes, the existing literature was appraised so as to better understand the role of patient safety culture in clinical settings.

A bibliometric analysis of publications showed an increasing interest in patient safety culture over the last 15 years. A closer analysis identified a large percentage (78%) of papers with a primary focus on the application or validations of questionnaires measuring patient safety culture. The literature is low on longitudinal studies and there is a predominance of single discipline studies (such as nursing). While there has been a lot published on the measurement of patient safety culture, a common thread of lack of agreement on what dimensions are core to patient safety culture was identified. Despite this shortcoming, a cluster of research focuses on interventions to improve patient safety. Effective strategies reported include management walk arounds, team training and interventions aimed at improving communication (e.g. Mahoney, Ellis, Garland, Palyo, & Greene, 2012; Morello et al., 2013; Weaver et al., 2013).
Common antecedents of patient safety culture were reported as leadership, teamwork, communication and management commitment to patient safety concepts. Using a model of evidence based practice, the highest level of evidence was found in the qualitative research, where the importance of hierarchical and professional sub cultures was identified. These organisational structures were interpreted as acting as barriers to effective team communication (Gillespie, Gwinner, Chaboyer, & Fairweather, 2013; Hesselink et al., 2013). In the quantitative papers, one high level, randomised control trial (Haugen et al., 2013) was identified which found a significant increase in patient safety culture scores following the implementation of a surgical safety checklist in operating theatres.

The literature on outcomes of consequences of patient safety culture remains much less researched. Clinical indicators predominate such as mortality rates, medication errors, blood stream infections and what was referred to as “nurse sensitive indicators” (Dicuccio, 2014; Groves, 2014). Reporting of adverse events such as patient falls and pressure injuries may actually increase in work places where patient safety culture is improved as a non-punitive response to errors encourages open reporting (AbuAlRub & Abu Alhijaa, 2014; Brown & Wolosin, 2013). Others have been unable to demonstrate any relationship between patient safety culture and patient outcomes (Ausserhofer et al., 2013; Smits et al., 2012). There is an absence of outcomes and the associated importance of these from the patient perspective.

The literature on patient safety is broad, and largely fragmented by professional specific approaches such as nursing or medicine. The suite of constructs to be further explored in this thesis was considerably narrowed down so as to enable a more focused testing of a number of hypotheses that linked to the research questions posed. These have been
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defined as workforce relationships, work environment and workforce capacity. Each of these empirical papers will now be discussed to inform a final conclusion.

7.1.2 Chapter 4, paper 2: “Dynamic workplace interactions for improving patient safety culture”

Chapter 4, paper 2 considered workplace relationships and using an empirical dataset, the constructs of employee engagement, supervisory support, and interprofessional collaboration were explored in relation to patient safety culture. In this empirical paper, I considered these constructs and components of workplace relationships as key processes that influence patient safety culture. Using regression analysis, I found a direct positive association among each of the independent variables with patient safety culture and also a three-way interaction among interprofessional collaboration, employee engagement and supervisor support in predicting patient safety culture. This chapter also found that the relationship of interprofessional collaboration with patient safety culture is strongest when staff are highly engaged.

The findings of chapter 4 provide empirical support of a statistically significant effect of employee engagement on patient safety culture. While improving employee engagement can be expected to reduce staff turnover and improve staff morale (Saks, 2006); it also needs to be considered in relation to patient safety culture and patient outcomes. To date the business case for effective human resource management processes has relied on anecdotal evidence in relation to employee engagement programs and organisational patient safety outcomes. It is plausible that engaged staff are more likely to adhere to patient safety protocols and work collaboratively in a team. Workforce relationships and the impact on patient safety culture is an important area that is open to additional research. The significant positive relationship found in paper 2 between employee engagement and patient safety culture has added to the existing evidence base.
7.1.3 Chapter 5, paper 3: “Bricks-and-mortar and patient safety culture”

Chapter 5, paper 3 considered structural elements of the environment and in doing so compared perceptions of patient safety culture from several viewpoints and at different times. Firstly, I compared patient safety culture before and after a major hospital move. Secondly, patient safety culture was compared between clinical and non-clinical groups. This chapter showed that despite substantial changes in a physical environment, perceived patient safety culture remained surprisingly constant across all different types of staff members. These findings make a unique contribution to what is known about patient safety culture in dynamic clinical environments.

This paper explored whether a physical move would have a significant impact on the perceptions that staff, and in particular clinical staff held toward patient safety culture. This was based on the reality that the financial injection into state of the art equipment and facilities was aimed at improving various patient outcomes. While clinical staff did have a statistically significant higher perceived patient safety culture scores than non-clinical staff; both groups’ perceptions remained constant over the two time periods. Interpreting the findings, it is possible that the concept of “cultural entrapment” (Weick & Sutcliffe, 2003) mattered in the case of the move where people get locked into lines of thinking to confirm their actions. People make sense of a situation so as to maintain their beliefs and behaviours. Sense making intensifies when an unexpected event happens (such as an adverse patient event), so that errors are not being hidden, but explained away (Weick, Sutcliffe, & Obstfeld, 2005). The move made no changes on their perceptions as individual workloads increased. In addition, a rapid growth in patient traffic was experienced following the opening of the new facilities.

A statistically significant difference in patient safety culture scores was identified between clinical staff and non-clinical staff at two time points; a finding reflecting that
of others (Aboul-Fotouh, Ismail, Ez Elarab, & Wassif, 2012; Parand et al., 2011). Clinical staff share a higher perception of patient safety culture than do non-clinical staff and this phenomenon was labelled “clinical capital”. One of the premises this idea stems from is that of a “just culture” (Dekker & Nyce, 2013).

Contemporary health structures are multi-disciplinary with shared responsibility for patient care and outcomes. The emerging role of the hybrid “clinician-manager” also complicates the task of separating clinical and non-clinical roles (Kippist & Fitzgerald, 2009). In paper 3, staff were compared on the divisions of clinical and non-clinical as defined by industrial awards. In reality the clinician-manager role blur these lines. This presents opportunities to consider how all members of the health work force can be engaged in patient safety culture improvement activities. While the review of the literature identified a predominance of studies embracing team training, evidence regarding the long term benefits of such initiatives remains inconclusive (Jones, Podila, & Powers, 2013; Thomas & Galla, 2013). While paper 3 identified differences in perceptions of patient safety culture between clinical and non-clinical staff, I am interested in pursuing what underpins these contrasts, and how workforce capacity can be maximised. The lack of change in patient safety culture between time one and time two remains a mystery. Additional research may uncover what elements need to be nurtured to stimulate a significant change in patient safety culture, and how clinical capital can be enhanced. The effect of an enormous change in physical environments showed no effect in improving patient safety culture.

7.1.4 Chapter 5, paper 4: “Bricks-and-mortar and the patient experience”

Chapter 5, paper 4 provided a patient experience of moving from an old hospital to a new university hospital as complementary information to the staff perspectives presented in the previous paper of this thesis. The unique research setting of moving a
hospital provided a unique opportunity to capture the patients’ experience of the impact of the old and new environment from the patient’s perspective. Using patient feedback survey, 40 patients involved in the hospital move were asked their views of a number of factors in relation to their perceived health care experience in both the old and the new environments. Organisational culture is comprised of artefacts, values and assumptions (Schein, 1990). The artefacts in this hospital move scenario were dramatically changed from an aging and dilapidated building to a new state of the art, custom built facility.

The feedback from patients demonstrated a measurable change in the patient experience in response to the changed environment. Ratings on the functional domains of the patient experience survey were significantly improved for comfort, noise, privacy and visitor amenities. Assessment of the general environment was also significantly improved from the old hospital to the new hospital. The relational domains of the patient experience such as staff attitude, clinical care and education showed no significant change. While acknowledging that this was a point in time assessment conducted within days of the move, it does provide a patient perspective. It validates that patients can differentiate between functional and relational elements of care and highlights the importance of attitudinal and culture components that impact on the patient experience (Siddiqui, Zuccarelli, Durkin, Wu, & Brotman, 2015). The key message here is that managers can influence the patient experience by improving the physical environment. The findings also demonstrate that relational domains of patient experience matter and that improving the environment needs to be accompanied by a broader change management strategy that focuses on staff communication, workforce relationships, and teamwork (Lin, Foster, Chaboyer, & Marshall, 2016).
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7.1.5 Chapter 6, paper 5 “Pixie Dust - the moderating effect of reflexivity on patient safety culture and quality of patient care”

Developing workforce capacity was identified as a common theme in the literature, with many publications reporting interventions aimed at developing a safe workforce, (e.g. Morello et al., 2013; Weaver et al., 2013). Work based training programs are one way of developing workforce capacity (Matovu et al., 2013). Multiple papers mentioned “team training” as a method to improve patient safety culture, however specific information on what this training included was limited. Sparse information was given on what skills and competencies were being developed, and how these were expected to impact on patient safety culture. Paper 5 considered skills that employees bring to the workplace, and how the act of reflexivity interacts with patient safety culture to improve the perceived quality of patient care. The difference between “reflective” and “reflexive” was explored and reflexivity defined as “reflection in action” (Iedema, 2011). The paper used patient safety culture as an independent variable and tested a model of moderation of reflexivity in leading to higher perceptions of quality of patient care. Reflexivity was shown to significantly amplify the benefits of patient safety culture. Reflexivity is a relatively new concept in the patient safety literature, and this paper adds to a growing evidence base of effective skills to develop in the health workforce. This finding of the effect of reflexivity in enhancing patient safety culture and the association with quality of patient care warrants further exploration. The embedding of reflexivity in the curriculum of health care professionals is one area that is ripe for further research.

The review of the literature identified a plethora of programs that aimed at impacting patient safety culture in the workplace. My findings suggest the potential for workforce capacity to be developed in health professionals. This is more than good relationships and working in teams. Workforce capacity includes health professionals with the ability
to be reflexive practitioners that can predict and respond to lapses in patient safety behaviours. This is an early intervention which has the potential to shape a more positive patient safety culture and is an area that I am interested in pursuing. A summary of findings from all of the chapters is graphically presented in Appendix C.

7.2 Key research findings

The empirical research papers emanating from this thesis report on empirical data from one organisation at different points in time. Because of this unique situation, generalisations of findings need to be considered with this in mind. The empirical papers on patient safety culture of this thesis add to the methods used in existing literature considering that this area of research is characterised mainly by point in time case studies, viewpoints and expert opinion. The longitudinal approach used, providing a before and after assessment of patient safety culture in relation to moving a major tertiary teaching hospital is also novel. From a political perspective this warrants discussion as health is so commonly politicised and governments held responsible for providing the structures that support the delivery of health care. When the government of the time announced the building of the new hospital at a new location (at a staggering cost of $1.8BAUD), the hidden agenda was to get back into government. While this ploy failed in the short term, the construction of a new hospital was seen a symbol and artefact that cultural change was on the horizon. The timing of this research is important to consider. The political environment during the study period provides an uncontrollable variable which must be discussed.

The “elephant in the room” is that the construction of the new hospital was a Labor government promise, announced by the state government in 2006 with the first sod turned on the 13th September 2008 (source GCUH records). It was in March 2012 that
the 14 years of left wing Labor government would be toppled by the Liberal National Party. The incoming conservative government had an agenda to be lean and in its first and only term in office was responsible for the loss of over 12,000 public service jobs. Of these redundancies 2,754 jobs were shed from Queensland Health by September 2013. This timing coincided with the lead up to the move of the hospital to its new greenfield site on the 29th of September 2013. The first data collection for this research was conducted in August 2013. This was a tumultuous period, and an unstable environment within which to be conducting research on organisational culture. Following a particularly turbulent period in politics, the conservative government was replaced by a Labor government in February 2015. While no changes in patient safety culture were identified in before and after surveys, attitudes and perceptions of staff may have been influenced by the political storm that was occurring during this two year time period. The timing of this research might also explain the low response rates to the survey methodology (306 in 2013 and 246 in 2015). That said, 115 (46%) people in the second sample indicated participation in the first survey which adds strength to the longitudinal comparisons.

Notwithstanding the above, this research has made an important contribution to what we know about patient safety culture. A unique contribution has been made by adding to the empirical method by the inclusion of a chapter on the patient experience. I had challenges trying to directly link patient safety culture with direct patient outcomes. This is a methodological and ethical issue which has confronted many others (Ausserhofer et al., 2013; Smits et al., 2012). Using the patient experience was one way of overcoming this challenge. This thesis is an initial effort to better understand patient safety culture. The use of a heterogeneous data set that considers all members of the health workforce also adds strength to the findings. While cautioning against broad
generalisation of my findings, specific learnings of the important value of interprofessional collaboration and perspectives on employee engagement may be applicable to other health services and thus provide an excellent future research opportunity.

The literature review identified key studies informing the overarching question of this thesis, namely “what effect does patient safety culture have on patient outcomes”. An enormous amount of papers were considered and I found that the vast majority of publications on patient safety culture had a focus on measuring the phenomenon. The remaining studies’ interests were spread across antecedents, interventions and patient outcomes in relation to patient safety culture. The proliferation of the literature on patient safety culture deserves to be better categorised with consistent definitions and domains. There needs to be a consensus on what patient safety culture is; what leads into it; and associated outcomes. Despite the overwhelming volume of publications, we still don’t know how to intervene to improve patient safety culture and sustain change.

In Chapter 4, paper 2, statistically significant relationships between employee engagement, interprofessional collaboration, supervisor support and patient safety culture were demonstrated. To date theories on the importance of workplace relationships in contributing to positive patient safety culture have lacked an empirical base. I find the concept of interprofessional practice particularly fascinating as juxtaposition to the “silo mentality” so often referred to as a negative feature of health systems failings (Alaszewski, 2002; McLean & Walsh, 2003). My findings lend support to continued efforts to enhance interprofessional education in the training of health care professionals. This is something I wish to pursue into the future.
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Moving hospitals is a rare event, and for me was a once in a lifetime opportunity to explore the effect of changing environments on patient safety culture. The move of a hospital to a greenfield site is a major undertaking and surprisingly, no significant change in patient safety culture was detected despite a large investment in bricks and mortar. In exploring the literature, my findings in Chapter 5, papers 2 and 3 are novel and new to the area of patient safety culture. As the large investment in hospitals of the post war modernisation period of Australia age and deteriorate, they are being replaced by new state of the art facilities. Current Australian examples include the Sunshine University Hospital (Qld), The Fiona Stanley Hospital (WA), Bendigo Hospital (Vic) and the Royal Adelaide Hospital (SA). Such is the investment in hospitals that the Royal Adelaide Hospital and the Gold Coast University Hospital are listed on the web in the ten most expensive buildings in the world (Campbell-Dollaghan, 2014). While the investment in capital works is enormous, a commensurate investment in staff development and training may amplify benefits to patient safety culture and consequent patient outcomes.

It would be interesting to reproduce the method used here to explore whether findings can be replicated at other sites. The return on investment business case has to date focussed on political agendas and outcomes that measure targets such as patient waiting times. There is much that could be learnt about the importance of patient safety culture across various examples of hospital relocations. My findings are potentially the first to explore patient safety culture in the context of major capital redevelopment. With aging infrastructure nationally, this is important research. The importance of “clinical capital” was highlighted as a resource that managers need to maintain and grow as organisations go through significant improvements in the physical environment.
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Comparing patient safety culture across a heterogeneous group of health service employees identified significant differences between the perceptions of clinical and non-clinical staff. Longitudinal studies in patient safety culture are rare and this thesis provides a comparison from two time points, two years apart. A major shortcoming identified by the literature review was the preponderance of single discipline, point in time studies of patient safety culture. While there remains much to be explored, this thesis has contributed empirical findings based on a multi professional sample across a longitudinal time frame.

Another gap identified through the review of the literature on patient safety culture was the absence of studies from the patient perspective. Paper 3 therefore is one of the first to provide an insight into the patient experience before and after a major hospital move. I found that the new environment had improved the patient experience of specific functional domains of care; however, the relational aspects of the perceived experience remained unchanged. Patients can discriminate between cultural and environmental aspects of care, and managers can significantly improve the patient experience by investing in bricks and mortar. Additionally, staff attitudes remained unchanged and these findings corroborate the non-significant change in patient safety culture reported in paper 2.

Paper 4, in Chapter 6 then explored workforce capacity and in doing so found a significant moderating effect of reflexivity on the relationship between patient safety culture and quality of patient care. These findings provide evidence of the importance of developing a health workforce that is nimble and reflexive to patient safety events. Reflexivity is an area that is under researched in the patient safety literature, and methods of how to develop a reflexive workforce warrant further investigation.
Chapter 7 Discussion and Conclusion

This PhD has, by focussing on specific domains, contributed to the knowledge of antecedents and consequences of patient safety culture. As a whole it shows that workforce relationships are important and that interprofessional collaboration and employee engagement are significant antecedents of this remarkable phenomenon. While I have demonstrated a link to improved perceptions of patient safety culture, there remains opportunity to discover what interventions are effective in enhancing positive workforce relationships. I have discovered that there is a real difference in the patient safety culture perceptions of clinical and non-clinical staff, and was disappointed to see that these remained constant despite enormous change. There remains much to be discovered in how cultural change management can be achieved and aligned with significant change in the physical environment. Finally, the learnings from the patient experience prove that as end users their perspectives provide valuable insights into the strengths and shortcomings of the health services they experience.

The final angle considered was that of developing work force capacity. I am particularly interested in exploring how the current practice of reflection can be adapted to be more reflexive and improve quality of care outcomes by amplifying perceptions of patient safety culture. To me this is a new frontier as current research on reflexivity in health care is in its infancy. Patient safety culture is elusive, and while there are many aspects that could be considered, this thesis has narrowed down to a focused group of domains that warrant additional research. For example, the empirical evidence presented here shows that moving buildings has no effect on patient safety culture. Context is important, and future research should give this closer attention.
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7.3 Practical implications

There are a number of implications for practice that emerge from this research in the areas of improving workforce relationships, changing environments and developing workforce capacity. An important message is to ensure managers engage their staff and train them in reflexivity within an environment of interprofessional collaboration. Fancy buildings and facilities may impact on the patient experience, but this investment may not improve perceived patient safety culture. Additional change management strategies that support cultural change are also required to optimise capital investments. These change management approaches would consider nurturing teams and supporting interprofessional practice (Grant, 2011; Parmelli et al., 2011). Clinical staff have different perceptions of patient safety culture to non-clinical staff, therefore, efforts at enhancing patient safety culture requires a bespoke approach which recognises the importance of the various sub cultures within the healthcare team. Investment into bricks and mortar and capital infrastructure should therefore be accompanied by an ongoing investment in the development of clinical capital.

Additionally, there are opportunities at an interprofessional level present for training staff in reflexivity techniques. The curriculum of health care professionals is a starting point where such activities could be introduced. The development of a patient safety curriculum by the World Health Organisation (Tingle, 2011) is an excellent initiative which this research could inform. Additional curriculum components that have the potential to add value include modules around developing interprofessional competencies and reflexivity skills.

Managers can be assured that investment into bricks and mortar does make an improvement to the patient experience. Patients are sensitive to changes in the physical
Chapter 7 Discussion and Conclusion

environment. The challenge is how to transform patient safety culture commensurate with environmental improvements. When exploring the impact of a major move on staff perceptions of patient safety culture, I found that new bricks and mortar had no measurable impact on staff perceptions of patient safety culture. In contrast, the patients were very responsive to environmental changes and sensitive to the relational aspects of care, such as staff attitude, which remained unchanged.

These findings imply that managers explore ways of increasing the stock of clinical capital; build an engaged workforce, consider context; and look at ways of enhancing discretionary behaviours such as collaboration in the workforce. My experience indicates that patient safety culture persists over time and that significant differences occur between clinical and non-clinical staff. This suggests that managers require a long term commitment to organisational change and recognise the complex and intangible nature of patient safety culture.

7.4 Final comments

During the passage of time to complete this thesis, I have come to the view that assessment of patient safety culture serves little purpose unless it is followed by an action plan that is targeted and has clearly defined benefits. The findings in Chapter 4, (paper 2) around employee engagement and interprofessional collaboration and reflexivity in Chapter 6 (paper 5) may offer an alternative direction.

Over the timeline of my PhD, my career has moved from working in a hospital to that of a University environment and I now recognise the value of the ubiquitous PhD which has consumed my last few years. If I had my time over there are several things I would do different now, knowing what I have learnt along the way. For example, the exploration of the patient experience could have been a more robust and longitudinal
study. This study was virtually over before it began. In retrospect I would have liked to include a more diverse group of patients such as community out-patients, day surgery, and long-term chronic disease patients (such as those on renal dialysis). The scope of my sample was specifically inpatients as these people were easily available to interview. Outpatients may have different perspectives on care which could contribute to our understanding of the patient experience across different service settings. This was an opportunity missed due to competing resources and tight time frames during a very busy time of moving a hospital.

As a registered health professional for decades of my life, I have always been encouraged (and encouraged others) to use clinical reflection as a means to improve my clinical approach. Up until recently, I had not really considered how introspective and almost narcissistic the activity of reflection is. I had never thought much about reflexion hence the research I conducted in understanding the difference between reflexion (with an x) and reflection (with a c) is was particularly rewarding for me. I can now see how we can modify people’s patient safety behaviours and perceptions of patient safety culture by modifying how we develop the health professional work force. My discovery of reflexivity and the findings of the importance of interprofessional collaboration now provide a foundation for my teaching and learning approaches in my new work environment. This is something I didn’t anticipate at the start of my doctoral journey. I would also like to explore how reflexivity can be better measured in the work place and further test the link between quality patient outcomes. A major limitation of my modelling on reflection is that my data was based on staff perceptions. There is opportunity to extend the theory to test real interactions, and not just measure perceptions. The issue of common method variance is a new and important concept that I am now acutely aware of.
Finally while at the outset this research articulated a post positivist philosophy, one of the lessons learnt is that context matters. The learning throughout my doctoral process has been invaluable and greatly assisted my personal and professional growth. I am now not afraid of statistics; I have learnt the importance of the research process and feel that I have contributed to the empirical evidence on the antecedents and consequences of patient safety culture. It has been a story with a happy ending.

“It’s no use going back to yesterday, because I was a different person then.”

Carroll and Tenniel (1976), Alice Wonderland
Chapter 7 Discussion and Conclusion

References


Parand, A., Burnett, S., Benn, J., Pinto, A., Iskander, S., & Vincent, C. (2011). The disparity of frontline clinical staff and managers' perceptions of a quality and
Chapter 7 Discussion and Conclusion


Appendix A1: Constructs, questions and source – staff survey

<table>
<thead>
<tr>
<th>Construct</th>
<th>Patient Safety Climate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>Vogus and Sutcliffe (2007)</td>
</tr>
<tr>
<td>Application</td>
<td>DV Paper 2</td>
</tr>
<tr>
<td></td>
<td>IV Paper 3</td>
</tr>
<tr>
<td></td>
<td>IV Paper 4</td>
</tr>
<tr>
<td>Questions</td>
<td>We have a good “map” of each other’s talents and skills.</td>
</tr>
<tr>
<td></td>
<td>We talk about mistakes and ways to learn from them.</td>
</tr>
<tr>
<td></td>
<td>We discuss our unique skills with each other, so that we know who on the unit has relevant specialized skills and knowledge.</td>
</tr>
<tr>
<td></td>
<td>We discuss alternatives of how to go about our normal work activities.</td>
</tr>
<tr>
<td></td>
<td>When giving report to an oncoming nurse, we usually discuss what to look out for.</td>
</tr>
<tr>
<td></td>
<td>When attempting to resolve a problem, we take advantage of the unique skills of our colleagues.</td>
</tr>
<tr>
<td></td>
<td>We spend time identifying activities we do not want to go wrong.</td>
</tr>
<tr>
<td></td>
<td>When errors happen, we discuss how we could have prevented them.</td>
</tr>
<tr>
<td></td>
<td>When a patient crisis occurs, we rapidly pool our collective expertise to attempt to resolve it.</td>
</tr>
</tbody>
</table>
### Construct: Employee Engagement

<table>
<thead>
<tr>
<th>Reference</th>
<th>Spreitzer (1995)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td>IV Paper 2</td>
</tr>
<tr>
<td><strong>Questions</strong></td>
<td></td>
</tr>
<tr>
<td>I am kept informed of important things that are happening in the workplace.</td>
<td></td>
</tr>
<tr>
<td>I feel that it is useless to make suggestions about my work because decisions are made regardless of my attempts to influence them.</td>
<td></td>
</tr>
<tr>
<td>I find myself uninterested in the many changes taking place at work.</td>
<td></td>
</tr>
<tr>
<td>I have influence over what goes on in my unit or department.</td>
<td></td>
</tr>
</tbody>
</table>

### Construct: Supervisor Support

<table>
<thead>
<tr>
<th>Reference</th>
<th>Beugre and Baron (2001)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Application</strong></td>
<td>IV Paper 2</td>
</tr>
<tr>
<td><strong>Questions</strong></td>
<td></td>
</tr>
<tr>
<td>When decisions are made about my job, the manager treats me with kindness and consideration.</td>
<td></td>
</tr>
<tr>
<td>When decisions are made about my job, the manager treats me with respect and dignity.</td>
<td></td>
</tr>
<tr>
<td>When decisions are made about my job, the manager is sensitive to my personal needs.</td>
<td></td>
</tr>
<tr>
<td>When decisions are made about my job, the manager deals with me in a truthful manner.</td>
<td></td>
</tr>
<tr>
<td>When decisions are made about my job, the manager shows concern for my right as employee.</td>
<td></td>
</tr>
<tr>
<td>Concerning decisions made about my job, the manager discusses with me the implications of the decisions.</td>
<td></td>
</tr>
<tr>
<td>The manager offers adequate justification for decisions made about my job.</td>
<td></td>
</tr>
<tr>
<td>When making decisions about my job, the manager offers explanations that make sense to me.</td>
<td></td>
</tr>
<tr>
<td>My manager explains very clearly any decisions made about my job.</td>
<td></td>
</tr>
</tbody>
</table>

### Construct: Inter professional collaboration

| Reference       | Kenaszchuk, Reeves, Nicholas, and Zwarenstein (2010) |
Appendix

<table>
<thead>
<tr>
<th>Application</th>
<th>IV Paper 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Questions</td>
<td>My professional / occupational group has a good understanding with other professional / occupational groups about our respective responsibilities within Gold Coast Health. Other professional / occupational groups are usually willing to take into account the inter-dependency with my professional / occupational group when planning their work within Gold Coast Hospital. I feel that patient treatment and care are not adequately discussed between my professional / occupational group and other professional / occupational groups within Gold Coast Health. My professional / occupational group and other professional / occupational groups share similar ideas about how to treat patients within Gold Coast Health. Other professional / occupational groups are willing to discuss my professional / occupational group’s issues within Gold Coast Health. Other professional / occupational groups cooperate with the way we organize my professional / occupational group’s new practices within Gold Coast Health. Other professional / occupational groups would be willing to cooperate with my professional / occupational group’s new practice within Gold Coast Health. The other professional / occupational groups do not usually ask for my professional / occupational group’s opinion within Gold Coast Health. The other professional / occupational groups anticipate when my professional / occupational group will need their help within Gold Coast Health. Important information is always passed on between my professional / occupational group and other professional / occupational groups with Gold Coast Health.</td>
</tr>
</tbody>
</table>
Disagreements with other professional / occupational groups often remain unresolved within Gold Coast Health.
Other professional / occupational groups think their work is more important than the work of my professional / occupational group within Gold Coast Health.
Other professional / occupational groups would not be willing to discuss their new practices with my professional / occupational group within Gold Coast Health.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Reflexivity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>Patterson and West (2005)</td>
</tr>
<tr>
<td>Application</td>
<td>MV Paper 5</td>
</tr>
</tbody>
</table>

Questions:
- In this organization, the way people work together is readily changed in order to improve performance
- The methods used by this organization to get the job done are often discussed
- There are regular discussions as to whether people in the organization are working effectively together
- In this organization, objectives are modified in light of changing circumstances
- In this organization, time is taken to review organizational objectives

<table>
<thead>
<tr>
<th>Construct</th>
<th>Quality Patient Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>Patterson and West (2005)</td>
</tr>
<tr>
<td>Application</td>
<td>DV Paper 5</td>
</tr>
</tbody>
</table>

Questions:
- This organisation is always looking to achieve the highest standards of quality patient care
- Quality patient care is taken very seriously here
- People believe the organisation’s success depends on high-quality work by employees
- This organisation does not have much of a reputation for top-quality patient care.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Safe patient care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reference</td>
<td>Sorra and Dyer (2010)</td>
</tr>
<tr>
<td>Application</td>
<td>DV Paper 5</td>
</tr>
</tbody>
</table>

Questions:
- Please give your work area/unit in this hospital an overall grade on patient safety
Appendix

Appendix A2: Items, questions and source – Patient experience survey

The following table lists the questions used in the patient survey:

<table>
<thead>
<tr>
<th>Item</th>
<th>Questions</th>
<th>Reference (Kitson, Marshall, Bassett, &amp; Zeitz, 2013)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Looking back to before the move how would you rate your satisfaction with the following items -</td>
<td>Picker ACSQHC</td>
<td></td>
</tr>
<tr>
<td>Comfort</td>
<td>a) The comfort of the rooms?</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>b) And now we have moved, how would you rate this?</td>
<td>*</td>
</tr>
<tr>
<td>Noise</td>
<td>a) The noise in the ward?</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>b) And now we have moved, how would you rate this?</td>
<td>*</td>
</tr>
<tr>
<td>Privacy</td>
<td>a) Your personal privacy?</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>b) And now we have moved, how would you rate this?</td>
<td>*</td>
</tr>
<tr>
<td>Visitor amenities</td>
<td>a) Amenities for your visitors?</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>b) And now we have moved, how would you rate this?</td>
<td>*</td>
</tr>
<tr>
<td>Access to education / information</td>
<td>a) The information and education you have received about your condition?</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>b) And now we have moved, how would you rate this?</td>
<td>*</td>
</tr>
<tr>
<td>Clinical Care</td>
<td>a) The clinical care you have received?</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>b) And now we have moved, how would you rate this?</td>
<td>*</td>
</tr>
<tr>
<td>Staff attitude</td>
<td>a) The attitude of the staff?</td>
<td>*</td>
</tr>
</tbody>
</table>
b) And now we have moved, how would you rate this?

| Patient call (nurse buzzers) | a) The patient / nurse call system? | Requested by organisation |
| Environment pre move | b) And now we have moved, how would you rate this? | 
| Environment post move | a) On a scale of on to ten where 1 is the worst environment imaginable and 10 is the best environment imaginable, how would you rate the healing environment at Southport? | 
| Environment post move | b) On a scale of on to ten where 1 is the worst environment imaginable and 10 is the best environment imaginable, how would you rate the healing environment here at Parklands? | 
| General Satisfaction | Do you have any other comments on any of the above items or your current hospital experience? | * |
### Appendix B1: Summary of literature review, Section A

<table>
<thead>
<tr>
<th>Reference</th>
<th>Period</th>
<th>Objectives</th>
<th>Design</th>
<th>Database</th>
<th>Search Terms</th>
<th>Inclusions</th>
<th>Findings</th>
<th>Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Brand et al. (2012)</strong></td>
<td>Jan 1996-May 2010</td>
<td>To critically appraise the literature relating to associations between high level structural and operational hospital characteristics and improved performance.</td>
<td>Structured narrative review</td>
<td>Medline, Cinahl, Proquest, Psychinfo</td>
<td>Not stated</td>
<td>Systematic reviews, meta-analysis, RCTs, controlled before and after, observational that were multicentre.</td>
<td>12 syst reviews, 47 observ studies</td>
<td>Limited, mainly low quality evidence</td>
</tr>
<tr>
<td><strong>Dicuccio (2014)</strong></td>
<td></td>
<td>To evaluate the state of research connecting patient safety culture and patient outcomes to determine nurse sensitive outcomes</td>
<td>Ebsco, Ovid, Proquest, Cinahl, Medline</td>
<td>Safety climate, Safety culture, Safety environment, Patient outcomes, Nurse sensitive indicators, Treatment outcomes, Outcomes research</td>
<td>Nursing</td>
<td></td>
<td>17 articles</td>
<td>Evidence found at the hospital and nursing unit level, however non-significant. Research needed on effective interventions</td>
</tr>
<tr>
<td><strong>Flin, Burns, Mearns, Yule, and Robertson (2006)</strong></td>
<td>2006</td>
<td>Review quantitative studies of safety climate in health care to examine the psychometric properties of the</td>
<td>Systematic review</td>
<td>Medline, Psychinfo, Ebsco, Web of science</td>
<td>Health care workers, Hospital safety, Patient safety, Safety climate, Safety culture</td>
<td>Quantitative studies, English only</td>
<td>12 studies</td>
<td>Measuring culture, Lack of explicit theoretical underpinning for most</td>
</tr>
<tr>
<td>Source</td>
<td>Timeframe</td>
<td>Methodology</td>
<td>Overview</td>
<td>Findings</td>
<td></td>
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</tr>
<tr>
<td>Goh, Chan, and Kuziemsky (2013)</td>
<td>Not stated</td>
<td>Review lit on patient safety culture, organisational learning, teamwork and collaboration to develop a conceptual framework</td>
<td>Narrative review</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Not stated</td>
<td>Developed a conceptual framework linking organisational learning, teamwork, patient safety culture and outcomes.</td>
<td></td>
</tr>
<tr>
<td>Groves (2014)</td>
<td>To Aug 2012</td>
<td>Examined relationship between patient safety outcomes and safety culture</td>
<td>Meta-analysis</td>
<td>Pubmed, Cinahl, Hand searches</td>
<td>Safety culture, Safety climate, Patient safety, Medication error, Quality of health care, Adverse event, Nosocomial infection, Pressure ulcer</td>
<td>Use of quantitative measure of SC Acute care hospital</td>
<td>60 eligible, 10 included</td>
<td>Limited reports available therefore did 5 small pilot meta-analysis: Pressure injury, PSOs and safety culture in hospitals</td>
</tr>
<tr>
<td>Laugaland, Aase, and Barach (2012)</td>
<td>2000-2010</td>
<td>Identify interventions designed to improve patient safety during transition (discharge) of elderly</td>
<td>Systematic review</td>
<td>Pubmed, Medline, Cinahl, Elite, Cochrane</td>
<td>Discharge planning, Patient care planning, Follow-up care, Transitional care, Handoff, Clinical pathways, Patient safety And/or interventions &amp; Elderly</td>
<td>English Hospital discharge, Elderly patients &gt;65 Excluded surgical and mental health</td>
<td>569, 37 met inclusion</td>
<td>Discharge planning and support Key co-ordinator Patient and family involvement Multidisciplinary Education and training Pharmacy/medication interventions Standardised discharge reports Transition care programs Outcomes-reduce readmission, adverse drug events, health care use, patient</td>
</tr>
<tr>
<td>Source</td>
<td>Date Range</td>
<td>Methodology</td>
<td>Key Findings</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td>--------</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parand, Dopson, Renz, and Vincent (2014)</td>
<td>1 Jan 1983 - 1 Nov 2012</td>
<td>Systematic review</td>
<td>Found a dearth of empirical studies, further weakened by a lack of objective outcome measures.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parmelli et al. (2011)</td>
<td>1900 - 2011</td>
<td>Systematic review</td>
<td>Absence of effective, generalizable strategies to change organisational culture in health care.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Author(s)</td>
<td>Year</td>
<td>Methodology</td>
<td>Databases/Sources</td>
<td>Languages</td>
<td>Number of Studies</td>
<td>Description</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------</td>
<td>------------</td>
<td>-----------------------------------------------------------------------------</td>
<td>--------------------------------------------------------</td>
<td>-------------</td>
<td>--------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pumar-Mendez, Attree, and Wakefield (2014)</td>
<td>1999- Aug 2012</td>
<td>A literature review to identify methodological aspects in assessment of safety culture, and examine how these have been addressed in hospital based studies of patient safety.</td>
<td>Psychinfo, Embase, Cinahl, Medline, Google Scholar</td>
<td>English or Spanish</td>
<td>43 records</td>
<td>3 methodological areas crucial for measuring safety culture: a) research approaches, b) survey tools, c) levels of data aggregation for analysis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ring and Moody Fairchild (2013)</td>
<td>Not stated</td>
<td>Synthesise evidence on relationship among leadership competencies, patient safety and healthy work</td>
<td>Not stated</td>
<td>English</td>
<td>150, 23 reviewed</td>
<td>Creation of learning cultures is critical is promoting a culture of patient safety</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Appendix

<table>
<thead>
<tr>
<th>Reference</th>
<th>Time Period</th>
<th>Methodology</th>
<th>Databases</th>
<th>Setting</th>
<th>Study Design</th>
<th>Tools Used</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scott, Mannion, Davies, and Marshall (2003) (b)</td>
<td>Up to June 2001</td>
<td>Review quantitative instruments available to measure cultural change</td>
<td>Medline, Cinahl, Kings Fund, Helmis Psychlit, Dhdata</td>
<td>Organisational culture</td>
<td>Qualitative tools</td>
<td>84 papers found</td>
<td>13 tools found, 9 used in health care</td>
</tr>
<tr>
<td>Scott, Mannion, Marshall, and Davies (2003) (a)</td>
<td>Not stated</td>
<td>Review evidence for a relationship between organisational culture and health care performance</td>
<td>Medline, CINAHL, Kings Fund, Helmis, Dhdata</td>
<td>Organisational culture</td>
<td>Relationship between organisational culture and health care performance</td>
<td>10 studies</td>
<td>Current policy prescriptions which seek service improvements through cultural transformation are lacking an evidence base.</td>
</tr>
<tr>
<td>Weaver et al. (2013)</td>
<td>Jan 2000-Oct 2012</td>
<td>Identify and assess interventions used to promote patient safety culture</td>
<td>Systematic review</td>
<td>Patient safety culture</td>
<td>English only</td>
<td>33 studies</td>
<td>21 measures, 19 multi component, 20 Team training, 8 executive walk around</td>
</tr>
</tbody>
</table>
### Appendix

<table>
<thead>
<tr>
<th>Study</th>
<th>Year</th>
<th>Research Design</th>
<th>Databases</th>
<th>Themes</th>
<th>Articles</th>
<th>Evidence Quality</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xuanyue, Yanli, Hao, Pengli, and Mingming (2013)</td>
<td>Jan 2001-Dec 2011</td>
<td>To explore theme and study design of published research on patient safety culture</td>
<td>Systematic thematic review, Medline, Chinese, medline</td>
<td>Hospital safety culture, Safety culture, Safety climate, Patient safety culture, Culture of patient safety, Organisational culture</td>
<td>193</td>
<td>Low evidence</td>
<td>More methodologically rigorous designs needed.</td>
</tr>
</tbody>
</table>
## Appendix

### Appendix B2: Qualitative studies 2011 - 2014

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Sample Group</th>
<th>Findings</th>
<th>Level*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chassin and Loeb (2013)</td>
<td>Information theory, method poorly described</td>
<td>Literature, leading safety scholars.</td>
<td>Conceptual paper, defines a series of changes that hospitals should take to become high reliability</td>
<td>III descriptive</td>
</tr>
<tr>
<td>Garza Lozano (2013)</td>
<td>Qualitative case study</td>
<td>Information was gathered through semi structured one-on-one interviews with various members of the radiation oncology team.</td>
<td>The organization created a culture in which the staff shares a sense of ownership for the clinical facilities, and the administration makes the &quot;softer&quot; aspects of care - knowing the patient personally - a top priority</td>
<td>IV single case study</td>
</tr>
<tr>
<td>Gillespie, Gwinner, Chaboyer, and Fairweather (2013)</td>
<td>Ethnography, method well described</td>
<td>Operating theatre 6-month fieldwork period of observation and 19 interviews with 24 informants from nursing, anaesthesia and surgery</td>
<td>3 themes – building shared understandings through open communication, managing contextual stressors, and intermittent membership influences team performance</td>
<td>I generalisable</td>
</tr>
<tr>
<td>Grant (2011)</td>
<td>Cultural web framework, focus groups and questionnaires</td>
<td>Johnson &amp; Schole's cultural web framework was used to explore the attitudes of junior doctors toward a patient safety and quality improvement program. Data collection was through the use of focus groups backed up with quantitative data from a web based questionnaire</td>
<td>Doctors represent a dominant subculture within the National Health Service and their beliefs, attitudes, and value are often at odds or unrecognized by senior health care managers.</td>
<td>III descriptive case study</td>
</tr>
<tr>
<td>Study</td>
<td>Qualitative Approach</td>
<td>Summary</td>
<td>Design/Generalisability</td>
<td></td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>---------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td>--------------------------</td>
<td></td>
</tr>
<tr>
<td>Hesselink et al. (2013)</td>
<td>Grounded theory</td>
<td>In 5 European Union countries, 192 individual and 25 focus group interviews were conducted with patients and relatives, hospital physicians, hospital nurses, general practitioners, and community nurses. Three themes emerged representing aspects of organizational culture: a fragmented hospital to primary care interface, undervaluing administrative tasks relative to clinical tasks in the discharge process, and lack of reflection on the discharge process or process improvement.</td>
<td>I generalisable</td>
<td></td>
</tr>
<tr>
<td>Jeffs, Smith, McKernan, Hayes, and Ferris (2013)</td>
<td>Focus groups, content analysis</td>
<td>10 Clinicians (nursing, physio) and 12 administrators associated with the SafetyNET intervention. Identified two themes: being aware of what clinical incidents to report and competing priorities impede learning from error.</td>
<td>III descriptive</td>
<td></td>
</tr>
<tr>
<td>Montgomery, Todorova, Baban, and Panagopoulou (2013)</td>
<td>focus groups</td>
<td>153 physicians, 133 nurses, and 46 patients from Greece, Portugal, Bulgaria, Romania, Ireland, Turkey, Croatia, and the Republic of Macedonia. Improving quality of care requires not only the understanding of the clinical environment, health workers' motivation and commitment, but also patients' needs and literacy, health policy, and the social and political context in which health services are delivered. Health practitioners and patients view quality differently.</td>
<td>I generalisable</td>
<td></td>
</tr>
<tr>
<td>Ovseiko and Buchan (2012)</td>
<td>Mixed methods – survey, free text with quantitative analysis of survey data.</td>
<td>436 academic physicians and scientists. Health system culture characterised by dominant hierarchical culture, moderate rational and team cultures, underdeveloped entrepreneurial culture.</td>
<td>II conceptual</td>
<td></td>
</tr>
<tr>
<td>Sirriyeh, Lawton, Armitage, Gardner, and Ferguson (2012)</td>
<td>Semi structured interviews, exploratory</td>
<td>26 managers from 2 hospitals within the same Trust. Perceptions of attitude toward error, impact of making an error, barrier to error management, beliefs about strategies to support staff through error management, Subcultures exist in health, these act as a barrier to team working.</td>
<td>IV single case study</td>
<td></td>
</tr>
</tbody>
</table>

*(Daly et al., 2007)*
### Appendix B3: Antecedents of patient safety culture (9 papers)

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Sample Group</th>
<th>Construct</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Auer, Schwendimann, Koch, De Geest, and Ausserhofer (2014)</td>
<td>Cross sectional</td>
<td>Swiss Nursing Group 1,633</td>
<td>Leadership communication</td>
<td>Higher hospital management support related to higher perception of patient safety culture</td>
</tr>
<tr>
<td>Etchegaray, Gallagher, Bell, Dunlap, and Thomas (2012)</td>
<td>Survey, bivariate correlational case study. Adapted SAQ</td>
<td>496 participants USA</td>
<td>Error disclosure</td>
<td>Error disclosure culture consists of general culture and trust culture</td>
</tr>
<tr>
<td>F. Jones, Podila, and Powers (2013)</td>
<td>Pre Post HSOPSC TeamSTEPPS</td>
<td>Emergency Department 70 staff</td>
<td>communication</td>
<td>Training on team work improves staff perception of patient safety culture</td>
</tr>
<tr>
<td>Li (2013)</td>
<td>Structural equation modelling. SAQ TeamSTEPPS</td>
<td>470 Nurses 76 Physicians Taiwan</td>
<td>teamwork</td>
<td>A positive association (0.78) between teamwork and safety attitudes. Nurses lower scores in team structure, communication and situation monitoring</td>
</tr>
<tr>
<td>McFadden, Stock, and Gowen (2014)</td>
<td>Structural equation modelling</td>
<td>273 hospital surveys USA</td>
<td>6 sigma initiatives (SSI), Knowledge Management (KM), Continuous quality improvement (CQI)</td>
<td>Positive relation between CQI and patient safety learning; CQI and KM. Positive relationships between responsiveness to customers and patient safety learning.</td>
</tr>
<tr>
<td>Richter, McAlearney, and Pennell (2014)</td>
<td>Multiple regression HSOPSC</td>
<td>1,052 hospitals</td>
<td>Teamwork &amp; Handover Vogus model of enabling, enacting and elaborating</td>
<td>Perceived teamwork across teams a significant predictor of successful handoffs</td>
</tr>
<tr>
<td>Thompson et al. (2011)</td>
<td>Cross sectional survey HSOPSC</td>
<td>711 nursing staff inpatient units</td>
<td>Leader member exchange theory (LMX)</td>
<td>Significant differences between high and low LMX and perceptions of safety climate, supervisor expectations and communication openness. Higher relationship leaders can positively impact PSC.</td>
</tr>
<tr>
<td>Zaheer, Ginsburg, Chuang, and Grace (2013)</td>
<td>Cross sectional</td>
<td>National data set Canada</td>
<td>Leadership, openness reporting</td>
<td>Ease of reporting, unit norms of openness, participative leadership positively related to PSC.</td>
</tr>
</tbody>
</table>
Appendix B4: Intervention studies aimed at improving patient safety culture (17 papers)

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Sample Group</th>
<th>Intervention</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstoss et al. (2011)</td>
<td>Pre post SAQ</td>
<td>ICU, children’s hospital</td>
<td>Pharmacy multi-pronged, staff development, posters, computerized physician entry</td>
<td>Reporting rate of medication errors increased 25%, from average of 3.16 to 3.95 per 10000 doses dispensed (p&lt;0.09), Harmful medication errors decreased 71%, from average of 0.56 to 0.16 per 10000 doses dispensed (p&lt;0.01). SAQ improved in all 13 survey items related to medication safety, five of which were significant (p&lt;0.05)</td>
</tr>
<tr>
<td>AbuAlRub and Abu Alhijaa (2014)</td>
<td>Quai experiment pre post HSOPSC</td>
<td>Jordanian Nurses (57)</td>
<td>education</td>
<td>significant improvements of positive scores ‘Frequency of event reporting’ and ‘Non-punitive response to errors,’ and significant decline of the rate of adverse events</td>
</tr>
<tr>
<td>Benn, Burnett, Parand, Pinto, and Vincent (2012)</td>
<td>Pre post, longitudinal Safety Climate and Capability Scale SCC</td>
<td>UK NHS</td>
<td>Safer Patients Initiative</td>
<td>Modest but significant positive movement in SCC score. Individual programme responsibility, availability of early adopters, multi-professional collaboration and extent of process measurement were significant predictors of change in SCC.</td>
</tr>
<tr>
<td>Bryan Sexton et al. (2011)</td>
<td>Pre post SAQ</td>
<td>ICU Michigan USA</td>
<td>Unit based safety program</td>
<td>Overall mean safety climate scores significantly improved from 42.5% (2004) to 52.2% (2006), t = -6.21, p &lt; .001, with scores higher in faith-based intensive care units and smaller-bed-size hospitals. Five of seven safety climate items significantly improved from 2004 to 2006</td>
</tr>
<tr>
<td>Burstrom, Letterstal, Engstrom, Berglund, and Enlund (2014)</td>
<td>Pre post HSOPSC</td>
<td>ED Sweden; 1 country hospital, 1 tertiary hospital</td>
<td>Lean Methodology</td>
<td>Team-work and Communication openness improved at follow-up.</td>
</tr>
<tr>
<td>Chera et al. (2014)</td>
<td>Pre post HSOPSC</td>
<td>Radiation oncology</td>
<td>Process improvements using quality improvement (QI)</td>
<td>QI initiatives implemented in an academic radiation oncology department yield measurable improvements in operations resulting in improvement in PSC.</td>
</tr>
<tr>
<td>Haugen et al. (2013)</td>
<td>RCT, prospective control HSOPSC</td>
<td>Operating Theatre, Norway Control = 203 Intervent = 146</td>
<td>Surgical Safety Checklist</td>
<td>Significant positive change in checklist group. Intervention group more positive PSC scores. Significant decrease in frequency of events reports, and perceptions of adequate staffing.</td>
</tr>
<tr>
<td>F. Jones et al. (2013)</td>
<td>Pre Post HSOPSC TeamSTEPPS</td>
<td>Emergency Dept 70 staff</td>
<td>Team training (TeamSTEPPS)</td>
<td>Training on teamwork improves staff perception of patient safety culture</td>
</tr>
<tr>
<td>K. J. Jones, Skinner, High, and Palmon (2013)</td>
<td>Quasi experiment pre post HSOPSC</td>
<td>24 US hospitals 2,137</td>
<td>Team training (TeamSTEPPS)</td>
<td>Team training associated with greater hospital level HSOPSC score in dimensions reflecting flexible and learning cultures. (Kirkpatricks taxonomy of training; Rogers diffusion of innovation)</td>
</tr>
<tr>
<td>Mahoney, Ellis, Garland, Palvo, and Greene (2012)</td>
<td>Pre post Team Assessment Questionnaire</td>
<td>Psychiatric hospital Pre 108, Post 143</td>
<td>Team training (TeamSTEPPS)</td>
<td>Significant improvement in 5 of 7 scales team foundation, team functioning, team performance, team skills and climate and atmosphere</td>
</tr>
<tr>
<td>Study</td>
<td>Design</td>
<td>Setting</td>
<td>Sample Size</td>
<td>Data Collection</td>
</tr>
<tr>
<td>------------------------------</td>
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</tr>
<tr>
<td>Manojlovich et al. (2014)</td>
<td>Quasi experiment</td>
<td>13 disciplines, 1,896 staff Canada</td>
<td>Interprofessional Model of Patient Care (IPMPC)</td>
<td>Collaboration and respect were significant independent predictors of PSC. Conflict and independent and significant inverse predictor of PSC.</td>
</tr>
<tr>
<td>Nagelkerk et al. (2014)</td>
<td>Pre post, quasi experimental</td>
<td>Children’s hospital 213 staff and students</td>
<td>Interprofessional didactic training, simulation exercises, rounding</td>
<td>Didactic component most effective when coupled with simulation to enhance critical thinking. Benefits of teaching students with staff</td>
</tr>
<tr>
<td>Schwendimann et al. (2013)</td>
<td>Retrospective cross section, Linear regression</td>
<td>49 US hospitals</td>
<td>Leadership rounds</td>
<td>Caregivers reporting at least 1 walk round had significantly higher safety climate, increased patient safety risk reduction and a higher proportion of feedback on actions.</td>
</tr>
<tr>
<td>Simons et al. (2014)</td>
<td>Mixed methods</td>
<td>Radiotherapy Netherlands 12 workshop participants 51 surveys</td>
<td>Lean Methodology MaPSaF workshops</td>
<td>Decreased incidents over 3 years. Inconclusive due to confounding variables such as new equipment and staffing changes.</td>
</tr>
<tr>
<td>Thomas and Galla (2013)</td>
<td>Pre Post HSOPSC</td>
<td>15 hospital USA</td>
<td>Team training (TeamSTEPPS)</td>
<td>Case study of improvements in PSC post implementation</td>
</tr>
<tr>
<td>Vigorito, McNicoll, Adams, and Sexton (2011)</td>
<td>Pre post SAQ</td>
<td>24 ICU</td>
<td>Safety and Quality Action Plans (SAQAP)</td>
<td>Units with SAQAP higher improvement in all domains except working conditions. Units with SAQAPs decreased the CLABSI rates by 10.2% in 2008 compared with 2007, while those without SAQAP had a 2.2% decrease in rates (p = .59). Similarly, VAP rates decreased by 15.2% in SAQAP units, while VAP rates increased by 4.8% in units without SAQAP (p = .39)</td>
</tr>
<tr>
<td>Wallin et al. (2014)</td>
<td>Quasi experiment Controlled before and after</td>
<td>Operating theatre 22 participants, 11 control staff Sweden</td>
<td>3 day Interprofessional training</td>
<td>Participants perception of safety climate and teamwork climate and readiness for interprofessional learning significantly higher post training</td>
</tr>
</tbody>
</table>
# Appendix B5: Patient outcomes (12 papers)

<table>
<thead>
<tr>
<th>Author</th>
<th>Method</th>
<th>Sample Group</th>
<th>Outcome</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstoss et al. (2011)</td>
<td>Pre post SAQ</td>
<td>ICU, children’s hospital</td>
<td>Medication errors</td>
<td>Reporting rate of medication errors increased 25%, from average of 3.16 to 3.95 per 10000 doses dispensed (p&lt;0.09). Harmful medication errors decreased 71%, from average of 0.56 to 0.16 per 10000 doses dispensed (p&lt;0.01). SAQ improved in all 13 survey items related to medication safety, five of which were significant (p&lt;0.05)</td>
</tr>
<tr>
<td>AbuAlRub and Abu Alhijaa (2014)</td>
<td>Quai experiment pre post HSOPSC</td>
<td>Jordanian Nurses (57)</td>
<td>Adverse events, falls, pressure injuries</td>
<td>Significant improvements of positive scores 'Frequency of event reporting' and 'Non-punitive response to errors,' and significant decline of the rate of adverse events</td>
</tr>
<tr>
<td>Agnew, Flin, and Mearns (2013)</td>
<td>Regression analysis HSOPSC</td>
<td>NHS Scotland</td>
<td>Worker and patient injuries</td>
<td>Perceptions of staffing levels and managerial commitment were significant predictors for all the safety outcome measures</td>
</tr>
<tr>
<td>Ausserhofer et al. (2013)</td>
<td>Multilevel regression SOS</td>
<td>35 Swiss hospitals 1630 RNs</td>
<td>7 patient outcomes: falls, medication errors, pressure injuries, urinary tract infections, bloodstream infections, pneumonia, patient satisfaction.</td>
<td>Found no relationship between PSC and patient outcomes</td>
</tr>
<tr>
<td>Braun et al. (2013)</td>
<td>Multisite cross sectional survey</td>
<td>316 staff, 5 hospitals USA</td>
<td>Perception of infection control and infections</td>
<td>Infection prevention culture varies by hospital</td>
</tr>
<tr>
<td>Brown and Wolosin (2013)</td>
<td>Correlational and regression analysis HSOPSC</td>
<td>9 Californian hospitals</td>
<td>Adverse outcomes: falls, pressure injury</td>
<td>Teamwork within units negatively correlated with falls.</td>
</tr>
<tr>
<td>Smits et al. (2012)</td>
<td>Multilevel regression analysis HSOPSC</td>
<td>20 hospitals Netherlands 542 staff</td>
<td>Unintended events</td>
<td>Found no relationships between PSC and patient outcomes</td>
</tr>
<tr>
<td>J. Sorra, K. Khanna, N. Dyer, R. Mardon, and T. Famolaro (2012)</td>
<td>Multiple regression HSOPS</td>
<td>73 hospitals USA</td>
<td>Consumer assessment of hospital care</td>
<td>Hospitals with more positive perceptions of PSC received a more positive assessment from patients</td>
</tr>
<tr>
<td>*Steyer, Schifflinger, Huber, Valentin, and Strunk (2013)</td>
<td>Prospective 48 hr observational cross section</td>
<td>57 ICU Europe 378 patients</td>
<td>Errors in medication, dislodgement of lines, catheters or drains</td>
<td>Higher workload detrimental effect on patient safety</td>
</tr>
<tr>
<td>Study</td>
<td>Study Design</td>
<td>Setting/Participants</td>
<td>Outcomes/Findings</td>
<td></td>
</tr>
<tr>
<td>----------------------</td>
<td>---------------------------</td>
<td>-----------------------------------------------------------</td>
<td>-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>Taylor et al. (2012)</td>
<td>Cross sectional, Multilevel logistic regression SAQ</td>
<td>723 nurses, trauma center USA Falls, pressure injuries pulmonary embolism, DVT</td>
<td>Negative association between PSC and teamwork and pressure injuries. Unit turnover negatively associated with falls and pressure injuries</td>
<td></td>
</tr>
<tr>
<td><em>Valentin, Schiffinger, Steyrer, Huber, and Strunk (2013)</em></td>
<td>Prospective, observational, 48hr cross section</td>
<td>57 ICUs Austria, Germany, Switzerland 795 patients Medication errors Loss of artificial airways Dislodgement of lines</td>
<td>Identified 49.8 errors per 100 patient days. Workload increases errors and positive PSC contributes to a reduction in medical errors (<em>same data set as reported by Steyrer et al 2013)</em></td>
<td></td>
</tr>
<tr>
<td>Vigorito et al. (2011)</td>
<td>Pre post SAQ</td>
<td>23 ICU Unit culture and clinical outcomes of central line-associated blood stream infections (CLABSIs) and ventilator-associated pneumonia (VAP) rates</td>
<td>Units with SAQ plans higher improvement in all domains except working conditions. Units with SAQAPs decreased the CLABSI rates by 10.2% in 2008 compared with 2007, while those without SAQAP had a 2.2% decrease in rates (p = .59). Similarly, VAP rates decreased by 15.2% in SAQAP units, while VAP rates increased by 4.8% in units without SAQAP (p = .39)</td>
<td></td>
</tr>
<tr>
<td>Wang et al. (2014)</td>
<td>HSOPC Descriptive correlation</td>
<td>Nursing Units 7 hospitals China, 463 nurses surveyed Estimations of adverse events, medication errors, pressure ulcers</td>
<td>Higher mean score of &quot;Organizational Learning-Continuous Improvement&quot; was significantly related to lower the occurrence of pressure ulcers (OR=0.249), prolonged physical restraint (OR=0.406), and complaints (OR=0.369); a higher mean score of &quot;Frequency of Event Reporting&quot; was significantly related to lower the occurrence of medicine errors (OR=0.699) and pressure ulcers (OR=0.639).</td>
<td></td>
</tr>
</tbody>
</table>
## Appendix B6: Outcome indicators in the literature in relation to patient safety culture

<table>
<thead>
<tr>
<th>Outcome Indicator</th>
<th>Population</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mortality rates &lt;30days</td>
<td>Acute Myocardial Infarction</td>
<td>Curry et al. (2011)</td>
</tr>
<tr>
<td></td>
<td>Intensive Care Units US</td>
<td>Huang et al. (2010)</td>
</tr>
<tr>
<td>Risk Adjusted Surgical Morbidity and mortality</td>
<td>General and vascular surgical units, 52 sites USA</td>
<td>Davenport, Henderson, Mosca, Khuri, and Mentzer (2007)</td>
</tr>
<tr>
<td>AHRQ Patient Safety indicators as listed below:</td>
<td>Aggregated data from 91 US hospitals</td>
<td>Singer, Lin, Falwell, Gaba, and Baker (2009)</td>
</tr>
<tr>
<td>Complications of anaesthesia</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decubitus ulcer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Iatrogenic pneumothorax</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Infection due to hospital care</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post-operative indicators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>hip fracture</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*haemorrhage or hematoma</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*physiologic-metabolic derangement</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*respiratory failure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*PE or DVT</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Sepsis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Wound dehiscence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Accidental puncture/laceration</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Readmission rates</td>
<td>Acute Myocardial Infarction and heart failure patients</td>
<td>Hansen, Williams, and Singer (2011)</td>
</tr>
<tr>
<td>Length of Stay</td>
<td>Intensive Care Units US</td>
<td>Huang et al. (2010)</td>
</tr>
<tr>
<td>Medication Errors</td>
<td>Nursing units US</td>
<td>Hofmann and Mark (2006)</td>
</tr>
<tr>
<td></td>
<td>Nursing units US</td>
<td>Chang and Mark (2011)</td>
</tr>
<tr>
<td></td>
<td>Nurses in emergency, internal medicine, ICU and surgery</td>
<td>Vogus and Sutcliffe (2007)</td>
</tr>
<tr>
<td></td>
<td>Medical surgical units</td>
<td>Mark et al. (2008)</td>
</tr>
<tr>
<td></td>
<td>Children’s ICU</td>
<td>Abstoss et al. (2011)</td>
</tr>
<tr>
<td></td>
<td>57 ICU Europe</td>
<td>Steyrer et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>35 Swiss hospitals</td>
<td>Ausserhofer et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>7 hospitals, China</td>
<td>Wang et al. (2014)</td>
</tr>
<tr>
<td>Event Type</td>
<td>Location/Setting</td>
<td>Authors and Year</td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-----------------------------------------</td>
<td>------------------</td>
</tr>
<tr>
<td>Patient Falls</td>
<td>Medical surgical units</td>
<td>Mark et al. (2008)</td>
</tr>
<tr>
<td></td>
<td>57 Jordanian nurses</td>
<td>AbuAlRub and Abu Alhijaa (2014)</td>
</tr>
<tr>
<td></td>
<td>35 Swiss hospitals</td>
<td>Ausserhofer et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>9 Californian hospitals</td>
<td>Brown and Wolosin (2013)</td>
</tr>
<tr>
<td></td>
<td>723 nurses, US trauma centre</td>
<td>Taylor et al. (2012)</td>
</tr>
<tr>
<td>Pressure Injuries</td>
<td>57 Jordanian nurses</td>
<td>AbuAlRub and Abu Alhijaa (2014)</td>
</tr>
<tr>
<td></td>
<td>35 Swiss hospitals</td>
<td>Ausserhofer et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>9 Californian hospitals</td>
<td>Brown and Wolosin (2013)</td>
</tr>
<tr>
<td></td>
<td>723 nurses, US trauma centre</td>
<td>Taylor et al. (2012)</td>
</tr>
<tr>
<td></td>
<td>7 hospitals, China</td>
<td>Wang et al. (2014)</td>
</tr>
<tr>
<td>Patient Satisfaction</td>
<td>Nursing Units US</td>
<td>Hofmann and Mark (2006)</td>
</tr>
<tr>
<td></td>
<td>35 Swiss hospitals</td>
<td>Ausserhofer et al. (2013)</td>
</tr>
<tr>
<td>Family Satisfaction</td>
<td>Critical care units</td>
<td>Dodek et al. (2012)</td>
</tr>
<tr>
<td>Hand Hygiene</td>
<td>Critical Care Units</td>
<td>Cloonan, Larson, Early, Sugrue, and Parides (2000)</td>
</tr>
<tr>
<td>Urinary Tract Infections</td>
<td>35 Swiss hospitals</td>
<td>Ausserhofer et al. (2013)</td>
</tr>
<tr>
<td>Bloodstream infections</td>
<td>35 Swiss hospitals</td>
<td>Ausserhofer et al. (2013)</td>
</tr>
<tr>
<td></td>
<td>23 ICU</td>
<td>Vigorito et al. (2011)</td>
</tr>
<tr>
<td>Infections</td>
<td>5 hospitals US</td>
<td>Braun et al. (2013)</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>35 Swiss hospitals</td>
<td>Ausserhofer et al. (2013)</td>
</tr>
<tr>
<td>Dislodgement of lines, catheters or drains</td>
<td>57 ICU Europe</td>
<td>Steyerer et al. (2013)</td>
</tr>
<tr>
<td>PE or DVT</td>
<td>723 nurses, US trauma centre</td>
<td>Taylor et al. (2012)</td>
</tr>
<tr>
<td>Adverse events (general)</td>
<td>20 hospitals, Netherlands</td>
<td>Smits et al. (2012)</td>
</tr>
</tbody>
</table>
### Appendix C: Research Questions and Findings

Research question: How can patient safety culture be improved in dynamic clinical settings?

<table>
<thead>
<tr>
<th>Chapter &amp; Paper</th>
<th>Construct</th>
<th>Hypothesis</th>
<th>Findings</th>
</tr>
</thead>
</table>
| **Chapter 4, paper 2** | Employee engagement (EE)  
Patient safety culture (PSC) | H1: There is a direct and positive effect of EE on PSC | Accepted p < .001 |
| Improving Workplace Relationships | Supervisory support (SS)  
Patient safety culture (PSC) | H2: There is a direct and positive effect of SS on PSC | Accepted p < .001 |
| Interprofessional collaboration (IPC)  
Patient safety culture (PSC) | H3: There are direct and positive effects of IPC on PSC | Accepted p < .001 |
| Interprofessional collaboration (IPC)  
Employee engagement (EE), Supervisor support (SS)  
Patient safety culture (PSC) | H4: There will be a three-way interaction among IPC, EE and SS in predicting PSC. | Accepted p < .001 |
| **Chapter 5, paper 3** | Patient safety culture (PSC) before the move (old facility) and after move (new facility) | H1: There will be significant improvement in perceived PSC from before the move (old facility) compared to after the move (new facility) | Rejected p = .585 |
| Changing the work environment | Clinical and non-clinical perceptions of patient safety culture (PSC) before the move (time 1) after the move (time 2) | H2a: Perceived PSC will be higher in clinical staff than non-clinical staff  
H2b: A move from an old to a new purpose built hospital will have greater impact on perceived PSC of clinicians compared to non-clinicians | Accepted p < .05  
Rejected p = .705 |
| **Chapter 5, paper 4** | The patient experience before and after the move:  
Comfort, noise, privacy, visitor amenities, education, nurse call, clinical care, staff attitude, environment | Quality improvement report using descriptive statistics and change analysis | Significant improvement in functional domains:  
comfort p < .001, noise p < .05, privacy p < .001 visitor amenities p < .05 |
<table>
<thead>
<tr>
<th>Chapter 6, Paper 5</th>
<th>Patient safety culture (PSC)</th>
<th>Quality patient care (QPC)</th>
<th>H1a: Patient safety culture is positively related to perceived quality of patient care</th>
<th>Accepted p &lt; .001</th>
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<tr>
<td>Developing workforce capacity</td>
<td>Quality patient care (QPC)</td>
<td>Reflexivity (RX)</td>
<td>H1b: Reflexivity is positively related to perceived quality of patient care</td>
<td>Accepted p &lt; .001</td>
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<tr>
<td>Patient safety culture (PSC)</td>
<td>Quality patient care (QPC)</td>
<td>Reflexivity (RX)</td>
<td>H2: Reflexivity amplifies the positive relationship between perceived patient safety culture and quality of care outcomes</td>
<td>Accepted p &lt; .005</td>
</tr>
</tbody>
</table>


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“Rivers know this: there is no hurry. We shall get there some day.”

Milne and Shepard (1927), Winnie-the-Pooh”