Clinical handover improvement for safer patient care: Exploring the practical aspects of organisational processes and the theoretical aspects of the safety value alignment model

by

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Kwang Chien Yee

December 2014
Abstract

This PhD thesis is a synthesis of research work, and analysis and reflections from 7 out of a series of 18 publications from 2005-2013, with the aim of answering the following research questions:

1. **What are the understanding and practices of clinical handover from the perspective of clinicians?**

2. **What interventions are required to improve clinical handover from the perspective of clinicians?**

3. **What are the essential elements of clinical handover improvement?**

Clinical handover, defined as "the transfer of responsibility and accountability of patient care from one team of healthcare professionals to the other", is an essential part of clinical practice for delivering safe and high quality patient care. Poor clinical handover has been associated with medical errors, adverse clinical events, medico-legal claims and patient complaints. With the increasing emphasis on reduction in working hours of healthcare professionals to reduce fatigue, clinical handover has become increasingly important in order to deliver safe patient care. While the literature has provided guidance on how to improve clinical handover, there remains a lack of clear understanding of clinical handover practices and a lack of a conceptual understanding of different strategies and interventions to improve clinical handover, especially from the perspective of clinicians across different clinical practice areas, institutions and professional boundaries.

This thesis is written based on the PhD candidate’s published work in clinical handover improvement. It is the product of analysis and reflections of a selection of 7 publications based on research projects in the field of clinical handover improvement from 2005-2013, after the PhD candidate’s involvement in local, regional and national clinical handover improvement programs. This thesis provides a synthesis and review of these 7 key publications. Through this process, five key findings are described and discussed. This thesis then provides an analysis and reflection of these publications to develop a conceptual model to understand strategies and interventions aimed at improving clinical handover.

This thesis firstly explores and reflects on the current literature in the field of clinical handover improvement. An analysis of current literature categorises the literature into three fields: safety and clinical handover, standardisation of clinical handover practices and engagement of clinicians to improve clinical handover.

This thesis then provides detailed clinical and research context for primary data collection and data analysis utilised in the research project. This research project was conducted in two parts. The first part of the research project started in October 2005 and was conducted at the Department of General Internal Medicine, Royal Hobart Hospital. The first part of the research project aimed to understand clinical handover and clinical handover improvement among medical practitioners with the ultimate aim of developing an electronic tool to support clinical handover. Data collection involved observations, interviews and clinical handover notes analysis. Data analysis involved open,
axial and selective coding applying grounded theory principles. This part of the research formed the foundation for the second part of the research project to take place.

The second part of the research project was conducted between 2007 and 2009. It was also conducted at the Royal Hobart Hospital, Tasmania, Australia but across 6 clinical settings: Medical and nursing handover at the Department of General Internal Medicine, Department of Emergency Medicine and Department of General Surgery. Data collection techniques used were the same as the first part of the research project. It involved observations, interviews and clinical handover notes analysis. All collected data were analysed using open, axial and selective coding techniques, applying grounded theory principles. Both the first and the second part of the research project produced publications which are included in this thesis.

These publications are derived from primary data collection consisting of 112 interviews, 120 observation sessions and 1769 clinical handover notes analysis. These publications are:


The overarching analysis of these publications identified the following five key findings:

- Clinical handover is a complex process, with varied understanding and practices among different clinicians and healthcare settings. The unifying underlying purpose of clinical handover is the transfer of responsibility and accountability of patient care.

- Local socio-cultural context and clinical practice need to be taken into consideration in standardising clinical handover processes.

- Clinical judgement and communicative practices among clinicians affect the outcomes of standardisation of clinical handover.

- An effective education and training program, developed based on a standardised procedure and tool, is essential to improve clinical handover.

- Clinical handover improvement requires continual commitment from the organisation and continual engagement of clinicians working towards the common goal of safe patient care.

Upon reflection of these 7 publications, five key findings and available literature, this thesis presents the safety value alignment model which is a conceptual model to understand strategies and interventions aimed at improving clinical handover. The safety value alignment model proposes that in order for clinical handover improvement programs to achieve the ultimate goal of improvement in patient care, there must be an alignment between the safety values assigned by clinicians and organisations on clinical handover.

There are two aspects to the alignment of safety values. Internal alignment involves interventions for clinical handover improvement. Organisations must consider three important effects when deploying clinical handover improvement programs in clinical practice: the multiplier effect, the consecutive-continuity effect and the cohesiveness effect. The safety value alignment model proposes that these three effects affect the relationships between the outcomes achieved through clinical handover improvement and the future safety value assigned by the organisation and individual clinicians involved. External alignment proposes that efforts and enthusiasm from individual clinicians regarding clinical handover improvement must be supported by organisational commitment to improve clinical handover.

This thesis therefore argues that clinical handover improvement should not be based on a particular goal or standard as the outcome. Clinical handover improvement has to be a continuous journey for safer patient care.
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I gratefully acknowledge the constructive criticisms by the peer reviewers of these conferences and journals for publications related to clinical handover and clinical handover improvement as listed below. I would also like to acknowledge the contributions made by my co-authors in these publications.


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- AUSTRALIAN COMMISSION ON SAFETY AND QUALITY IN HEALTH CARE (2010) OSSIE guide to clinical handover improvement., Sydney, Australian Commission on Safety and Quality in Health Care.

Last but not least, I would also like to acknowledge the support provided by the Royal Hobart Hospital Research Foundation and the Australian Commissions in Safety and Quality in Health Care for providing the funding required to complete this research.
Statement pertaining to this thesis

This thesis is written based on published works from research projects conducted by the PhD candidate and research team. Published works include peer-reviewed manuscripts, literature reviews, research reports and training manuals.

This thesis is written and presented in accordance with the requirements set by the University of Tasmania. It includes:

- Clear and detailed statements on authorships
- A comprehensive, concise and critical introduction to the work (which may be in the format of a conventional literature review or a review article) – see Chapters 1 and 2
- A clear outline of the research methodology used – see Chapter 3
- The publications themselves and sections that link the publications together. Although the individual publications arising from this thesis will be in the format prescribed by the respective journals, the thesis and papers must be formatted in consistent (uniform) style throughout in standard typescripts (Word). Offprint/pdf files of published manuscripts must not be presented within the body of the thesis – see Chapter 4
- A discussion chapter – see Chapter 5
- A conclusion chapter – see Chapter 6
- A single reference list/bibliography
Statement of Co-Authorship

The following people and institutions contributed to the publication of work undertaken as part of this thesis:

- Dr. Kwang Chien Yee, School of Medicine, University of Tasmania (the candidate)
- Dr. Ming Chao Wong, School of ICT and Engineering, University of Tasmania
- Associate Professor Paul Turner, School of ICT and Engineering, University of Tasmania.

Publication 1: Medical error management and the role of information technology -- a new approach to investigating medical handover in acute care settings. Section 4.2.1

Publication 3: National clinical handover initiative: Overarching minimum data set. Section 4.2.3

Publication 4: National clinical handover initiative: Overarching standardised operating protocol. Section 4.3.4

Publication 5: National clinical handover initiative: Clinical handover training manual. Section 4.3.5

Publication 6: "HAND ME AN ISOBAR": a pilot study of an evidence-based approach to improving shift-to-shift clinical handover. Section 4.3.6

Publication 7: Understanding how clinical judgement and communicative practices interact with the use of an electronic clinical handover system. Section 4.3.7

For Publication 1, 3, 4, 5, 6, 7, the candidate was the primary author and with Dr. Wong and Associate Professor Turner contributed to the idea, its formalisation and development

Publication 2: A structured evidence-based literature review regarding the effectiveness of improvement interventions in clinical handover. Section 4.2.2

For Publication 2, the candidate was the clinical lead for this review and the candidate reviewed all the publications in the literature to provide clinical commentaries. Dr. Wong conducted the initial review. All three authors contributed to the writing of the review.

We the undersigned agree with the above stated “proportion of work undertaken” for each of the above published (or submitted) peer-reviewed manuscripts contributing to this thesis:

Signed: 

A/Prof. Kate MacIntyre
Supervisor
School Of Medicine
University of Tasmania

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Chapter 1  Introduction

1.1  Introduction
This thesis presents the safety value alignment model to understand and provide guidance for clinical handover improvement. The safety value alignment model was developed based on analysis and reflections of 7 out of a series of 18 publications between 2005 and 2013 by the PhD candidate and the research team on the topic of clinical handover and clinical handover improvement. These 7 selected publications are included in full or in part in Chapter 4 and form part of this thesis.

The initial research work was conducted in two parts. The first part was conducted at the Royal Hobart Hospital’s Department of General Internal Medicine (DGIM) from 2005 to 2007, with the aim of understanding shift-to-shift medical handover and medical handover improvement through developing and implementing an electronic tool. The first part of the research was conducted by the PhD candidate and an information systems researcher. The second part was conducted at the Royal Hobart Hospital’s Department of General Internal Medicine (DGIM), Department of General Surgery (DGS) and Department of Emergency Medicine (DEM) from 2007 to 2009. The second part of the research work focused on medical and nursing shift-to-shift clinical handover. The second part of the research was funded by the Australian Commission on Safety and Quality in Health Care in order to expand on the work of the first part, without the development of an electronic tool. Some of these research results were subsequently adopted into the Australian National Clinical Handover Improvement Guideline, known as the “OSSIE” guide (Australian Commission on Safety and Quality in Health Care, 2010b).

This chapter provides an introduction to the international, national and local context for conducting the clinical handover research project at the Royal Hobart Hospital and the University of Tasmania. This chapter is divided into the following sub-sections:

- Section 1.2 provides the background and rationale for conducting clinical handover research.
- Section 1.3 states the research questions and associated research objectives in relation to this thesis.
- Section 1.4 describes the context in which the research has taken place. It provides an overview of the three departments in which clinical handover research was conducted.
- Section 1.5 describes the publications included in this thesis and the rationale for their inclusion.
- Section 1.6 provides an introduction to the safety value alignment model.
- Section 1.7 provides an overview of the structure of this thesis and outlines of chapters.
- Section 1.7 provides a summary reflection of this chapter.
1.2 Research background

The delivery of healthcare services is facing significant challenges. Advances in technology in combination with an ageing population substantially increase the complexity of healthcare delivery. Advances in technology over the last few decades however, have not been matched by changes in service delivery models. While healthcare access has improved, the quality and safety of healthcare has lagged behind. This has become the main focus of health services research in the past decade (Marshall et al., 2013).

Studies have shown that there is potential for significant improvement in the quality and safety of healthcare delivery. The Quality in Australia Health Care Study analysed over 14,000 admissions in New South Wales, Australia and found that 16.6% of admissions were associated with an adverse event (Wilson et al., 1995). These adverse events resulted in disabilities and longer hospital stays (Wilson et al., 1995). An analysis of the preventable adverse events concluded that human factors were the most significant contributor to the causation of adverse events (Wilson et al., 1999). Similar studies in different countries such as the United Kingdom (Vincent C et al., 2001), Canada (Baker et al., 2004), the United States (Kohn et al., 1999), Denmark (Amrion, 2014) and France (Michel et al., 2004) have all concluded that our healthcare systems could be safer. Significant efforts and resources have been allocated to improve patient safety in the last two decades (Marshall et al., 2013).

Clinical handover is defined as the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or a group of patients, to another person or professional group on a temporary or permanent basis (Australian Medical Association, 2006a). Healthcare professionals carry out clinical handover on a daily basis. It is estimated that at least 7 million clinical handover sessions are conducted in all hospitals in Australia annually (Australian Commission on Safety and Quality in Health Care, 2010b). Clinical handover is an important aspect of quality and safety in healthcare. Clinical handover has been identified as one of the key accreditation standards for the Australian healthcare system (Australian Commission on Safety and Quality in Health Care, 2011) and one of the key areas for improvement by the World Health Organisation (Riesenberg et al., 2010). The literature however suggests that clinical handover is a poorly defined process and often poorly conducted by healthcare professionals (Wong et al., 2008a). Poor clinical handover is associated with poor patient outcomes (Bittner et al., 2012, Bomba and Prakash, 2005), increased medical errors (Pezzolesi et al., 2010, Arora et al., 2007), poor staff satisfaction (Borowitz et al., 2008, Wong et al., 2008a) increased medico-legal claims (Jagsi et al., 2005) and increased patient complaints (Singh et al., 2007). Efforts to improve clinical handover have become more urgent and essential in order to improve quality and safety of patient care due to the reduction in working hours of healthcare professionals.

Among the preventable factors, physician fatigue has been identified as one of the most important factors to address in order to improve quality and safety of patient care (Kevat et al., 2014, Shea et al., 2014, West et al., 2009, Lockley et al., 2007, Wilson et al., 1999). It has been shown that nurses working more than 12.5 hours without a rest period were more likely to make errors and suffer
from injuries at work (Lockley et al., 2007). Medical doctors traditionally worked very long hours as part of medical training and it was thought that long working hours were necessary to provide trainee doctors with adequate clinical exposure (Ulmer C et al., 2009). As such, greater than 24 hours on-call shifts were a routine work pattern for many trainees (Mansukhani et al., 2012).

Long shifts however have a significant physical and psychological impact on healthcare practitioners. Fatigue and loss of sleep have significant impact on patient safety and physician safety. Research has shown that psychometric performance started to decline from 16 hours of wakefulness, and this effect was equivalent to 0.04% of alcohol concentration in the bloodstream (Dawson and Reid, 1997). Fatigue and lack of sleep might have significant impact on safe practices by doctors. In a nationwide study of interns, extended shift (>24 hours) was associated with 2.3 times increase in the risk of motor vehicle accidents and 5.9 times increase in the risk of near-misses (Barger et al., 2005). More importantly, fatigue has been associated with an increased chance of medical errors and adverse events. In a recent study, it has been shown that fatigue increased the medical error rate by 22% (McCormick et al., 2012).

In recent years, fatigue has been shown to impact on depression, burn-out and empathy. In a recently published study, a group of researchers in the USA showed that a protected sleep period was associated with improvement in depression and burn-out as well as expression of empathy (Shea et al., 2014). This might have significant impact on patient care as well as working relationships with colleagues. As such, there is an urgent need to address fatigue, especially as a cause of patient harm.

In recent years, many countries and healthcare organisations have started initiatives to limit the effect of fatigue on healthcare service delivery. In Europe, the working hours of medical trainees were limited to 48 hours per week in August 2009, as specified in the European Working Time Directive (Mansukhani et al., 2012). In the United States of America, the State of New York limited the total working hours of resident physicians to 80 hours per week (Okie, 2007). In 2003, the Accreditation Council for Graduate Medical Education mandated maximum working hours of interns and residents in the US to 16 continuous hours and 24 continuous hours respectively (Accreditation Council for Graduate Medical Education, 2011). In Australia, the Australian Medical Association released a safe working hours guideline in 2006 and the guideline has placed a limit on the working hours of junior doctors to 16 hours a day (Australian Medical Association, 2006b).

There is much debate regarding the impact of reduced working hours on patient care (Kevat et al., 2014, Press et al., 2011, Ulmer C et al., 2009, Jagsi et al., 2008) and training (Amirian, 2014, Markelov et al., 2011, Christmas et al., 2009, Pappas and Teague, 2007, Kiernan et al., 2006). Various studies have demonstrated that reduction in working hours has not created a significant adverse impact on training and education (Markelov et al., 2011, Ulmer C et al., 2009, Pappas and Teague, 2007, Kiernan et al., 2006).

It therefore seems logical that a reduction in working hours would reduce fatigue and improve patient outcomes (Kevat et al., 2014, Jagsi et al., 2008). This much promoted benefit of reduced working hours on improvement in patient outcomes has not been clearly demonstrated in research studies (Amirian, 2014, Mansukhani et al., 2012). A study which investigated changes in readmission rates concluded that working hour restriction had not improved readmission rates
A large scale 24 months follow up study showed that working hour restrictions did not change the outcomes of patient care (Salim et al., 2007). More importantly, the study showed an increase of 30% in non-fatal complications after working hours restrictions (Salim et al., 2007). A recent study which investigated operative complications showed that night shift did not impact on the complication rate (Amirian, 2014, Veddeng et al., 2014). While further studies are urgently needed to confirm these findings, practical implementation of working hour restrictions does not seem to achieve the theoretical benefits of reduced work hours.

The impact of working hour restrictions on patient safety highlights the importance of clinical handover practice within the acute healthcare setting. Patients need to be looked after by medical and nursing teams throughout their hospital stay. The restriction on working hours of healthcare professionals means that patients will be looked after by different teams of healthcare professionals throughout their hospital stay. The lack of significant improvements in patient outcomes after working hour restrictions could be partly due to the lack of continuity of patient care (Kevat et al., 2014, Ulmer C et al., 2009, Wong et al., 2007). There is therefore an urgent need to understand and improve clinical handover in order to improve patient care. Otherwise, the problems associated with fatigue are just being replaced by discontinuity of care due to poor patient handover.

The research project that resulted in the publications that formed this thesis was conducted in the context of an urgent international need to provide evidence based clinical handover improvement strategies and interventions. A literature review by the Australian Council for Safety and Quality in Health Care in 2005 suggested that there were few studies in the field of clinical handover, especially when medical practitioners were involved (Australian Council for Safety and Quality in Health Care, 2005). The literature review included literature from other industries outside the field of healthcare due to the paucity of literature available within the healthcare sector. Most of the literature available at that time regarding clinical handover in healthcare was related to nursing handover (Australian Council for Safety and Quality in Health Care, 2005). The nursing practice had long established a shift work pattern and therefore clinical handover had become part of the nursing practice routine. It was suggested that while nursing handover was a ritual of nursing care, the quality of nursing handover could be improved (Scovell, 2010, Manias and Street, 2000, Strange, 1996). In medical practice, clinical handover has become increasingly recognised as part of the clinical practice since the introduction of working hour restrictions. These factors have prompted the international community to investigate and suggest improvement strategies for clinical handover. The first part of the research project that contributes to this thesis was initiated at the end of 2005 in order to provide evidence and strategies to improve clinical handover among medical practitioners. This resulted in Publication 1, presented in Chapter 4. Subsequently the first part of the research project was expanded to include the development of an electronic tool to support shift-to-shift handovers among medical practitioners at the Royal Hobart Hospital. The engagement of clinicians and users into the development of an electronic tool to support clinical handover was the subject of a PhD, submitted and awarded by the University of Tasmania in 2011.

Since 2005, the international community has highlighted the need to improve clinical handover. Clinical handover was included in the World Health Organisation (WHO) High 5s project in 2006 (O'Leary, 2006). The High 5s project included the five most important areas in quality and safety
that the WHO aimed to develop international consensus and guidelines on practice improvement. These five areas were managing concentrated injectable medicines, the performance of correct procedures at correct body sites, communication failures during handover, healthcare associated infections and medication accuracies at transition (O'Leary, 2006). The Australian Commission on Safety and Quality in Health Care was appointed the technical leading agency to develop the clinical handover improvement guideline for the WHO High 5s project in 2006.

Because of the paucity of available literature in the area of clinical handover, the Australian Commission on Safety and Quality in Health Care funded a literature review on the topic. The PhD candidate was involved in this literature review as the clinical lead. This literature review was subsequently made available electronically through the Commission's website (Wong et al., 2008b). The summary part of the literature review forms part of this PhD and is included Chapter 4 as Publication 2. The Australian Commission on Safety and Quality in Health Care subsequently funded further projects to investigate clinical handover improvement. The Royal Hobart Hospital and the University of Tasmania were funded for a large scale research project to develop a standardised operating protocol for clinical handover improvement. This large scale project formed a partial extension of the first part of the research project with the aim of understanding clinical handover improvement strategies without the development of an electronic tool.

This second part of the research project (the research project funded by the Australian Commission on Safety and Quality in Health Care) has resulted in publications of manuscripts and reports describing research results. These publications are included in Chapter 4 of this thesis as Publication 3, Publication 4, Publication 5 and Publication 6. This research evidence was subsequently adopted and developed into the Australian National Clinical Handover Improvement Guideline, known as the OSSIE guide (Australian Commission on Safety and Quality in Health Care, 2010b) and the Australian National Clinical Handover Standard 6: Clinical Handover (Australian Commission on Safety and Quality in Health Care, 2011).

The PhD candidate was a member of the Australian national committee to improve clinical handover from 2008-2012. During this period of time, the PhD candidate worked with staff at the Australian Commission on Safety and Quality in Health Care to adapt research results, mainly from the second part of the research project from the Royal Hobart Hospital and the University of Tasmania, as well as all other research projects associated with the Australian National Clinical Handover Initiative, into a consultative version of the OSSIE guide. After 6 months of public review and submissions, the OSSIE guide was edited, revised and subsequently endorsed by the Australian Government as the Australian National Clinical Handover Improvement Guideline. The PhD candidate then assisted the process of development of the Australian National Clinical Handover Standard 6: Clinical Handover and the toolkit guide to improve clinical handover. From 2012-2014, the PhD candidate was involved as a member of the Royal Hobart Hospital Clinical Handover Improvement Committee. Publication 7 was prepared after the PhD candidate re-analysed earlier data, having gained experience from participating in clinical handover improvement activities and programs since 2005.
The PhD candidate analysed and reflected upon these 7 publications to derive the main findings of this thesis. The analysis of these publications as well as the publications themselves, in part or in full as included in Chapter 4, form this PhD.

1.3 Research questions and research objectives

Given the above research context, and after 10 years of researching the topic of clinical handover and contributing to the literature in this field, the candidate in the process of synthesising this thesis, pose the following research questions for this thesis. These research questions are therefore posed retrospectively after reflection and analysis of all the publications and research projects that the candidate involved in. This thesis aims to address the following research questions and research objectives.

RQ1: What are the understanding and practices of clinical handover from the perspective of clinicians?
   RQ1-01: To explore clinicians’ understanding, expectations and experiences of clinical handover.
   RQ1-02: To identify the purpose of clinical handover practice.

RQ2: What interventions are required to improve clinical handover from the perspective of clinicians?
   RQ2-01: To identify strategies for clinical handover improvement from the perspective of clinicians.

RQ3: What are the essential elements of clinical handover improvement?
   RQ3-01: To identify critical success factors for clinical handover improvement process.

1.4 Research context

This section provides the context in which this research was conducted. It provides an overview of the Royal Hobart Hospital and the three departments and three wards regarding their clinical handover settings in which the data was collected.

The first part of the research project was conducted between October 2005 and May 2007. Data collection was purely conducted at the Department of General Internal Medicine (DGIM) in the Royal Hobart Hospital. Data collection was focused on understanding clinical handover and clinical handover improvement among medical practitioners for shift-to-shift handover at DGIM.

The second part of the research project was conducted between 2007 and 2009. Data collection was conducted at DGIM, DGS and DEM for both medical and nursing shift-to-shift clinical handover. The results from the second part of the research project and subsequent publications form the foundation for this thesis.

1.4.1 The Royal Hobart Hospital

The Royal Hobart Hospital is the tertiary referral and major teaching hospital in Tasmania. The Royal Hobart Hospital has fully developed emergency, general medical and general surgical
services. The hospital services a population of approximately 240,000 people in Southern Tasmania. The hospital also provides state-wide specialist care in cardiothoracic, neurosurgery, vascular surgery, neonatal intensive care, hyperbaric and diving medicine and high risk obstetrics. The hospital has 460 acute care beds, 9 intensive care beds, 5 high dependency beds as well as 45 physical treatment spaces in the Department of Emergency Medicine.

1.4.2 Context of medical handover at the Department of General Internal Medicine

The DGIM accepted patients with medical issues who needed inpatient investigations and managements. This arrangement included many subspecialty patients as specialty medical units such as cardiology and gastroenterology only accepted a selected group of patients requiring procedures.

There were 5 medical units within the DGIM. There were 2 consultants supervising patient care in each unit. Each unit had 1 registrar and 1 intern. The 5 medical units set up a roster to accept patients for a particular day of the week, termed as the on-call day. During routine working hours, all medical teams worked from 08:00 till 17:00. The on-call team was responsible for all patient care from 17:00 to 22:00. At 22:00, the on-call team handed over to a night team. The night team consisted of 1 on-site registrar and 1 intern. The consultant on-take was off-site. The intern had to cover both general medicine and general surgery patients. Each medical unit had on average of around 10 inpatients.

During weekends and public holidays, there was one team working from 08:00 till 22:00. The team consisted of 1 consultant, 1 registrar and 2 interns. The registrar and interns were on-site and the consultant was off-site. The night team worked from 21:30 till 08:30. The on-take consultant from the night before and a “post-take” team consisting of a registrar and an intern would review patients admitted overnight. There was a separate team working on Saturday and on Sunday respectively.

Inpatients serviced by the DGIM varied in the acuity and severity of their illnesses significantly. Some patients might not have had a clear diagnosis while others might have complex medical illness requiring complex investigations and treatments. Some patients might deteriorate rapidly while others were very stable medically and required allied health involvement. While patients were reviewed daily by the treating team other than on weekends and public holidays, in the after-hours setting, the after-hours team had the responsibility of care for between 50-100 inpatients. It was therefore impossible for the after-hours team to have a thorough and detailed handover about every patient on the medical ward.

The handover practice in the DGIM varied depending on the time of the day. The major clinical handover session was the morning handover at which the night team discussed every patient admitted overnight in details for the day team to take over care. At 17:00, the on-call team (after-hours team) would receive a handover for patients who might deteriorate or patients who might need certain treatments. There was a more formal handover at night between 21:30 to 22:00. This handover occurred between the on-call team and the night team.
1.4.3 Context of medical handover at the Department of General Surgery

The DGS accepted patients with surgical diagnoses who potentially required surgery. This arrangement included patients without a clear diagnosis as well as trauma patients. Some patients were admitted directly to a specialty surgery unit, such as plastic surgery and burns unit, otolaryngology, neurosurgery or cardiothoracic surgery.

There were 3 surgical units within the DGS. There were 2-3 consultants supervising patient care in each unit. Each unit had 1 registrar and 1-2 interns. The 3 surgical units set up a roster to accept patients for a particular day of the week. During routine working hours all surgical teams worked from 07:30 till 17:00. The on-call team was responsible for all patient care from 17:00 to 22:00. At 21:30, the on-call team handed over to the night team. The consultant was off site, so was the registrar. The same registrar was on-call for the full 24 hours but would only come into the hospital if required. The on-call surgical intern was onsite from 08:00 till 22:00. The surgical intern then handed over patients to the night intern and the night intern covered for both general medicine and general surgery patients.

During weekends and public holidays, the consultant and the registrar on-call covered for all surgical patients and they were off-site. The consultant and the registrar commonly covered patient referral requests for the whole weekend. There were 2 surgical interns working from 08:00 till 22:00. The surgical intern then handed over patients to the night intern.

Inpatients serviced by general surgical unit were generally of high acuity. Their conditions could change rapidly. Their investigations and treatments were generally complex. The after-hours team generally cared for 20-30 inpatients.

Clinical handover in the DGS varied depending on the time of day. As the on-call surgical registrar was often assisting with operations in the operating theatre, the handover between registrar and registrar often occurred on the phone. The surgical interns however, generally accepted handover from the night team around 07:30 and provided the night team with handover at 21:30.

1.4.4 Context of medical handover at the Department of Emergency Medicine

The DEM at the Royal Hobart Hospital is the major trauma centre for Southern Tasmania. The DEM was staffed by a varying number of specialist emergency physicians, senior registrars, registrars, residents and interns. During the day, there were at least 2 specialist emergency physicians and 2 senior registrars on-site. There were varying number of registrars, residents and interns at any one time. The DEM used staggered shifts for registrars, residents and interns. This was designed so that the peak number of staff available on the floor for clinical work correlated with the peak number of patient presented to the DEM, i.e between 11:00 to 21:00. There were no differences between weekdays, weekends or public holidays.

All junior medical staff members who arrived at work would generally take on new patients rather than have existing patients handed over to them. As such, accepting patient handovers was not a practice for junior medical staff members in DEM. At the end of their shifts, however, the workload was designed so that the number of patients that junior staff needed to handover was minimal. The tradition was that junior staff members could only handover to senior registrars or consultants. Sometimes, junior medical staff had to work longer shifts in order to provide a plan for patients or
to wait for senior staff to accept handovers of patients. There were 3 main clinical handover sessions per day, regardless of the day of the week. These handover sessions were: 08:00 – 08:30, 15:00pm – 15:30 and 22:30 – 23:00. All medical staff as well as a senior nursing staff member gathered around a computer screen to go through all the patients currently in DEM as listed in the current electronic display system. It was the most senior member of the shift, handing over to the most senior member of the incoming team. The most senior member acted as the leader and took the responsibility of all patient care in DEM.

1.4.5 Context of nursing handover at the General Medical Ward.
The research regarding nursing handover for medical patients was conducted at one of the two medical wards at the Royal Hobart Hospital. The General Medical Ward accepted the care of patients with medical issues requiring further investigations and managements. The staff had special expertise in the management of acute strokes, endocrinological, rheumatological, renal and gastroenterological problems. Most of their patients were elderly with multiple co-morbidities requiring social care in addition to caring for their acute medical conditions. Nursing care requirements for medical patients were complex and required individual planning. While clinical pathways were available for common conditions, most patients in this ward had different diagnoses and treatment plans. Nursing staff also had to interact significantly with medical teams and allied health teams.

The medical ward had three different wings with a total of 32 patients. There were 10 nurses per shift. The number of nurses rostered on the ward was dependent on the number of patients on the ward. Furthermore, there were less nurses on the ward during night shifts. It is very important to note that while the same nurse might work consecutive days, he or she might not look after the same patients during these days as he or she might work in a different section and with a different team.

There were 3 shifts for nurses on general medical ward and the handover time was 07:30, 14:15, and 22:00. The same handover pattern occurred over weekends and public holidays. Morning handover started at 7:30, afternoon handover started at 14:15 and evening handover started at 22:00. There were 30 minute shift overlaps with the aim of achieving a good handover.

A handover sheet typed up in MSWord was used as the basis for discussion. Nurses often updated the sheet just before the handover time. Nursing staff conducted face-to-face handover in a meeting room away from the clinical area with this handover sheet. They referred to the patients’ notes when necessary. The handover session usually involved all nursing staff from the incoming team and at least one nurse from the outgoing team.

1.4.6 Context of nursing handover at the General Surgery Ward
The research regarding nursing handover for surgical patients was conducted at the only General Surgery Ward at the Royal Hobart Hospital at the time. The General Surgery Ward accepted care of patients who have surgical issues requiring further investigations and managements. There were a total of 25 beds within the General Surgery Ward, with a step-down ICU care area, known as the Special High Observation Unit (SHOU unit), which could cater for up to 3 patients requiring close observation and monitoring. While post-operative care was usually complex and labour intensive, these care requirements were standardised into patient care pathways.
The surgical ward was a long "U" shaped ward. There were a total of 34 nurses, comprising of part-time and full-time staff. The morning shift consisted of 6-7 staff, excluding the clinical nurse manager. The afternoon shift consisted of 5-6 staff and night shift had 3-4 staff. There was a 30 minute overlap between shifts for morning and night handover and an 1 hour and 45 minute overlap for afternoon handover.

There were three nursing handover sessions per day each day of the week. These handover sessions started by updating on the computer the handover sheet which was typed up using MSWord and printed off for each incoming staff member. The handover sheet consisted of patient demographics, operation details, deterioration status, in situ devices and urgent care requirements. The handover process occurred near the patients' bedside. Nurses moved from one bedside to the other to complete the handover process.

1.4.7 Context of nursing handover at the Department of Emergency Medicine.
The research regarding nursing handover for DEM patients was conducted throughout the whole DEM. DEM accepted care of patients requiring emergency investigations and treatments. There were usually many sick patients at any one time and they required constant observations. Nursing staff were allocated patients to look after but the complex and dynamic environment of DEM with the rapid changeover of patients meant that nursing staff needed to multi-task continuously. Constant interruptions were the norm in DEM.

DEM had 45 treatment places and 3 resuscitation bays at the time of research. There were 3 main clinical handover sessions per day every day of the week. Varying durations of shift overlap were observed within DEM i.e. 2 hours overlap for morning to afternoon shift, 45 minute overlap for afternoon to night shift and 15 minute overlap for night to day shift. Nursing handover always commenced in an allocated room at the start of their shifts. Nursing staff of the incoming shift were briefed by the outgoing nurse coordinator who provided a brief summary of the previous shift and an overview of DEM. Following this, nursing handover occurred in parallel around clinical areas, only involving staff who were going to look after the particular group of patients.

In each of the clinical areas, nursing handover occurred outside patient bedsides, near a computer terminal where patient notes were available. Nursing staff would only obtain handover information related to the patients allocated to them.

1.5 Publications and rationale for inclusion
The two part research project carried out at the Royal Hobart Hospital has resulted in a total of 18 publications. These 18 publications include 11 peer review manuscripts, 5 research consultancy reports and 2 national guidelines. The PhD candidate has been extensively involved in the preparation and editing of all these 18 publications.

A total of 7 publications have been selected to form part of this PhD. All these publications, in part or in full, have been included in Chapter 4 of this thesis. A short description regarding each publication is provided below. An analysis and review of each of these publications are provided in Chapter 4 of this thesis.
Publication 1


This publication describes the methodological approach to the research project. This publication also describes preliminary results from the first part of the research project, highlighting the variability of clinical handover practices, the need for standardisation and the emphasis on education and training program by clinicians.

Publication 2


This publication provides a comprehensive literature review regarding clinical handover till 2008, focusing on literature 5 years prior to 2008. A total of 110 publications were reviewed with commentary in this document. The PhD candidate was the clinical lead for the literature review and was responsible for the review of all these publications to provide clinical contexts. As the literature regarding clinical handover has increased significantly in the last few years, this document only forms part of the literature review (Chapter 2) of this thesis.

Publication 3, Publication 4 and Publication 5


These three publications arise from the same research project and the same research data. These publications were reviewed by staff members of ACSQHC and the Australian National Clinical Handover Improvement Initiative Committee, chaired by Professor Dorothy Jones. Revisions were made based on recommendations from peer reviews. Publications included in this thesis have been through three rounds of peer reviews and revisions. These publications describe the results of the second part of the clinical handover research project and provide a discussion regarding each individual component of the clinical handover intervention program. Publication 3 describes the minimum data set and standardised information transfer required for clinical handover, after analysing the research data and integrating the available literature.
Publication 4 describes a standardised operating protocol for clinical handover improvement derived from the research data. Publication 4 describes the complexity of clinical handover, the purpose of clinical handover, interventions, including the standardisation of procedures and the standardisation of information transfer, education and training and continual improvement through an iterative-feedback cycle. Publication 5 provides an outline of education and training requirements for clinical staff in order to improve clinical handover.

- Publication 6


Publication 6 forms the academic basis for discussion of standardisation within local clinical context. This publication describes the experience of using the standardised procedure and information standardisation platform derived from the second part of the research project, through the term "HAND ME AN ISOBAR", a 4 step approach to improve clinical handover. This is further discussed and explained in Chapter 4.

- Publication 7


Publication 7 was prepared after the PhD candidate's involvement in clinical handover research and clinical handover improvement programs from 2005-2013. The PhD candidate re-analysed the data and established a new perspective on clinical handover improvement. This publication explores the impact of clinical judgement and communicative practices on the outcomes of the standardisation of clinical handover.

The PhD candidate analysed and reflected on these publications and literature regarding clinical handover to derive the key findings and to develop a conceptual model to discuss clinical handover improvement. At the time of submission, the model described in Chapter 5 of this thesis has been submitted for the journal publication peer review.

All other publications that the PhD candidate has been involved in regarding clinical handover are listed in the acknowledgement page.

1.6 Introduction to the safety value alignment model

The literature review in Chapter 2 suggests that the most significant research gap in clinical handover research is the lack of a conceptual model to understand clinical handover and clinical handover improvement. As such, this thesis addresses this research gap by developing the safety value alignment model for clinical handover improvement (see Section 5.3). This model is developed through an analysis and reflection of the 7 publications included in this PhD and the current literature. This model fills the current gap in the literature and provides guidance for clinical handover improvement.
These 7 publications and 5 key findings of this thesis suggest that there are factors at a system level and at an individual level that affect clinical handover. When clinical handover improvement is considered, these factors form the safety value assigned by clinicians and the organisations that the clinicians work in. Every clinician assigns a safety value to their own clinical handover practice, based on a combination of their individual knowledge, skills and interests in the area and the external environment of peer pressures, legal and legislative requirements and organisational culture. On the other hand, the organisation assigns a safety value on the clinical handover process and clinical handover improvement based on a combination of accreditation requirements, recent adverse events and incidences, research and/or management interest of clinical leaders and the importance of clinical handover for risk management within the organisation. The safety value alignment model proposes that clinical handover improvement programs will only achieve substantial positive clinical outcomes if there is internal and external alignment of safety values for clinical handover assigned by clinicians and by healthcare organisations.

The internal alignment of safety values refers to the alignment of safety values of different strategies and interventions to improve clinical handover by both clinicians and the healthcare organisations. Five interventions have been identified in both this research and a review of the literature:

1. A process to understand clinical handover and the purpose of clinical handover
2. The standardisation of clinical handover practice,
3. The standardisation of information transfer,
4. Education and training program and
5. Evaluation and feedback to continual engagement of clinicians for continuous improvement.

This model suggests that three important effects of interventions to improve clinical handover must be considered:

1. the multiplier effect,
2. the consecutive-continuity effect and
3. the cohesiveness effect.

This model argues that the combination of different interventions produce a multiplier effect to clinical handover improvement. It is essential to have commitment from both the clinicians and the organisations as each intervention must be completed within an appropriate time-frame and in a set sequence. More importantly, all interventions must be cohesive and complement each other, in order to achieve improvement in the safety value assigned to clinical handover by clinicians and healthcare organisations.

The external alignment of safety value refers to the alignment of the safety value of clinical handover assigned by clinicians to the safety value of clinical handover assigned by the organisation that clinicians work in. Both clinicians and the healthcare organisation must commit
time and effort in the process of clinical handover improvement in order to achieve clinical outcomes of safer patient care.

1.7 Summary of following chapters
This section provides a brief overview of the remaining chapters of this thesis and how they correlate with the publications selected for inclusion in the PhD thesis as described above.

1.7.1 Chapter 2 – Literature Review
Chapter 2 provides the analysis and review of core literature in the field of clinical handover. This chapter is based on the work previously published via the Australian Commission of Safety and Quality in Health Care (Wong et al., 2008b), the summary of which is attached as Publication 2 in Chapter 4. The published work provides a comprehensive review of all the handover literature until 2008. This chapter summarises and provides a critique of that literature review, with a focus on the publications which are relevant to this thesis. Furthermore, this chapter provides a comprehensive review of the relevant literature regarding clinical handover from 2008 onwards.

1.7.2 Chapter 3 - Research approach and processes
Chapter 3 examines the research approach and research processes in order to complete data collection for publications included in this PhD. The chapter addresses the need to consider the clinical and the quality and safety domains, in particular when qualitative methodology is used. The chapter then outlines the research strategy and procedures employed, the data analysis techniques applied and also outlines the approach to the interpretation and discussion of the research.

1.7.3 Chapter 4 - Interpretation of key findings
Chapter 4 provides a summary of each of the 7 publications included in this thesis. This chapter then provides an overview of these publications in relation to the research questions in this thesis. All publications, in part or in full, are attached within the chapter. This chapter describes and interprets five key findings derived from analysis and review of these publications.

1.7.4 Chapter 5 - Discussion
Chapter 5 provides a discussion of the five key findings in relation to the literature. This chapter then discusses the overarching link between these key findings and proposes a new model for consideration – the safety value alignment model for clinical handover improvement.

1.7.5 Chapter 6 - Conclusion
Chapter 6 provides a synthesis of the key findings in relationship to the research questions. It reflects on how the research project has provided a discussion around the research questions identified in this thesis. It discusses limitation of the research. It then provides future research direction in the field.
1.8 Chapter reflections
This chapter has provided the background and the rationale for research into clinical handover and clinical handover improvement. This chapter has also provided the overview of this PhD which is written based on previous publications. The research questions and objectives were discussed. The chapter then discussed the research context. Publications by the PhD candidate were discussed and the rationale for the selected publications to form the PhD thesis was outlined. This chapter then provided a summary of the thesis and the remaining chapters.

Quality and safety of healthcare delivery has recently become an increasingly important aspect of health services research. Clinical handover has become an increasingly important part of clinical practice due to the changes in work practices and reduction in working hours. In order to improve patient safety, the conflict between physician fatigue and discontinuity of patient care needs to be balanced. Reduction in working hours of doctors and nurses needs to be supported by well developed clinical handover practices. The WHO High 5s project and the Australian National Clinical Handover Initiatives provide the research context for this research. The data collected through this research has resulted in 18 publications over the timeframe of 9 years. A total of 7 publications are included in this thesis as they examine a common theme. This thesis will provide a literature review to date regarding clinical handover and clinical handover improvement. This thesis will then describe the research approach and research processes adopted initially to collect and analyse data for publications. This thesis will then discuss the 7 publications and key findings derived from these 7 publications. Finally, this thesis will discuss the five key findings in relation to the literature and discuss a proposed model for clinical handover improvement, the safety value alignment model. This thesis concludes by answering the research questions and addressing research limitations and future research directions.

The next chapter provides a review of relevant literature in the field of clinical handover. It provides a review and discussion of current relevant literature in the field in addition to a summary and a discussion of relevant literature from previously published literature review, which forms part of this thesis, attached as Publication 2.
Chapter 2 Literature Review

2.1 Introduction
This chapter uses a previously published literature review (Wong et al., 2008a) as the foundation to discuss literature relevant to clinical handover research, in particular, focusing on the literature relevant to this thesis. This chapter discusses the literature review conducted in 2008 as a background for the research project. It provides a definition for clinical handover used throughout the thesis and publications included and associated with this thesis. This chapter then conceptualises clinical handover literature into three domains: quality and safety and clinical handover, standardisation of clinical handover and engagement of clinicians for clinical handover improvement. This chapter discusses clinical handover literature in these three domains. This chapter then provides an overview of the impact of clinical handover interventions reported in the literature as well as research gaps in the literature pertaining clinical handover. Finally, this chapter provides a reflection of the literature available regarding clinical handover.

- Section 2.2 provides a discussion regarding the literature review conducted in 2008. It provides the definition for clinical handover adopted in this thesis. This definition has been used in all articles related to this thesis.
- Section 2.3 provides a discussion regarding the summary and conceptualisation of clinical handover based on available literature. This section discusses three domains: quality and safety and clinical handover, standardisation of clinical handover and engagement of clinicians for clinical handover improvement. This section identifies and discusses the intersection of these three domains as the research gap addressed in this thesis.
- Section 2.4 discusses quality and safety and clinical handover. It reviews the described risks associated with clinical handover. It provides a discussion regarding the various functions that clinical handover serves as well as factors that affect the quality and safety of clinical handover.
- Section 2.5 discusses standardisation of clinical handover. The literature emphasises the need for standardisation of information and content of clinical handover as well as the process of clinical handover. This section also discusses the use of electronic tools for clinical handover improvement as part of the standardisation process.
- Section 2.6 discusses strategies to engage clinicians to discuss clinical handover improvement. The main strategy emphasised in the literature involves education and training for clinicians. Studies that use various methods to improve clinical handover that involves engagement of clinicians are also discussed in this section.
- Section 2.7 provides a review of the clinical impact of clinical handover interventions. It then provides a discussion regarding research gaps to guide future research.
- Section 2.8 provides a summary reflection of this chapter.
2.2 Clinical handover: Introduction

The term clinical handover was first described in the literature as the process of doctors providing instructions to care for patients and communicating these instructions to nurses (McMurray et al., 2010). Since that time, clinical handover has become a process which is practised by all healthcare professionals on a daily basis in different formats. This seemingly routine clinical practice, however, lacks uniform understanding and uniform terminology (Robertson et al., 2014). Clinical handover is often defined as the transfer of information between healthcare professionals (Wong et al., 2008a). Discharge summaries and communication, referral process and medication reconciliation have all been discussed under the heading of clinical handover in the literature (Wong et al., 2008a).

In 2005 the Australian Council for Quality and Safety in Health Care commissioned a literature review regarding clinical handover (Australian Council for Safety and Quality in Health Care, 2005). In that review, a total of 777 articles were examined and only 27 articles fulfilled the inclusion criteria. Out of the 27 articles, 8 articles were from non-health related industries and 19 articles were related to healthcare. All but one study were descriptive studies. There was only one interventional study which aimed to address strategies to improve the clinical handover process. The literature review concluded that there was an urgent need to generate research evidence to guide clinical practice.

Since 2005, there has been a proliferation of research activities in the field of clinical handover. In 2008, the Australian Commission on Safety and Quality in Health Care (the succeeding organisation to the Australian Council for Quality and Safety in Health Care), commissioned a comprehensive literature review to summarise the current knowledge in order to guide the Australian National Clinical Handover Initiative: an initiative to improve clinical handover practices across all healthcare organisations in Australia. The PhD candidate was involved in the full and comprehensive literature review as the clinician lead for the review.

During this literature review process, it became obvious that not only were there varying definitions of clinical handover, but also that different terminologies had been used to describe the clinical handover process. In Australia and Europe, clinical handover was the preferred term. Literature and research from the United States of America however, preferred the term hand-off (Cohen and Hilligoss, 2010). Other terms which had been used to describe the clinical handover process included hand-over, sign-off, handoff, sign out, intershift report, shift-to-shift communication, shift-to-shift transfer and morning report (Wong et al., 2008a). As such, all of these terms were included during literature search to provide a comprehensive review of the field relevant to this thesis.

The literature review and this thesis adopted the definition of clinical handover proposed by the British Medical Association (Junior Doctors Committee, 2004) and Australian Medical Association (Australian Medical Association, 2006a).

"Clinical handover is the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis"
The review team, consisting of the PhD candidate and two other researchers, identified 1004 publication materials related to the above search terms. Out of that, 218 publications were reviewed by the team according to inclusion and exclusion criteria as described in the review (Wong et al., 2008). The PhD candidate reviewed each of the 218 publications to provide clinical context and comment. A total of 110 publications fulfilled the inclusion criteria and definition of clinical handover as described above. These 110 publications were described and reviewed in detail in the literature review (Wong et al., 2008). The literature review report forms the foundation of this chapter.

It is important to note that there is a recent review that only focused on intra-hospital clinical handover practices (Scott et al., 2012). The review aimed to identify evidence practice to guide clinical governance and clinical handover improvement. This review suggested that OSSIE guide is an adequate resource to be considered for clinical handover improvement although the review acknowledged the lack of clear evidence to support its use (Scott et al., 2012).

In more recent years, a consensus has emerged in regard to the definition of clinical handover. Recent literature emphasised the transfer of responsibility and accountability of patient care as the core element of clinical handover (Chin et al., 2012, Australian Commission on Safety and Quality in Health Care, 2010b, Cohen and Hilligoss, 2010, Jorm et al., 2009). This thesis therefore adopts the same definition of clinical handover as described above.

This chapter includes a discussion regarding previous literature as well as literature published post 2008. There were a total of 368 additional publications which were reviewed to form this comprehensive and up to date review described in this chapter.

### 2.3 Clinical handover: Intersection of three domains

The review of available literature in the field of clinical handover research led to the categorisation of the literature into three domains in order to capture key messages and key findings of this thesis. Firstly, clinical handover is discussed within the broader perspective of improvement in quality and safety of patient care. The main driving force of clinical handover research is the need to improve quality and safety of patient care. As such, this domain, discussed in Section 2.4 will provide an overview of quality and safety literature related to clinical handover improvement. This section will then describe clinical handover literature regarding quality and safety in healthcare.

Secondly, quality and safety literature proposes systemic interventions, especially standardisation of practice as a key step to improving healthcare systems. The concept of standardisation has been applied to clinical handover improvement, including standardisation of content and information transfer during clinical handover as well as standardisation of clinical handover processes and procedures. In fact, the literature regarding clinical handover interventions mainly involves standardisation of practice in clinical handover. Studies have also been conducted to develop and implement electronic tools to improve clinical handover. This has been included in the standardisation domain, Section 2.5, as the utilisation of electronic tools delivers standardisation.

Thirdly, quality and safety literature also discusses the need to engage clinicians and improve safety awareness among clinicians. Within the clinical handover literature, the main intervention which has been emphasised to increase clinician awareness of clinical handover and to improve clinician
engagement in the process of clinical handover improvement is education and training programs. There are studies that investigate different change processes to improve clinical handover. The ultimate aim of these studies of different change processes, however, is the engagement of clinicians in the process. This will be further discussed in Section 2.6.

As such, the research space that this thesis describes lies in the intersection between three domains of clinical handover research: 1. Quality and safety and clinical handover, 2. Standardisation of clinical handover and 3. Engagement of clinicians for clinical handover. This is demonstrated in Figure 1. This thesis contributes to the discussion of each of these domains. It defines the purpose of clinical handover and clinical handover improvement. It discusses the need for standardisation processes and the intersection between standardisation and engagement of clinicians. It then emphasises the need for continual engagement of clinicians. Most importantly, this thesis highlights the intersection of these three domains as the essential conceptual model to describe clinical handover improvement, the safety value alignment model discussed in Chapter 5.

Figure 1: Intersection of three domains in clinical handover research.
2.4 Quality and safety improvement and clinical handover

This section describes current models and theories in the field of quality and safety in healthcare in relation to clinical handover and clinical handover improvement. The section then describes the risk of clinical handover from the perspective of quality and safety. It then describes factors that impact on clinical handover, especially the safety of clinical handover practice and the various functions of clinical handover and how these functions relate to safe patient care.

2.4.1 Models to describe quality and safety in healthcare

There are a few models in the literature that describe medical errors and adverse events in healthcare. A personal perfectionism model emphasises the need to train healthcare professionals to be perfect as errors only occur due to inadequate training and imperfect performance of healthcare professionals (Reason, 2000). This personal approach to errors and quality and safety improvement is the dominant approach in healthcare tradition. This approach is still very much alive in current healthcare settings. The approach to improve quality and safety in healthcare using this model is the need to train better healthcare professionals and use the “blame and shame” approach to manage adverse events (Reason, 2000).

An alternative model which has been discussed in the last two decades is the system model of errors. Despite the “blame and shame” approach, errors continue to occur. Researchers therefore examine the safety model of other high-risk industries, such as the aviation industry and the nuclear power industry, in order to understand and develop a safety model for healthcare. A dominant model within the healthcare setting is the Swiss Cheese Model of medical errors, as proposed by Reason (2000). The Swiss Cheese Model is presented in Figure 2. Each slice of the cheese presents a step within the healthcare system. Each step has fallibility within it. The arrow represents accident trajectory. When all the safeguards fail, an adverse event occurs.

Figure 2: Swiss cheese model of error causation (Reason, 2000:769)
The “holes” in each slice of the cheese represent latent systemic factors that are embedded within the healthcare system. Active factors, commonly human errors, will lead to an adverse event when these latent systemic factors have not been addressed. These latent systemic factors are the cause of systemic vulnerability. Human errors are unavoidable because as long as humans are involved in the system, errors will occur. The management and minimisation of latent systemic factors will make the healthcare system safer. As such, quality and safety initiatives will need to focus on systemic factors and solutions will need to be based on changing the system. This paradigm shift is best summarised by Reason in the statement below.

“We cannot change the human condition, but we can change the conditions under which humans work.” (Reason, 2000:769)

This chapter and this thesis utilise this model to discuss clinical handover interventions and improvement programs. Section 2.4.2 will now discuss risks of clinical handover from the perspective of quality and safety. The section will then discuss factors that affect clinical handover as described in the literature to consider safety aspects of clinical handover and how clinical handover might be improved. The section then considers the practice of clinical handover and identifies functions of clinical handover described in the literature that might have implications for clinical handover improvement and quality and safety of patient care.

2.4.2 Risk of clinical handover from the perspective of quality and safety.

The literature suggests that clinical handover in its current form, carries significant risk from the perspective of clinical practice. Clinical handover carries risks because poor handover is associated with poor patient outcomes (Younan and Fralic, 2013, Bittner et al., 2012, Bomba and Prakash, 2005), increased medical errors (Younan and Fralic, 2013, Pezzolesi et al., 2010, Arora et al., 2007), poor staff satisfaction (Borowitz et al., 2008, Wong et al., 2008a) increased medico-legal claims (Jagsi et al., 2005) and patient complaints (Singh et al., 2007). This section describes the risk in detail.

Healthcare professionals carry out clinical handover on a daily basis. It is estimated that at least seven million clinical handover sessions are conducted in all hospitals in Australia annually (Australian Commission on Safety and Quality in Health Care, 2010b). A review of the literature however, suggests that clinical handover is not a standardised process (Cohen and Hilligoss, 2010, Wong et al., 2008a). In fact, it seems likely that clinical handover is an ill-defined process which is poorly conducted by healthcare professionals. The main issues identified in the literature include the lack of consistency in the occurrence (Pezzolesi et al., 2012, Murphy and Ryan, 2011, Pezzolesi et al., 2010, Fassett et al., 2007), poor information retention (Jensen et al., 2014, Bhabra et al., 2007, Pothier et al., 2005) and the lack of comprehensiveness of clinical handover sessions (Devlin et al., 2014, Goff et al., 2014, Pezzolesi et al., 2012, Borowitz et al., 2008, Ye et al., 2007, Bomba and Prakash, 2005, Sexton et al., 2004).

Firstly, clinical handover should occur at every hospital at every shift change. The literature, however paints a different picture. An analysis of incident-reporting systems involving clinical handover in one UK hospital found that 29% of incidents were due to the fact that handover did not happen at all (Pezzolesi et al., 2010). In a study regarding Irish hospital handover practice, it was found that only 28% of respondents reported formal handover practices in their hospitals.
(Murphy and Ryan, 2011). In Australia, it was found that only 58% of accredited training hospitals had formal handover practice (Fassett et al., 2007). The literature therefore suggests that there is a lack of consistency in the occurrence of handover. This is a systemic latent issue that needs consideration in clinical handover improvement.

Secondly, the literature suggests that clinical handover is practised poorly and verbal handover normally does not help with patient care. The literature supports the need for written handover. It is suggested that verbal handover alone does not help with information retention. Studies suggest that most verbal information transfer during handover is lost after a few cycles of handover. In a simulated environment, residential medical officers were observed for five consecutive handover cycles for twelve simulated patients (Bhabra et al., 2007). The study compared verbal only handover, verbal with note taking method and printed handouts. It was found that 2.5% of patient information was retained using verbal only handover method while 85.5% and 99% of patient information was retained using verbal with note taking method and printed handouts (Bhabra et al., 2007). The authors concluded verbal handover alone was inadequate to support safe patient care (Bhabra et al., 2007). In a similar study on nursing handover, clinical handover sessions were observed for twelve simulated patients over five consecutive handover cycles (Pothier et al., 2005). The study showed a loss of all handover data after three handover cycles if verbal handover alone was used. If the traditional handover practice was used, i.e. note-taking during handover, 69% of data were lost. The data lost was minimal if a typed handover sheet was used. As such, for nursing handover, the authors recommended a formal handover sheet be used (Pothier et al., 2005). In a recent study, a group of researchers examined the information decay using two different simulated patient history (Jensen et al., 2014). There was consistent loss of information for both scenario. Overall, 33% of information was lost between the first and the third handover using verbal communication handover (Jensen et al., 2014).

Despite the evidence to support written handover, it was found that 83% of junior doctors believed that clinical handover was practiced poorly and the majority of clinical handover sessions were conducted using verbal handover only (Roughton and Severs, 1996). This is a very important systemic factor that needs to be considered in clinical handover improvement.

Finally, the literature suggests that current clinical handover practices do not provide adequate and comprehensive patient information and care transfer. In a study which investigated the adequacy of handover for the incoming team, resident physicians were asked to rate the adequacy of handover information that they received from the previous shift (Borowitz et al., 2008). The study found that 31% of the shifts were associated with unexpected events. Residents did not receive useful handover and information from the previous shift regarding these events in 82% of the cases. Most importantly, among these cases, residents believed that helpful information could have been provided to the incoming team in 80% of the cases (Borowitz et al., 2008). In Australia, a study found that the clinical handover process was informal, error prone, lacked structure and was in need of a process change (Bomba and Prakash, 2005). In a prospective study in a Department of Emergency Medicine in Australia, 914 patient handovers were observed. The study found that 15.4% of handovers lacked adequate information for continuity of patient care (Ye et al., 2007). In a detailed analysis of nursing handover, it was found that only 5.9% of handover information discussed involved ongoing care or ward management issues which clarified patient care (Sexton et
In that study it was found that handover content often caused confusion when compared with other written documentation and handover did not contribute substantially to continuity of patient care (Sexton et al., 2004). Despite the recent publicity and interventions regarding clinical handover, the quality of clinical handover remains problematic in clinical practice. Recent studies showed that only 60% of clinical handover sessions were considered high quality for continuity of patient care (Goff et al., 2014). In a separate study, it was found that 40% of clinical significant issues were not handed over and 85.8% of these issues were not documented in written format (Devlin et al., 2014). It therefore appeared that despite all the research and handover improvement programs, the practical outcomes of better information transfer have not been fully achieved. As such, information transfer to allow patient care transfer is still part of the factors to be considered in clinical handover improvement.

In the literature, clinical handover is considered to carry significant risks and inadequate handover is associated with discontinuity of care, adverse events and medico-legal complications (Wong et al., 2008a). These risks could be considered from the perspective of patients, clinicians and organisations.

From the patient’s perspective, poor clinical handover might delay diagnosis and treatment (Pronovost et al., 2002, Priest and Holmberg, 2000) as well as causing incorrect medication and incorrect prescriptions (Arora et al., 2007). In a study which investigated medication discrepancies, it was found that 27% of medication entries on the clinical handover sheet examined at the end of the shift contained errors. These errors were potentially harmful to patients (Arora et al., 2007). A recent pilot study found that the quality of clinical handover correlated directly with the length of stay in post-operative intensive care unit (Bittner et al., 2012).

From the clinician’s perspective, clinical handover was associated with adverse events and near misses (Borowitz et al., 2008, Jagisi et al., 2005). In a study which aimed to investigate the cause of adverse events among resident physicians, it was found that 15% of significant adverse events involving resident physicians were related to handover problems (Jagisi et al., 2005). In a separate study, it was found that handover was the most important factor which determined the readiness of the incoming team for the shift (Borowitz et al., 2008).

From an organisational perspective, poor clinical handover was found to be associated with patient complaints as well as litigation (Singh et al., 2007). Among 240 cases of malpractice claims or harmful errors involving trainees over a 10 year period, the majority (70%) involved teamwork. Handover problems accounted for 19% of claims against junior doctors and 13% of claims against senior doctors (Singh et al., 2007).

In summary, clinical handover plays an important role in patient safety. The literature suggests that current clinical handover practices lack consistency, comprehensiveness and causes discontinuity of patient care. Poor clinical handover is associated with poor patient outcomes, increased workload and increased medico-legal claims. The latent systemic factors identified through the analysis of current literature on the risk of clinical handover include consistency of practice, documentation of practice and adequacy of information transfer during the practice. This is further discussed below when literature regarding factors that impact clinical handover is considered.
2.4.3 Factors affecting clinical handover

While poor and ineffective clinical handover is associated with adverse clinical outcomes, factors associated with the effectiveness and efficiency of clinical handover have not been clearly identified in the literature. The Australian Council on Quality and Safety in Health Care commissioned a literature review in 2005 in order to investigate factors which impact on clinical handover (Australian Council for Safety and Quality in Health Care, 2005). The literature review adopted a classification of factors that impact on clinical handover, based on previous published work (Priest and Holmberg, 2000). This section therefore reviews the literature regarding factors that impact on clinical handover based on the previous proposed classification (Australian Council for Safety and Quality in Health Care, 2005). Furthermore, this section discusses the impact of these factors on clinical handover improvement based on the Swiss Cheese Model described in Section 2.4.1.

2.4.3.1 System design factors

The literature review by the Australian Council for Safety and Quality in Health Care identified system design factors as one of the key factors that affected clinical handover (Australian Council for Safety and Quality in Health Care, 2005). System design factors mainly deal with organisational support and directions for clinical handover practice. The reported system design factors included policies and procedures, legislations and supervision for proper clinical handover (Priest and Holmberg, 2000). While the literature in 2005 identified different system design factors such as training in communication (Litzinger and Rohde Boehler, 1997) and documented care plan process (Menke et al., 2001); these processes are not included in this thesis as they are not considered as clinical handover according the definition adopted for this thesis. These processes involved clinical communication and documentation and did not involve the transfer of responsibility and accountability.

One major change recently regarding system design factors is bedside handover, especially in the Australian healthcare setting. Previous studies showed equivocal results for bedside clinical handover (Cahill, 1998, Howell, 1994). Cahill (1998) utilised unstructured interviews techniques to understand bedside handover. The study was conducted in a surgical ward and data analysed using grounded theory techniques. The study showed that patients preferred to maintain a distance from direct involvement in the discussion of their care during handover and the impact of bedside clinical handover on safe patient care was not clearly established (Cahill, 1998). The study also found that patients had more problems with confusion and anxiety during bedside clinical handover when medical terminologies were used to describe their conditions (Cahill, 1998). In a different study carried out in an aged care population, it was found that bedside clinical handover practice encouraged patient participation. The major concern regarding bedside clinical handover however, was the maintenance of confidentiality (Howell, 1994).

In 2008, the review of the NSW hospital inquiry was released, known as the Garling’s report (Garling, 2008). Garling’s report placed significant emphasis on bedside clinical handover. Since 2008, substantial work had been done in the area of bedside handover, particularly by Australian researchers. In a study which utilised Lewin’s 3 steps model for change, it was shown that bedside handover could improve the safety of handover. The study also showed that staff members received the change positively (Chaboyer et al., 2009). A subsequent case study of 6 wards in 2
hospitals found that bedside handover provided a patient-centred approach to patient care delivery (Chaboyer et al., 2010). In a study in 2011, the research examined patient's perception of bedside handover using qualitative research methods. The study found that bedside handover provided an opportunity for patients to positively participate and contribute to the clinical handover process and their care (McMurray et al., 2011). In a separate but related study, the team found that bedside clinical handover facilitated family-centred care and family members believed that their participation in bedside handover improved the accuracy of handover communication (Tobiano et al., 2013).

Further research from other groups have found that bedside handover improve nursing care documentation (Kerr et al., 2013) and improved individual patient care and patient-professional relationship (Kerr et al., 2014).

It is important to note that while there are some positive findings in relation to bedside handover, recent analysis of different nursing handover styles did not find any significant relationship between handover styles and patient outcomes when the whole field literature was combined together for in-depth analysis (Smeulers et al., 2014). The potential lack of patient care outcomes might be related to the fact that there were multiple interruptions during bedside handover which resulted in significant loss of critical information and therefore adverse patient events (Spooner et al., 2014). As such, future research needs to focus on the organisational factors and infrastructure to better support handover for safer patient care.

From a system design factor perspective, it therefore seems likely that a consistent policy and procedure in combination with good infrastructural support might help improve clinical handover.

2.4.3.2 Organisational cultural factors

In the literature review conducted in 2005, the Australian Council for Safety and Quality in Health Care considered information transfer as the organisational cultural factor that affected clinical handover. The review included three papers, describing different information requirements by nurses (Patterson et al., 1995), nurses and doctors (McKnight et al., 2001) and written care plan (Canatsey et al., 1994). According to the definition adopted for this thesis however, these cases did not involve transfer of responsibility and accountability and therefore the impact of these factors on clinical handover was unclear.

In recent years however, the literature examining organisational and cultural factors emphasised the impact of organisational culture on clinical handover (Catchpole et al., 2010b, Horwitz et al., 2009). In a study which examined the similarity between formula one motor vehicle racing and handover, it was found through interviews that cultural issues, such as working practice, policies and awareness of clinical handover had significant impact on clinical handover (Catchpole et al., 2010b).

In a study aimed to analyse quality of clinical handover sessions, it was found that familiarity of patients, sense of responsibility as well as the presence of a senior leader during clinical handover were important factors. It was suggested that the leadership and handover culture were essential to improve clinical handover (Horwitz et al., 2009).
From the organisational cultural perspective, it therefore seems likely that engagement of clinicians to increase awareness of clinical handover is essential and forms a critical element for clinical handover improvement.

2.4.3.3 Individual factors
The last category is individual factors. The Australian Council for Safety and Quality in Health Care identified inaccurate assessment (Beach et al., 2003), incomplete transfer of information regarding peri-operative care (Anwari, 2002) and physical fatigue among doctors as individual factors that affected handover (Dean et al., 2002).

In a recent publication, the issue with clinician autonomy and the ability of clinicians to understand clinical diagnostic and shared care model had been emphasised as an important individual factor in affecting clinical handover (Yee et al., 2013, Philibert, 2010). This finding has recently been confirmed in a study which aims to standardise information transfer during handover (Lee et al., 2014). Importantly, the ability to lead and develop appropriate skills in ensuring clinical handover had been emphasised in the literature (Chang, 2011, Philibert, 2010).

The literature has identified different factors in affecting clinical handover. In a study conducted by the PhD candidate and the research team, it was found that certain factors impact on handover, including system design factors such as time of the shift changes; organisation cultural factors, such as available of room and the priority of handover among other tasks as well as individual factors, such as presentation skills, linguistic skills and leadership skills (Turner et al., 2006). The study reported that it was the interplay and interaction of all these factors at a particular time and place that determined the outcomes of clinical handover (Turner et al., 2006). This is a finding that requires further validation and research.

Individual factors in the Swiss Cheese Model constitute active factors. Active factors are difficult to control as whenever humans are involved, errors will occur. Individual factors, however are important in clinical handover improvement. Engagement of clinicians in the clinical handover improvement process and the promotion of safe clinical handover practice are important. This is future discussed in Section 2.6.

2.4.4 Functions of handover and patient safety
While clinical handover is defined as the transfer of responsibility and accountability of patient care and the effort to improve clinical handover and patient safety should focus on that objective, research results have identified different functions of clinical handover that are important for patient care delivery directly and indirectly. As this thesis has emphasised the relationship between clinical handover and patient safety, these functions and their relationship to patient safety is discussed here.

In a research by the PhD candidate and the research team (Turner et al., 2006), the following functions of clinical handover were reported:

- Clinical handover served as a time for education and training of junior doctors.
- Clinical handover provided the opportunity for debriefing and socialisation.
Clinical handover served as a double checking mechanism to follow up results.

Clinical handover was a time when senior were available and junior doctors used this opportunity to seek supervision.

Clinical handover served as a time for early referral to other disciplines.

These functions have subsequently been recognised in the Australian Medical Association guideline for clinical handover (Australian Medical Association, 2006a) as an important aspect to consider for all clinical handover improvement programs.

The literature provides a diverse view regarding the role of education and training during clinical handover. In Australia, it was reported that clinical handover sessions should focus on clinical outcomes rather than educational objectives (Fassett and Bollipo, 2006). On the other hand, other studies suggested that clinical education sessions were considered the most valuable education and teaching experience (Das et al., 2012). The consensus in the literature suggested that didactic teaching was not useful during clinical handover. Opportunistic teaching as well as teaching of clinical handover and handover skills however were very important during clinical handover sessions (Sanfey et al., 2008). The educational value of clinical handover was emphasised in different studies of nursing handover (Hopkinson, 2002, Kerr, 2002). In the study by Kerr (2002), observation and interviews findings suggested that clinical handover served different functions including a significant role in education and training. In studying nursing handover for dying patients, another study found that the educational role was important in nursing handover (Hopkinson, 2002). A recent study has shown that by combining the technology of a web-blog and clinical handover, better educational objectives could be achieved without affecting clinical care (Bogoch et al., 2012).

Clinical handover serves as the time for socialisation and debriefing. While these functions might not be directly related to patient care, the available studies suggested that these functions were important for incoming team caring for patients (Evans et al., 2008b, Turner et al., 2006, Hopkinson, 2002, O’Connell and Penney, 2001, Strange, 1996). In an ethnographic study of nursing handover, it was concluded that nursing handover could receive the label of ritual as it played an important role in psychological, social and protective functions for the profession (Strange, 1996). In a study of nursing handover in a psychology ward, the authors concluded that nursing handover provided the necessary mechanisms to keep anxiety at bay and provided adequate support for nurses to carry out their work in an effective manner (Evans et al., 2008b). Similar findings were reported in two different studies of nursing handover, one in a palliative care ward (Hopkinson, 2002) and the other at an acute care hospital (O’Connell and Penney, 2001).

Clinical handover serves as a mechanism for junior staff to seek supervision from senior staff. In a nursing handover study, it was found that the two main functions of clinical handover were to transfer care and information and to discuss opinion and to provide necessary knowledge for decision making process (Hopkinson, 2002). This function of seeking supervision and peer opinion is important for safe patient care.
It is worth noting that most of these studies are based on nursing handover scenarios. When medical handover was examined by the PhD candidate and the research team, an additional function of a double checking mechanism for follow up of results was identified. The study found that before clinical handover time, junior doctors would often double check the task list to ensure results were followed up according to plan. Furthermore, clinical handover served as a function to allow early referral to other specialties when specialties representatives attended clinical handover sessions (Turner et al., 2006).

In summary, clinical handover serves multiple different functions. Some functions are explicit such as transfer of patient care and educational objectives regarding patients discussed. Some functions are implicit but equally important, such as support, debriefing and socialisation. The variability in functions of clinical handover is context and organisation specific and should be taken into account in clinical handover improvement programs. More importantly, these functions affect patient safety, not only directly through patient care delivery, but also indirectly, through education and training as well as maintaining the well being of clinicians looking after patients.

When quality and safety of clinical handover is considered, the Swiss Cheese model emphasises the need to take into account latent systemic factors. A review of the literature demonstrates that this point is often addressed through standardisation of clinical handover. The literature regarding standardisation of clinical handover is reviewed in the next section.

2.5 Standardisation of clinical handover

There have been significant efforts worldwide to improve clinical handover since 2006 when clinical handover was identified as one of the five priority areas for patient safety improvement by the World Health Organisation (Turner et al., 2009). In 2007, the Australian Commission for Safety and Quality in Health care co-ordinated and funded a series of projects to improve clinical handover and to develop a national approach and national guidelines to improve clinical handover. This has resulted in a significant increase in the awareness of clinical handover among clinicians as well as a substantial increase in publications, especially from Australia regarding clinical handover improvement.

In the literature review conducted by the PhD candidate and research team in 2008, while there were a numbers of studies and publications describing interventions to improve clinical handover, the outcome data from these studies were lacking (Wong et al, 2008). Despite the proliferation of literature and publication of interventional studies, recent reviews and analysis of all the available interventional studies drew similar conclusions (Robertson et al., 2014, Scott et al., 2012). The first systemic review concluded that the current literature did not provide adequate evidence to confirm any particular clinical handover improvement intervention could reliably improve clinical outcomes (Robertson et al., 2014). The second review suggests the adaptation of OSSIE guide into clinical practice (Scott et al., 2012). The systemic review however, did identify that information transfer might have been improved and this was likely related to standardisation of clinical handover practice (Robertson et al., 2014).

The standardisation of clinical practice has been emphasised as an important step to improve patient safety (Beaumont and Russell, 2012). In the UK, it was found that variability of clinical practice was related to latent systemic factors that led to clinical adverse events and
standardisation of clinical practice and processes might improve patient outcomes (Burnett et al., 2012). The standardisation process is often achieved through the use of checklists, clinical pathways or guidelines (Beaumont and Russell, 2012). The standardisation process has been studied in various settings to improve patient safety and patient care, including surgical checklist (Treadwell et al., 2014), anti-microbial stewardship (Retamar et al., 2013), thrombosis prophylaxis (Millar, 2009) and others (Beaumont and Russell, 2012). The standardisation of clinical practices has the potential to improve safety.

Within clinical handover practices, studies report standardisation of contents and processes in the literature. These include standardisation of information transfer through the development of minimum data sets and mnemonics, standardisation of the clinical handover process itself, through the development of policies and standardised operating protocols and the development of tools to support standardised clinical handover. Furthermore, the use of electronic tools has been increasingly studied. The use of electronic tools serves as a form of standardisation and is therefore included in this section of literature review. There has been substantial work in the field of standardisation of information transfer with minimal data sets and mnemonics to improve clinical handover. Despite multiple studies in the field, however, there is no evidence that one particular way of information transfer is better than the other. The literature suggests that the standardisation of clinical handover process is important. There has been some work in the area of developing standardised operating protocols which will be discussed in the following section. The literature has advocated the use of tools to assist in the clinical handover standardisation process. The literature promotes the use of electronic tools in clinical handover, although the transferability of the finding using electronic tools is debatable and has not been clearly demonstrated.

This section will review in detail studies that describe the standardisation process as the intervention to improve clinical handover according to three headings: the standardisation of information transfer, including the use of minimal data sets for clinical handover improvement, the standardisation of clinical handover process and the use of electronic tools to support standardisation in clinical handover.

2.5.1 Standardisation of information transfer for clinical handover improvement

While clinical handover has been defined as the transfer of responsibility and accountability of patient care, the transfer of information plays a central role in ensuring transfer of responsibility and accountability. Unstructured information transfer is error prone. This process could produce omission errors (errors because of the lack of information) and commission errors (errors because of incorrect information). As such, it has been suggested that standardised information transfer could assist in the process of clinical handover improvement.

There have been many studies which have investigated information requirements for various different clinical handover scenarios. When these studies are analysed, the literature on standardised information transfer can be divided into two different bodies of work: comprehensive information requirements for a specific area and minimal data sets for common clinical handover elements. The first body of work involves studies which generate comprehensive and extensive information transfer requirements for specific clinical handover setting. The second body of work attempts to identify essential elements for all handover scenarios to improve patient care. It is
important to note that despite the number of studies in the field and the extensive list of mnemonics and tools to standardise information transfer at clinical handover, there is currently no evidence to support the use of one tool over the other.

The literature in the field of generating a detailed comprehensive information transfer list focuses mainly on situations in which healthcare delivery is complex. The care for these patients has often been standardised from the perspective of medical, nursing and allied health professionals. The transfer of care from one team to the other is often permanent. This includes peri-operative care, ambulance to hospital transfer, ICU discharge and emergency department handover.

In a study of peri-operative care for paediatric surgery, a team of researchers from the UK developed an extensive checklist based on the model of Formula 1 car racing pit-stop and aviation industry for the transfer of infant cardiac patients from operating theatre to intensive care unit (Catchpole et al., 2007). The study used multiple different checklists for different stages of the handover process. They found that after the introduction of checklists, the mean number of technical errors was reduced from 5.42 to 3.15 and the mean number of information omission during handover was reduced from 2.09 to 1.07. The duration of handover was reduced from 10.8 minutes to 9.4 minutes (Catchpole et al., 2007). In a different study conducted in the USA, researchers investigated the utilisation of a different checklist for patient transfer and handover from paediatric cardiac surgery to intensive care unit (Joy et al., 2011). Researchers found that the use of a comprehensive checklist for handover of complex patients from operating theatre to intensive care reduced the number of technical errors from 6.24 to 1.52. Furthermore, the mean number of information omissions was reduced from 6.33 to 2.38 (Joy et al., 2011). In a study which investigated the use of a checklist for clinical handover between operating theatre and intensive care unit for adult cardiac patients, researchers found that the use of a checklist improved staff satisfaction and reduced missed information from surgery reports but not from anaesthetic reports (Petrovic et al., 2012a). The duration of handover time however, increased by 1 minute (Petrovic et al., 2012a). A more generic tool has subsequently been developed by the team to improve operating theatre to Intensive care unit handover which could be used in any peri-procedural handover and patient transfer (Petrovic et al., 2012b).

Clinical handover between ambulance to Department of Emergency Medicine represented another handover scenario at which a comprehensive checklist was thought to improve outcomes (Wood et al., 2014, Bost et al., 2010). The use of checklists, protocols and guidelines had been advocated by multiples studies, which have investigated the gaps in ambulance to Department of Emergency Medicine handover (Meisel et al., 2014, Owen et al., 2009, Jenkin et al., 2007, Bruce and Suserud, 2005, Thakore and Morrison, 2001). In an Australian study to develop a checklist and protocol for ambulance to Department of Emergency Medicine handover, the research team undertook ten focus group interviews and video-reflective analysis of 73 in situ handover practices (ledema et al., 2012). The derived checklist and protocol was then used in real life clinical practice and the communication process during handover was evaluated (ledema et al., 2012). The study found that the use of a checklist reduced the duration of handover and improved the volume of information transfer during handover (ledema et al., 2012).
Clinical handover checklists have also been used in intensive care unit to ward transfer. A team of researchers from Queensland, Australia conducted a quality improvement study, using time series design to improve discharge from ICU to the ward (Chaboyer et al., 2012). The re-design process included the appointment of a change agent, the development of a checklist for patient handover, the organisation of specific time for transfer of patient and the use of a discharge alert sheet to provide warning for an expected discharge date. The study showed that the use of the above method, including the use of a checklist, reduced delay of patient discharge from ICU by 3.2 hours without affecting morbidity and mortality (Chaboyer et al., 2012).

A comprehensive checklist has also been used in clinical handover in the Department of Emergency Medicine and it has been shown that the use of a checklist improved clinical handover and potentially patient outcomes (Farhan et al., 2012a). A team of researchers from the UK utilised qualitative techniques of observations and interviews to derive a comprehensive checklist under the heading of ABC in handover. The handover checklist had 5 steps (Farhan et al., 2012b). The checklist had been evaluated in clinical practice. The study showed that the use of a checklist improved information transfer and staff satisfaction regarding clinical handover (Farhan et al., 2012a).

A recent study has investigated the cognitive aspect of clinical handover and checklist to improve clinical handover (Hilligoss and Moffatt-Bruce, 2014). The publication describes two modes of communication: narrative mode and paradigmatic mode. While clinicians often utilise the narrative mode to deal with complex and intensive clinical communication practices such as clinical handover, the use of a checklist focuses the information transfer into the paradigmatic mode. This has significant impact on the outcomes of the communication process (Hilligoss and Moffatt-Bruce, 2014). As such, while checklists improve information transfer, it might not necessarily improve communicative practices and patient outcomes in all scenarios.

The second approach of standardisation of information transfer during clinical handover is the development of standardised fields without detailed prescriptive lists of all the specific information requirements for each field (Manser and Foster, 2011). These standardised fields are often summarised into mnemonics in order to assist clinicians using these standardised fields. There has been an increasing number of publications describing the use of mnemonics to help clinical handover since 2006 (Riesenberg et al., 2009). This is most likely due to the Joint Commission in the USA creating a new National Patient Safety Goal in 2006 which placed significant emphasis on standardisation of handover communication (Riesenberg et al., 2009).

A review of the literature conducted in 2009 identified 24 different mnemonics used to standardise clinical handover communication (Riesenberg et al., 2009). Most of these publications however, presented personal opinions, anecdotal data or case study examples. In that review, there were only 4 articles identified, which studied handover mnemonics (Riesenberg et al., 2009). Since the publication of the review in 2009, a number of other studies have emerged describing mnemonics used in clinical handover. Many of these publications originated from Australia after the National Clinical Handover Improvement Initiative, led and funded by the Australian Commission on Safety and Quality in Health Care (Australian Commission on Safety and Quality in Health Care, 2010b). These recent research publications are described in detail in this section.
Among all the mnemonics used, the most commonly used mnemonics tend to be a variant of SBAR (Haig et al., 2006a). SBAR is a mnemonic for situation, background, assessment and recommendations. This is a structured communication format used initially by the military, subsequently popularised by Kaiser Permanente in the USA (Haig et al., 2006b). SBAR has been used by various groups in the healthcare setting (Cornell et al., 2013, Mikos, 2007, Haig et al., 2006b). A team of researchers implemented and evaluated the SBAR technique in a US hospital (Mikos, 2007). The team found significant improvements in clinical handover and time required for clinical handover (Mikos, 2007). The variants in SBAR which has been reported included ISBAR (Thompson et al., 2011b) and ISOBAR (Porteous et al., 2009, Yee et al., 2009).

The four interventional studies using different mnemonics are described in detail here. The first study is an evaluation of the SBAR mnemonic. Haig et al (2006) conducted a pre-intervention and post-intervention analysis using a phone survey method. The study described using the Plan, Do, Study, Act (PDSA) cycle to improve the utilisation of SBAR in the organisation. The study only included nursing staff. The number of subjects was not reported in this study. The study found that within 1 year 60% of participants were able to use SBAR at work and at the end of 2 years the use of SBAR reached 96% (Haig et al., 2006a).

The second study described the use of SBAR and SIGNOUT in an internal medicine ward (Horwitz et al., 2007). SIGNOUT is a mnemonics for Sick or do not resuscitate, identity of patient, general hospital course, new events of the day, overall health status, upcoming possibilities with plan and tasks to complete overnight with plan (Horwitz et al., 2007). A 1 hour educational session was used to introduce the concept. The authors concluded that SIGNOUT and SBAR both improved the perceived confidence of users in providing clinical handover (Horwitz et al., 2007). The users seemed to slightly prefer SIGNOUT than SBAR in this study (Horwitz et al., 2007).

The third study was a cross-sectional survey of 100 randomly selected Department of emergency medicine and ambulance services in England and Wales (Budd et al., 2007). The study found that two mnemonics were commonly used and known among ambulance crew and Department of Emergency Medicine: MIST and ASCHICE. MIST referred to mechanism of injury, signs and treatment initiated. ASCHICE referred to age, sex, history, injuries, condition, expected time of arrival. The study found that 45.5% of Department of Emergency Medicine and 86.7% of ambulance crews were familiar with ASCHICE. MIST was found to be less commonly used, with 27.4% of Department of Emergency Medicine and 15.4% of ambulance crew familiar with their use (Budd et al., 2007).

It is important to note that not all studies recommend the use of mnemonics. The fourth study in the use of mnemonics in clinical handover revealed conflicting results. The study was conducted in order to understand clinical handover from ambulance staff to the Department of Emergency Medicine. 18 handover sessions were observed before the implementation of a mnemonic compared to ten handover sessions after the implementation (Talbot and Bleetman, 2007). The mnemonic used was DeMIST, which referred to Patient demographics, Mechanism of injury, injuries sustained, symptoms and signs, treatments provided. The research found that the use of the DeMIST mnemonic had adverse outcomes in regards to accuracy of handover (Talbot and Bleetman, 2007). This study certainly raises questions regarding the use of mnemonics.
There are other mnemonics which have not been included in the review by Rosenberg et al (2009). These include JUMP (McCann et al., 2007), SHARE (Hatten-Masterson and Griffiths, 2009) and ISOBAR (Porteous et al., 2009, Yee et al., 2009).

A group of researchers in New Zealand investigated the use of mnemonics in shift to shift medical handover (McCann et al., 2007). The researchers developed a mnemonic called JUMP, which referred to jobs outstanding, unseen patients, medical contacts and patients to be aware of. The authors, however did not describe the implementation of this mnemonic and the impact on patient care.

A group of researchers in Queensland developed the mnemonic “SHARE” for use in a private hospital maternity ward. SHARE referred to situation, history, assessment, risk, expectation and documentation (Hatten-Masterson and Griffiths, 2009). The researchers described the implementation of the project and the evaluation of the project. The study found improvement in the documentation of handover after the implementation of the “SHARE” framework.

Two groups of researchers collaborated in the development and utilisation of the mnemonic “ISOBAR” for the Australian National Clinical Handover Initiative (Porteous et al., 2009, Yee et al., 2009). ISOBAR referred to identify, situation, observation, background, action, readback and recommendation. Both researchers described the development and the use of “ISOBAR” in their respective organisations. The Western Australian team utilised ISOBAR in hospital transfers, especially for the Flying Doctors Service (Porteous et al., 2009). The Tasmanian team utilised ISOBAR in nursing and medical shift to shift handover (Yee et al., 2009). Both teams reported good user satisfaction and adoption of the mnemonic. The impact of using mnemonics in patient care however has not been assessed.

While different mnemonics have been used, the basic principle is very similar. It is therefore possible to generate a universal data set within an organisation. Mistry et al. (2010) collected data through a 15-item questionnaire from 49 services within the hospital and demonstrated that it was possible to develop universal data sets.

Secondly, although there was no data to support the use of a particular minimum data set (Wong et al., 2008b), SBAR had been recommended by the World Health Organisation (World Health Organisation, 2007) and the Joint Commission in USA (Pillow, 2007). SBAR had since been described in the literature as a handover technique which could improve clinical handover in various settings, such as bedside clinical handover (Chaboyer et al., 2010), wound care management (Sibbald and Ayello, 2007), shift to shift handover (Brown, 2007) and emergency department handover (World Health Organisation, 2007).

It is important to note that despite the promotion of utilisation of mnemonics and the Swiss Cheese model suggesting that addressing latent systemic factors, such as the standardisation of clinical communication during handover might help, there is currently no direct evidence that it improves patient care and patient outcome.
### 2.5.2 Electronic clinical handover tools

Electronic tools have been touted as the panacea for future healthcare systems and have the potential to resolve many problems associated with the healthcare system. Electronic clinical handover tools have also been suggested as the revolution needed for effective and efficient clinical handover systems within the healthcare setting (Cheah et al., 2005, Solet et al., 2005, van Eaton et al., 2005, Petersen et al., 1998). The implementation of electronic handover systems provides a solution to addressing latent systemic factors as described in the Swiss Cheese model of errors (Reason, 2000).

The literature has provided some insights into using electronic tools for handover. This section will summarise the literature in this context. When considering electronic tools, it is important to note that some tools for clinical handover were designed as a stand-alone system (Morrison 2006, Chacko, 2006). Other tools however, were built into the existing electronic system and environment (Cheah et al., 2005, Morris and Baker, 2005).

**eHand-offs** was developed by IBM, Lotus and Domino for electronic patient handover in US hospitals (Chacko, 2006). The evaluation of the system showed improvement in continuity of patient care, reduction in medical errors and improvement in resident supervision and training (Chacko et al, 2006).

One of the key studies which investigated an electronic clinical handover system integrated into an existing electronic health system was the study conducted at an Australian hospital reported by Cheah et al, (2005). The research team developed a standardised information data set for electronic clinical handover. Some of the information was extracted directly from clinical information systems while other information required user entries. These were free-text entries. The study showed that the electronic tool assisted in providing better and more complete information transfer during handover (Cheah et al 2005).

While some studies focus on user satisfaction and information transfer during clinical handover using electronic tools, there are a few studies which focus on the clinical outcomes of electronic clinical handover systems implementation. A group of researchers in the USA evaluated clinical outcomes after the implementation of electronic clinical handover tools (Peterson et al., 1998, van Eaton et al., 2005) including using a randomised controlled trial to evaluate the outcomes of electronic clinical handover systems (van Eaton et al., 2005). These studies are discussed here.

In a study which investigated the outcomes of an electronic clinical handover system for shift to shift handover, it was found that there was a significant reduction in adverse events after the intervention from 3.9% to 2.4% (Petersen et al., 1998). Preventable adverse events however did not differ. It was found in the study that users were satisfied with the electronic system and therefore, they continued to use the system after the trial period (Petersen et al., 1998).

Van Eaton and colleagues (2005) showed that electronic clinical handover system improved the information transfer during shift-to-shift clinical handover for junior doctors. The team of researchers went on to conduct a prospective randomised cross-over trial to evaluate the outcomes of electronic clinical handover system (van Eaton et al., 2005). The trial found that
electronic clinical handover system improved information transfer during clinical handover and it reduced the ward round time by 1.5 minutes per patient.

A team of researchers compared the paper based clinical handover proforma with a purpose designed electronic handover system available through hospital information systems in the UK (Raptis et al., 2009). The study found that electronic systems provided more comprehensive and complete data fields than paper systems (Raptis et al., 2009). Staff members embraced the changes positively (Raptis et al., 2009). The high level of information technology literacy and the continual education strategy of the implementation team were thought to be important for positive outcomes (Raptis et al., 2009).

In a longitudinal study, a team of researchers investigated the use of an eSignout, an electronic handover tool, to improve clinical handover between the emergency department and medical ward (Gonzalo et al., 2014). The system generated an electronic message during handover, without the need for verbal communication. The study showed that eSignout was the preferred method for handover by users, and the lack of verbal communication did not have a significant impact on adverse outcomes. The study suggested that electronic platform without verbal communication could be used for patient handover (Gonzalo et al., 2014). A different study, however showed that electronic and written format alone was not as good as face-to-face communication (Craig et al., 2012). This is an area that requires further research validation.

While these aforementioned electronic clinical handover tools are related to desktop electronic tools, the concept regarding point of care handover entry is an attractive one. A team of researchers designed and implemented a mobile device with an electronic clinical handover tool to assist clinical handover (McGee-Lennon et al., 2007). This device was used by nurses and the study found that additional time was needed for data entry using handheld tool (McGee-Lennon et al., 2007). Furthermore, there were issues with battery life of handheld devices and sensitivity of the touch-screen being used (McGee-Lennon et al., 2007).

While all these studies attempted to understand the impact of electronic tools to conduct clinical handovers in replacement of the current paper based system, the PhD candidate was involved in a longitudinal study to investigate the effect of using an electronic tool to support clinical handover. This work resulted in publications which described the user-centred approach to designing the tool (Turner et al., 2006), the design process and engagement of clinicians (Wong et al., 2007) and finally, the safety aspect of the tool (Wong et al., 2008b). The evaluation of the tool and its impact on clinical handover has just been published (Wong et al., 2013).

Further to that, the work in designing the tool as well as further work with the Department of Health in South Australia has resulted in the publication of guidelines to improve the use of electronic tools for clinical handover based on safety principles (Thomas et al., 2009). For safe implementation of electronic systems, the team suggested that it was imperative to consider socio-technical integration (Showell et al., 2010).

The literature has suggested that an electronic handover system might help to improve clinical handover. It is important to note that due to the heterogeneity of studies, there is currently no conclusive evidence that electronic tool for clinical handover improves patient outcomes (Abraham
et al., 2014, Li et al., 2013). Current studies have suggested that electronic tools improve information transfer at clinical handover. Various issues, such as user friendliness, training, information technology literacy, as well as socio-technical integration of the electronic tool into current clinical practice are all important aspects to ensure best outcomes for electronic tool implementation to improve clinical handover. When designing and implementing an electronic tool for clinical handover, there are various socio-technical issues to be considered, including contextual nature of information, ethical, medico-legal issues, data standards and system interoperability. As such, a whole system view of safety improvement in clinical handover needs to be considered rather than focusing purely on electronic tools themselves (Balka et al., 2013, Balka et al., 2010). When electronic tools are properly designed and implemented in healthcare setting, they have the potential to improve clinical handover through standardisation of care and may form part of the solution for latent systemic factors from the quality and safety perspective.

The above section describes standardisation of information transfer and information management, standardisation of procedures and processes of clinical handover and standardisation using electronic tools. The standardisation process addresses the latent systemic factor as described in Section 2.4. Recently, studies have suggested that the standardisation process of clinical practice to improve patient outcomes need to consider clinicians and human factors (Beaumont and Russell, 2012). More importantly, studies have found that the standardisation process might not be sustainable (McQuillan et al., 2014). Furthermore, standardisation of information transfer might not achieve the outcomes of better patient care due to complexity in cognitive processes (Hilligoss and Moffatt-Bruce, 2014) and the utilisation of the information based on human interaction (Hilligoss, 2014, Lee et al., 2014, Yee et al., 2013). It therefore appears that engagement of clinicians forms an important part of the critical success factors for patient safety improvement (Wong et al., 2013, Thomassen et al., 2010, Benson et al., 2007, Catchpole et al., 2007). As such, the third domain in clinical handover improvement in this thesis relates to engagement of clinicians. The section below describes the need to consider clinician engagement to raise awareness of quality and safety improvements and clinical handover improvements.

2.6 Engagement of clinicians in the process of clinical handover
While understanding latent systemic factors is important to improve patient safety and clinical handover as described in the Swiss Cheese Model (Reason, 2000) in Section 2.4, it is recognised that frontline clinicians need to have "error awareness". Reason argues that while management of latent systemic factor is important, the need to engage clinicians in the process of quality and safety improvement is probably as important (Reason, 2003). Importantly, the engagement of clinicians is considered important to ensure effectiveness of standardisation in patient safety initiatives (Thomassen et al., 2010) as well as clinical handover improvement and standardisation process (Wong et al., 2013, Benson et al., 2007, Catchpole et al., 2007). This section therefore discusses the literature pertaining to engagement of clinicians in the process of clinical handover improvement.

According to the literature, clinical improvement interventions are often managed through a business model of change management (van Bokhoven et al., 2003). Different models to facilitate change for quality improvement have been described. The current contemporary models and most relevant models to clinical handover include total quality management (Talib et al., 2011), sigma six
program (Liberatore, 2013), lean learning (Toussaint and Berry, 2013), lean sigma six process (Ahmed et al., 2013), Lewin’s 3 step process (Suc et al., 2009) and Joanna Briggs’s model (Poh et al., 2013). These processes aim to reduce waste, improve patient satisfaction and reduce cost of healthcare systems. The outcomes of these programs at different settings are variable. Interventions to improve professional practice have been described as heterogenous and evaluation limited by the Cochrane Effective Practice and Organisation of Care group (van Bokhoven et al., 2003). As various studies using quality improvement programs to improve healthcare practice are reviewed, it becomes obvious that engagement of clinicians at the frontline is one of the most important critical success factors (Holden, 2011, Wang et al., 2006).

One of the critical aspects of clinician engagement is the education and training of staff to conduct good clinical handover (Talib et al., 2011). The following section therefore provides a review of clinical handover literature regarding engagement of clinicians, focusing on education and training.

2.6.1 Standardisation of clinical handover process

There is an increasing number of publications suggesting antedotal evidence that standardisation of clinical handover process improves patient care (Wong et al., 2008a). It has been suggested that a standardised operating protocol would assist in clinical handover improvement as the process would become more reliable and repeatable (Miller et al., 2009, Singer and Dean, 2006). Despite suggestions that standardisation can improve clinical handover, there are few published standardised operating protocols in the literature that are applicable beyond very limited clinical settings. Many of these protocols are only applicable to nursing handover and based on antedoctal evidence or personal opinion.

A standardised operating protocol has been proposed for nursing handover (Bourne, 2000). This paper however, did not describe the process of development of the standardised protocol, implementation of the protocol or evaluation of the protocol.

A group of researchers in Canada described the process of development, implementation and evaluation of a standardised operating protocol for nursing handover (Alvarado et al., 2006). The clinical handover standardised operating protocols had been developed through literature reviews and involvement of users in the design of the protocol. The protocol included four main principles:

- A safety checklist mechanism to review key patient safety issues
- The need for face-to-face handover to allow clarification
- Written tool utilisation to minimise memory lapses
- A whole unit view must be provided to at least one person on the shift

The project reported the initial phase of implementation and staff satisfaction but further evaluations were still pending (Alvarado et al., 2006).

Benson (2007) presented clinical handover principles based on literature review. There were eleven principles which were considered important for nursing shift to shift handover. These principles were:
• Consistency with organisation value, team mission and legal requirement
• Consistency with professional nursing practice standards
• Accurate and timely transfer of patient information
• Provision of continuity of staff during handover
• Patient-centredness in the transfer of information
• Support the development of good teamwork spirits
• Correlation with other sources of patient information, such as patient record
• Information of patient transfer verifiable by incoming staff
• Provision of appropriate skill mix for patient care
• Maintenance of confidentiality
• Time-efficiency and appropriate use of human and financial resources.

The paper however, did not provide a clear guidance on ways to achieve these principles. There were no clear evaluations of the impact of the implementation of these protocols.

In recent years, bedside handover has received significant attention in Australia due to the Garling report into hospital care in New South Wales (NSW Department of Health, 2009). The recommendations from Garling report included the suggestion that clinical handover should happen at patient’s bedside. There has been a proliferation of research work in the field of bedside nursing handover in Australia since the Garling report.

A bedside handover practice guideline and protocol was developed and implemented using Lewin’s 3 step model for change by a group of researchers in Australia. The study reported a positive perception among staff and patients (Chaboyer et al., 2009). The study was later expanded to include 6 wards in two different hospitals in Australia (Chaboyer et al., 2010). The larger study was evaluated with 532 bedside handover observations and 34 interviews. The study found that bedside handover improved the accuracy of information transfer and quality service delivery (Chaboyer et al., 2010). Further analysis of the interviews and observations were conducted in order to understand critical success factors for the implementation of bedside handover. The research team identified a few critical success factors, including linkage to standardisation and current quality and safety initiative, provision of reassurance of the new process on safety of patient care, as well as addressing the motivation and concerns of staff members. When the bedside handover protocol was suggested initially, there were concerns regarding patient confidentiality. A recent study has shown that patients felt comfortable with bedside handover, especially when they could obtain information and ensure accuracy of information being presented (McMurray et al., 2011). Furthermore, family members also appreciated the opportunity during bedside handover to be involved (Tobiano et al., 2013). Researchers from other organisations have
also identified that a standardised bedside clinical handover process can improve information transfer and patient-nurse relationship (Kerr et al., 2014).

The above studies regarding standardised operating protocols were related to nursing handover. Where medical handover and multi-disciplinary handovers are concerned, the literature provides little guidance on standardised operating protocols for medical and multi-disciplinary handovers. A team of researchers in the US described the use of interactive workshops (known as hand-off clinics in the publication), in order to design a standardised operating protocol for medical handover (Arora and Johnson, 2006). The authors designed, developed the protocol and the implementation plan. The authors subsequently recommended the implementation of the standardised operating protocol for medical handover. There were no evaluations to date.

Some standardised operating protocols for medical handover have been described in the literature. These were however, often designed only for specific clinical settings. A standardised protocol for paediatric cardiac surgery was proposed together with information standardisation tools by a team of researchers in the UK (Catchpole et al., 2007). The team used the principles and ideas from the aviation industry and Formula-1 car racing pit-stop model to design and implement a clinical handover standardised operating protocol for paediatric cardiac operating theatre to paediatric intensive care unit (Catchpole et al., 2007). The team designed a protocol, which consisted of four phases: pre-handover phase, equipment and technology handover phase, information handover phase and discussion and planning phase. This protocol was a detailed document and tool for the implementation of a standardised clinical handover practice. The research team identified eleven safety themes for handover. These were:

- Leadership for safety
- Task sequence and order
- Task allocation to particular individual
- Prediction of future events and planning for future events
- Disciplines and composure
- Checklist and documentation
- Involvement of multi-disciplinary staff
- Briefing before the event
- Creation of situation awareness among staff
- Training of the protocol and processes
- Review meetings to improve safety

An evaluation was conducted and the new protocol has been shown to improve technical errors and team work (Catchpole et al., 2010b). They team subsequently identified success factors,
especially the need for standardisation as the key theme to improving handover (Catchpole et al., 2010b).

The above mentioned standardised operating protocols are designed for specific clinical settings. A more general standardised operating protocol has been proposed and published by the PhD candidate and research team (Yee et al., 2009). This standardised operating protocol has been included in this thesis and it is derived from data collection for the two part research project described in Chapter 3. The protocol, summarised by the mnemonic “HAND ME AN ISOBAR” is based on primary data collection of 120 observation sessions, 112 one-to-one interviews and more than 1000 handover messages. The protocol included four steps:

• Preparation for handover
• Organisation for handover
• Environmental awareness
• Handover information for individual patients

This protocol will be discussed further in the results, discussion and recommendation sections (see Section 4.3.6).

The literature suggests that standardised operating protocols help with the handover process and possibly patient outcomes. In a longitudinal study recently, a group of researchers from the UK reported their experience in the introduction of a standardised operating protocol to assist with the clinical handover process from day to night shift (McQuillan et al., 2014). The number of flagging omissions and the number of out of hours deteriorations significantly improved after the introduction of the standardised protocol. Unfortunately, at 2 year follow up, these parameters deteriorated (McQuillan et al., 2014). The study concluded that in a complex healthcare system, the sustainability of the implementation of a standardised protocol, despite achieving improved clinical outcomes, could be threatened by conflicting interests and goals (McQuillan et al., 2014).

From the review of the literature, standardised operating protocols help in improving clinical handover. It is however, noted that some of these standardised protocols are designed for very specific purposes. The principles of the standardisation might work in other settings but the specific protocol is only applicable to the particular ward and setting. More importantly, recent literature has shown that the impact of implementation of a standardised protocol is not sustainable if there are conflicting goals. This requires further consideration and discussion in Chapter 5 when the safety value alignment model is discussed.

2.6.2 Education and Training
Within the clinical handover literature, education and training has been considered as one of the most important interventions to generate a sustainable cultural change and clinician engagement in healthcare settings (Wong et al., 2008a). Despite improvements in the standardisation of information transfer and clinical handover process, trainees and junior staff felt that the current clinical handover system was not satisfactory and unsafe (Kennedy et al., 2009).
One of the issues raised that caused significant dissatisfaction among junior doctors was the lack of formal education and training for clinical handover, especially in medical school (Gordon and Findley, 2011). This perception is confirmed by one of the recent studies of medical schools in the UK. 56% of medical schools reported having programs to provide education for handover (Gordon, 2013). Similar data was reported in the US, in which less than half of the medical schools provided students with handover teaching within their curriculum (Liston et al., 2014). While medical schools acknowledged the need for clinical handover education, it was felt that they should not have the ultimate responsibility for training healthcare workers in this particular area (Gordon, 2013). It was interesting to note that medical students often participate in clinical handover discussions during their clinical rotations (Arora et al., 2013). More importantly, a recent study has shown that junior doctors who have received training in medical school regarding clinical handover performed better in clinical handover during their post-graduate training using standardised assessment tools (Stojan et al., 2014). As such, education and training for clinical handover within university setting is essential to improve clinical handover.

Clinical handover education programs delivered for medical students have also been described. A 1 hour teaching program based on broader patient safety principles has shown to achieve high student satisfaction and improvement in the knowledge of clinical handover (Darbyshire et al., 2013). As such, there is an urgent need to consider a vertically integrated clinical handover education curriculum from the university to the workplace (Allen et al., 2014).

From the perspective of post-graduate workplace training beyond university, the provision of education and training to healthcare professionals not only provides the opportunity to engage clinicians in the process but also provides the opportunity to increase “error awareness” regarding clinical handover in clinical practice. Despite the importance of education and training in clinical handover, the available evidence in education and training, curriculum framework, pedagogical consideration and evaluation of education and training programs have been scant.

A team of researchers from the UK reported a study that aimed to understand the current situation regarding education and training among junior doctors and night nurse practitioners (Cleland et al., 2009). In this particular study, 5 focus group interviews were conducted with a total of 17 doctors and 4 night nurse practitioners (Cleland et al., 2009). The study found that junior doctors had skills and knowledge for good handover. They were however, unable to put the skills and knowledge to work in the particular clinical setting. All trainees suggested that a formal training program for clinical handover would have been useful prior to graduation as most of them tried to learn the skill on the job without clear guidance (Cleland et al., 2009).

The literature recently provided some guidance regarding a theoretical framework and a competency model for clinical handover education and training (Arora et al., 2008). The authors built on theoretical constructs from social science theory to map competencies and developed a framework for handover professional development programs (Arora et al., 2008).

It is important to note that clinical handover has been embedded and recommended in the curriculum in the USA (Accreditation Council for Graduate Medical Education, 2011), the UK (Royal college of paediatric and child health, 2010) as well as Australia (CPMEC, 2013). As such, there is a need to develop further understanding of education and training in the field of clinical handover to
achieve best patient outcomes. In recent years studies are starting to emerge and proliferate, describing education and training interventions in clinical handover improvement. These studies are described and reviewed below.

In 2005, Nestel et al. reported a study which investigated the effectiveness of a 2 hour teaching session on clinical handover presentation skills. The study utilised adult educational theory as the basis of educational intervention and 14 nurses participated in the study. The study found that a 2 hour teaching intervention was well received by the participants (Nestel et al., 2005).

In 2007, Horwitz and colleagues developed a 1-hour curriculum and teaching for handover communication for an internal medicine residency program (Horwitz et al., 2007). The program included face to face discussions, modelling and observations of individual performance with feedback (Horwitz et al., 2007). The curriculum included four domains for clinical handover education and training: knowledge, attitude, skills and competency and behaviours and performance (Horwitz et al., 2007). The team found that the 1 hour program was highly rated by participants (Horwitz et al., 2007). Furthermore, the teaching program improved participant's perception of their confidence in conducting clinical handover (Horwitz et al., 2007).

In a study which investigated the effectiveness of teaching and learning sessions on clinical handover, a group of researchers delivered lectures on clinical handover once a month and feedback was provided to interns and junior doctors during their handover sessions (Chu et al., 2010). The study evaluated the perception of knowledge and the impact on clinical handover processes. The study showed a significant increase in the perception among participants of their ability to handover patients (Chu et al., 2010).

A team of researchers trained fifteen residential doctors with a 30 minutes lecture followed by practice session with feedback using the SIGN-OUT mnemonic (Gakhar and Spencer, 2010). The team of researchers then evaluated the training program through observations of verbal handovers and written handovers. The team found that the training program significantly improved the accuracy of handover (Gakhar and Spencer, 2010).

Farnan et al. (2010) developed an observed simulated handover experience training model through a 90 minute workshop for final year medical students. The research team then conducted pre and post-workshop surveys for students to understand the impact of education and training sessions on self-assessment of preparedness for good practice in handover (Farnan et al., 2010). The research found that students were very satisfied with the teaching method. Self-assessed perceptions showed that the education and training session significantly improved the preparedness for performing effective handover (Farnan et al., 2010).

Similarly, Malter and Weinshel (2010) investigated the impact of a teaching program using SBAR technique to 17 doctors working in gastroenterology. They found that self-assessment of handover skills improved from 1-2 to 4 on a 5 point scale (Malter and Weinshel, 2010).

In a neurology critical care unit, a team of researchers conducted a single educational session based on a combination of literature review, local audits as well as senior's perception of good and effective handover (Lyons et al., 2010). The team then conducted content analysis of handovers
pre- and post-intervention (Lyons et al., 2010). The researchers found that the quality of handover improved significantly after the teaching intervention (Lyons et al., 2010). This improvement effect however, was not sustainable as the quality returned back to baseline after the change-over of staff to a group of untrained staff (Lyons et al., 2010).

Recent literature suggested that a simple 90 minute clinical handover teaching session has a long lasting effect on patient care (Aylward et al., 2012). The team delivered a 90-minute interactive workshop during intern orientation. They then evaluated the readiness to perform handover as well as the impact on clinical practice 3 to 6 months after the workshop. The team found that readiness to perform handover increased by 26% and interns continued to use aspects of the workshop in their clinical practice up to 6 months after the one-off workshop (Aylward et al., 2012).

These studies reviewed above investigate education and training as an independent intervention to improve clinical handover. There are some studies which have included education and training as part of the intervention to improve clinical handover. Simulation training was used by Berkenstadt and team (2008) during teamwork training to include clinical handover training. The team also developed a protocol and resources for education and training specifically for the protocol (Berkenstadt et al., 2008). The team demonstrated improvement in clinical handover communication after the intervention although they did not evaluate the education and training component specifically (Berkenstadt et al., 2008). Klamen and colleagues (2009) also used simulation as part of the training to train medical students to use a checklist to improve clinical handover. The study showed that simulation was useful for clinical handover improvement (Klamen et al., 2009).

Clark et al (2009) delivered assertive communicative training to doctors and nurses and they found that participants were more confident in handover communication. The team also showed that in combination with other interventions, teaching and training in assertive communication seemed to improve the perception of clinical handover practice (Clark et al., 2009).

Yee and colleagues (2006) describe a multi-faceted intervention through their research study. This study included education and training through feedback and reflective learning for junior medical officers as part of the multi-faceted intervention for clinical handover improvement. Education and training was found to be an important change agent for clinical handover improvement (Yee et al., 2006).

A recent study has confirmed the usefulness of reflective learning and feedback in clinical handover education. A group of researchers delivered a lecture based teaching in combination with deliberate feedback and practice using a standardised clinical handover platform to teaching clinical handover communication skills. This study found that the program improved knowledge of residents and increased in the inclusion of important features of communication during handover sessions (Sawatsky et al., 2013).

More convincing evidence has recently been published, showing that clinical handover education could improve clinical handover practice and patient care when combined with a process to standardise clinical handover practice (Airan-Javia et al., 2012). A research group in the UK reported an evaluation study of a single-institution, randomised controlled trial of a 45- minute
educational session on safe handover communication skills for interns and residents. Residents received additional education on effective feedback practices using standardised clinical handover process. The study found that interns who received education performed better than control interns. Furthermore, the study showed that communication failures were less likely in the intervention group using the written platform (Airan-Javia et al., 2012). The study, however found that educational intervention did not help with electronic handover documentation (Airan-Javia et al., 2012).

The literature seems to point towards the combination of education and training with other system interventions as the optimal way to improve clinical handover. In a review of educational literature in handover, it is suggested that both formal and informal teaching are important in training junior staff to improve clinical handover (Stoyanov et al., 2012). The review of the literature demonstrates that education and training is an important part of clinical handover improvement, especially with the view of improving knowledge, “error awareness”, and engagement of clinicians in the dialogue and process of clinical handover improvement. Different organisations have started to combine efforts in order to define teaching curriculum for clinical handover among university students and junior doctors such as the I-PASS curriculum (Starmer et al., 2014). This is a very important step towards implementation of a universal education and training program in order to engage clinicians in the conversation of clinical handover improvement.

2.6.3 Change management process in clinical handover

A number of studies have investigated different change management processes as applied to clinical handover improvement. These studies are reviewed here with a particular emphasis on clinician engagement.

A team of researchers in the UK reported the impact of introduction of the SBAR communication tool in their hospital as part of the broader patient safety initiative (Christie and Robinson, 2009). The team utilised the PDSA (Plan-Do-Study-Act) cycle to implement SBAR as the communication technique and communication tool particularly during handover (Christie and Robinson, 2009). The technique involved clinicians in the process and the study reported a 65% reduction in adverse event and 11% reduction in mortality (Christie and Robinson, 2009). The study however, did not provide clear demonstration of the data collection process and statistical analysis of these data (Christie and Robinson, 2009).

In a separate study, clinicians from a medical ward used the PDSA cycle to design and implement a new clinical handover process to improve patient care (Luther et al., 2014). The study found that by using the PDSA cycle to standardise clinical handover process, there was a substantial and sustainable reduction in handover associated errors (Luther et al., 2014).

Using Lewin's 3 step model for change, an Australian study found that it is useful to engage clinicians through this process to implement bedside handover (Chaboyer et al., 2009). The team developed practice guidelines and competency standards through this process. The study found that the change process that engages clinicians had a positive impact on safety and efficiency and it was well received by staff (Chaboyer et al., 2009).
Two studies using Joanna Briggs’s method to implement clinical handover improvement were reported in the literature (Poh et al., 2013, Kasinathan et al., 2012). The first study aimed to improve the quality and duration of clinical handover at an oncology ward. The study showed improvement in compliance rates as well as improvement in the duration for clinical handover by 21.67 min per registered nurse (Kasinathan et al., 2012). The main critical success factor found in this study was the engagement and commitment of all stakeholders and front line clinicians involved in the process (Kasinathan et al., 2012).

In a separate study, the Joanna Briggs method was used to improve clinical handover of four acute admitting wards (Poh et al., 2013). The results showed significant improvement in patient identification, patient history and observation discussion as well as the use of standardisation information transfer (Poh et al., 2013). The model of change included education and training program and clinician engagement through town hall meetings and these were critical factors to ensure successful improvement (Poh et al., 2013).

The continuous quality improvement approach has also been used to implement clinical handover improvement program (Yazici et al., 2013). The research project focused on resident-driven quality improvement process to implement a standardised template for handover quality improvement within a community hospital. A multi-step continuous quality improvement approach was used, including problem identification, standardised template creation and implementation. The team evaluated the quality improvement project at 3 months and 9 months (Yazici et al., 2013). The program reported a substantial increase in the attendance of clinical handover sessions from 40% pre-intervention to 89% at 9 months. Unreported overnight events and uncertainty about decisions due to poor handover had also reduced substantially (Yazici et al., 2013). The study, however found that reduction in missed contents has not been sustained at 3 months (Yazici et al., 2013).

In a recent review of the literature to provide guidance to support change in intra-hospital handover, a team of researchers recommended the use of OSSIE guide to improve clinical handover (Scott et al., 2012) . The OSSIE is an edited summary of the standardised operating protocol presented in this thesis as Publication 4 (see Section 4.2.4). The authors acknowledged that while OSSIE guide seems to provide essential guidance, the use of OSSIE guide in clinical settings have not been formally evaluated (Scott et al., 2012).

In summary, change management processes have been used to improve clinical handover with some success. The critical success factor in these studies however, is the engagement of clinicians often through the provision of education and training programs to increase awareness. More importantly, education and training programs seem to have the best effect when combined with systemic changes to the clinical handover practice through standardisation of clinical handover process and information transfer. The section below discusses the impact of clinical handover improvement research and research gaps, especially raising the issue of concurrent multi-faceted interventions and sustainability of interventions.
2.7 Impact of clinical handover intervention and research gaps.

Section 2.4 provided an extensive review of clinical handover and its relationship with quality and safety of patient care. Section 2.5 discussed the need to address latent systemic factors, through the process of standardisation of clinical handover practice, including the process of conducting clinical handover and information transfer during clinical handover. Section 2.6 discussed the change model for clinical handover improvement and provided evidence from the literature that engagement of clinicians, especially through education and training programs, seems to be the critical success factor in healthcare quality improvement, especially in clinical handover.

It is important to note that many studies have investigated each intervention in isolation. As such, the evaluation process aims to determine the particular aspect of clinical handover that the intervention addressed. For information standardisation tools, evaluations have mainly focused on the accuracy and completeness of information transfer. For clinical handover process standardisation, the studies have evaluated the errors associated with each step of the clinical handover process. For education and training interventions, these studies have investigated the satisfaction of participants for the program, their self-perceived confidence as well as knowledge and skills to conduct handover. For electronic tools, studies have tended to evaluate completeness of information transfer and user satisfaction. For change management processes, evaluations have focused on the compliance of the new process with the pre-defined objectives.

The heterogeneity of research and the lack of strong consensus evidence to lead clinical handover improvement have had a profound impact on the translation of clinical handover research into clinical practice change. This point has been highlighted by six whole field reviews of interventions in clinical handover practice recently (Abraham et al., 2014, Robertson et al., 2014, Smeulers et al., 2014, Flemming and Hubner, 2013, Li et al., 2013, Scott et al., 2012). These reviews focus on different aspects of clinical handover interventions, including clinical impacts of handover interventions (Robertson et al., 2014, Scott et al., 2012), clinical impacts of different types of nursing handover (Smeulers et al., 2014), clinical impacts of different tools to facilitate handover (Abraham et al., 2014) and clinical impacts of electronic tools (Flemming and Hubner, 2013, Li et al., 2013). The conclusion of these reviews, however shows that there is a lack of consensus and evidence to clearly support positive impacts of interventions on clinical handover. While each individual intervention appears to improve certain aspect of clinical handover, the overall impact on patient care is unclear. Furthermore, there is a lack of evidence to support specific intervention for all organisations.

It is therefore important to note that while many studies have shown improvement in clinical handover practice with each individual intervention, the need to understand multi-faceted interventions on the substantiveness and sustainability of clinical handover improvement is urgently needed. More recently, some studies have provided significant momentum and incentives to improve clinical handover in healthcare. Two studies recently have demonstrated the impact of multi-faceted interventions in improving medical errors and preventable adverse events in one institution (Starmer et al., 2013) and handover related errors across 23 institutions (Bigham et al., 2014) respectively. Furthermore, recent studies have also demonstrated significant impact of
clinical handover improvement on patient outcomes, including reduction in post-operative complication rates (Agarwal et al., 2012), reduction in length of hospital stay (Rao et al., 2012, Ryan et al., 2011) and improvement in mortality (Christie and Robinson, 2009). These studies are reviewed below.

A team of researchers conducted a prospective interventional study, using a resident handover bundle and found significant improvement in handover-related errors and preventable adverse events in Boston (Starmer et al., 2013). The team conducted the study from 2009 to 2010 in 2 inpatient units. The team implemented a handover bundle, which included standardised communication platform, a verbal mnemonic, a new team handover structure and an education and training program. One unit also re-organised the electronic medical record to include a handover platform (Starmer et al., 2013). The research team found that medical errors reduced from 33.8 per 100 admissions to 18.3 per 100 admissions. Preventable adverse events decreased from 3.3 per 100 admissions to 1.5 per 100 admissions. The duration of clinical handover per patient and workflow of staff did not change after the intervention (Starmer et al., 2013).

In a separate study involving paediatric hospitals, a team of researchers found that the implementation of a quality improvement collaborative program reduced handover-related care failures across 23 hospitals (Bigham et al., 2014). The team of researchers designed a collaborative intervention program which included handover intent and content, standardisation of handover process and content and provided clear guidance on responsibility transfer. The team found that over a 12 month period, handover related care failures decreased from 25.8% to 7.9%. Overall staff satisfaction with handover process improved from 55% to 70% (Bigham et al., 2014).

Improvement in clinical handover has also been associated with improvement in post-operative complications. A team of researchers conducted a prospective observational clinical study over a 3 year period to evaluate the impact of a structured handover tool on clinical outcomes and information loss (Agarwal et al., 2012). The team conducted the study in a cardiac intensive care unit and two different periods were evaluated, before and after the introduction of a structured handover tool. The team measured information loss as well as five clinical outcomes within the first 24 hours of arriving in ICU (Agarwal et al., 2012). These clinical outcomes were cardiopulmonary resuscitation, mediastinal re-exploration, placement of extracorporeal membrane oxygenation, development of severe metabolic acidosis and the number of early extubation in the first 24 hours period (Agarwal et al., 2012). The team found that the utilisation of the structured tool was associated with significant reduction in information loss (Agarwal et al., 2012). The team also found that post-operative complications of cardiopulmonary resuscitation, mediastinal re-exploration and metabolic acidosis were significantly reduced. Furthermore, early extubation had significantly increased (Agarwal et al., 2012). While these results require further validation, they are promising. There is now evidence to show that improvement in clinical handover is associated with improvement in patient outcomes.

While many electronic tools mentioned in Section 2.4.4 demonstrated improvement in information transfer, recent studies have provided clinical outcome data for their application in clinical settings. A team of researchers utilised a simple word processing software proforma with a standardised data set and hospital emails to provide the electronic clinical handover platform (Ryan et al., 2011).
The team of researchers then collected clinical data for two separate 2-week periods before and after the introduction of the electronic format (Ryan et al., 2011). The users of the system were not informed of the data collection. The researchers demonstrated a statistically significant improvement in patient’s length of stay from 5 to 4 days with this simple electronic measure (Ryan et al., 2011).

A team of researchers in Australia has also demonstrated significant improvement in clinical outcomes using an electronic clinical handover tool (Rao et al., 2012). The research team implemented an electronic clinical handover system within the current clinical information system (Rao et al., 2012). The team evaluated clinical outcome data 12 months before the implementation of the tool and 12 months after the implementation of the tool (Rao et al., 2012). The team found that 14.21% of discharges occurred over the week before the implementation of the tool and that had significantly increased to 20.39% (Rao et al., 2012). Furthermore, the team found that the rate of Medical Emergency Team (MET) calls were 7.5% before the implementation of the tool versus 5.5% after the implementation of the tool (Rao et al., 2012). It appeared that electronic clinical handover tool had significant impact on patient care although mortality data was not reported in this study (Rao et al., 2012).

A team of researchers in the UK reported the impact of introduction of SBAR communication tool in their hospital as the broader patient safety initiative (Christie and Robinson, 2009). The study reported a 65% reduction in adverse event and 11% reduction in mortality (Christie and Robinson, 2009). The study however, did not provide clear demonstration of the data collection process and statistical analysis of these data (Christie and Robinson, 2009).

Recent studies therefore appear to provide some evidence that improvement in clinical handover might lead to significant improvement in clinical outcomes during the study period. It is very important to note that these interventions are multi-faceted interventions. More importantly, these studies analysed above have significant limitations and weakness in study design and therefore the applicability of the study results to other clinical settings and other institutions might be limited.

Firstly, many of these studies involve small number of participants and patients within a single institution or a single ward. It is unclear whether other institutions or in fact other wards within the same hospital would achieve similar results using these intervention programs. There is a lack of multi-disciplinary studies, across different wards and different healthcare settings reported in the literature.

Secondly, with the exception of a few studies, different types of interventions have been described in these studies in isolation, with different study designs. There is a significant lack of understanding of the process of clinical handover and the process of implementation of these interventions to improve clinical handover. The lack of research and guidance on the choice of interventions, timing of interventions, implementation of interventions and local evaluation and feedback on interventions provides strong rationale for further research to understand a whole system, whole organisation approach to clinical handover improvement. It is also unclear whether multiple interventions will produce further improvement. More importantly, the impact on clinical practice of these interventions over time has not been evaluated. The sustainability of
interventions is a very important aspect of clinical handover improvement, which has been highlighted by recent studies that conflicting demands diminished the impact of clinical handover intervention over time (McQuillan et al., 2014, Yazici et al., 2013).

Finally, these studies have not articulated their level of engagement of frontline clinicians in the design of interventions and in the implementations of interventions. It is likely that studies reported in the literature are conducted by researchers and clinicians interested in clinical handover improvement. As such, there is already strong engagement of clinicians prior to interventions. Clinicians who participated in clinical handover studies are likely to be clinicians who want to improve their clinical practice and patient care. While studies have suggested that engagement of clinicians was important, the level of engagement of clinicians in the process of clinical handover improvement in these studies has not been established. The engagement of clinicians in clinical handover intervention is a crucial factor in clinical handover improvement. Recent studies have shown that clinical communicative practices among clinicians are more important than standardised clinical handover content transfer in providing patient care (Hilligoss and Moffatt-Bruce, 2014, Lee et al., 2014, Yee et al., 2013). This is a very important observation which will need to be taken into consideration in clinical handover improvement.

There is a lack of understanding and consensus around topics for examination under the heading of clinical handover research and a lack of a framework to guide clinical handover improvement research. Furthermore, evaluations of interventions are variable, with many studies reporting information transfer improvement as their evaluation. It is therefore difficult to draw conclusions and to compare intervention outcomes of studies. More importantly, despite the evidence that multi-faceted interventions seem to be the key strategy, studies have not provided a clear whole of system view of what interventions might work within a particular setting and the outcome which might be achieved through these interventions. Furthermore, the sustainability of clinical handover improvement programs and interactions between clinician utilisation of handover information in patient care requires further examination.

This thesis fills this research gap. This thesis discusses clinical handover from the perspective of clinicians and the context of clinical handover practice. This thesis then discusses the context sensitive and specific interventions to improve quality and safety of clinical handover. This thesis discusses improvement strategies and critical success factors for improvements across multiple different wards and across traditional healthcare disciplinary boundaries. Finally and most importantly, through reflection of these research works and available literature, this thesis proposes a model: the safety value alignment model to discuss clinical handover, the impact of clinical handover interventions and the relationship between communicative practices and clinical handover intervention. This model provides explanations to the current research findings and provides a model for discussion of optimal future clinical handover improvement strategies.
2.8 Chapter reflections

This chapter has provided a detailed literature review on clinical handover. The chapter described selected literature with significant relevance to this thesis in details and provided an analysis and review of these articles.

The chapter firstly described the rationale for a clear definition of clinical handover. The chapter provided a clear definition for clinical handover which has been used in previous publications and this PhD thesis. The chapter discussed the three domains pertaining to clinical handover literature: quality and safety and clinical handover, standardisation of clinical handover and engagement of clinicians for clinical handover improvement. Firstly, this chapter described the relationship between clinical handover and quality and safety of patient care. This chapter discussed latent systemic factors and active factors related to clinical handover. This chapter reviewed various functions of clinical handover and their relationships to safe patient care. The latent systemic factors and active factors for clinical handover improvement could be addressed through standardisation of clinical handover practice and engagement of clinicians in clinical handover improvement respectively. This chapter discussed standardisation of information transfer and standardisation of the clinical handover process as interventions to improve clinical handover. This section included electronic tools to improve clinical handover. This chapter emphasised the need to address active factors of clinical handover improvement through engagement of clinicians in the process. The most important intervention for active factors in the literature was education and training. Different studies have demonstrated improvement in knowledge and skills of clinical handover as well as applicability of these skills and knowledge into clinical practice. Finally, this chapter reviewed various techniques and methods described in the literature to change clinical practices through engagement of clinicians.

This chapter shows that clinical handover interventions reported in the literature are conducted in highly motivated organisations and staff. Furthermore, each study aims to demonstrate the impact of a particular intervention. The main research gap in clinical handover improvement is the understanding of the interplay of these interventions and the substantiveness and sustainability of clinical handover improvement. This research gap provides the rationale and imperative for this thesis, with the discussion of safety value alignment model. Chapter 3 will provides the research context and research methods associated with publications contained in this thesis.
Chapter 3  Research approach and processes

3.1 Introduction
This chapter provides a discussion and description regarding the overall research approach and processes adopted in conducting the primary research that has resulted in the 7 publications that form part of this thesis. Each individual research component had relevant approval from the Tasmanian Human Research Ethics Committee Network. This chapter is structured as follows:

- Section 3.2 discusses the need to develop a research approach for a whole system, whole organisation view for clinical handover improvement. It describes the research philosophy, ontology and epistemology adopted in the research project informing this thesis.

- Section 3.3 details the research design and procedures. This section discusses the data collection processes and strategies to collect data in different wards and clinical areas.

- Section 3.4 describes the data collection techniques utilised. These include observations, semi-structured interviews and clinical handover notes analysis. This section provides a more detailed discussion of data collection and challenges of data collection in healthcare setting, drawing on previous publications describing data collection techniques.

- Section 3.5 describes the data analysis techniques utilised. The range of analysis techniques deployed included coding, constant comparison and memoing.

- Section 3.6 describes the process of key findings emerged from the data analysis and how these key findings are further interpreted and discussed in relation to the available literature in this thesis.

- Section 3.7 provides a summary reflection of the chapter.
3.2 Research philosophy and approach

This section provides a discussion regarding the research philosophy underpinning the primary research. This section is based on a published paper that describes the need for healthcare improvement work to take into account three different groups of interested parties: clinicians, social science researchers and systems design researchers (Yee et al., 2006). The research paper is presented in full in Chapter 4 as Publication 1. This section firstly provides a discussion regarding the research philosophy, which refers to the view of the world by researchers, the way researchers obtain knowledge, disseminate knowledge and communicate knowledge to the rest of the world (Trauth, 2001). It then provides a discussion regarding research strategy. Finally, this section provides a discussion regarding the intersection of three interested parties in improvement science research.

3.2.1 Ontology

Ontology refers to the view of the researcher regarding the perceived nature of the world. The fundamentals of ontology address the question of whether it is possible to understand the objective truth about the world. (Orlikowski and Baroudi, 1991, Burrell and Morgan, 1985). Clinical science is based on the presumption that the scientific, logical basis of medicine and practice of medicine is unbiased truth that is reliable, repeatable and reproducible under the same circumstances (Taylor and Bogdan, 1998).

An opposite view of the world is the view that there is no such thing as an objective truth, known as the relativist (subjectivist) ontology (Taylor and Bogdan, 1998). Feyerabend made the argument that science is by its nature governed by relativist ontology (Scott and Briggs, 2009). Similar arguments have been made for social science (Denzin and Lincoln, 2005, Denzin and Lincoln, 1994) and improvement science (Marshall et al., 2013, Taylor and Bogdan, 1998). A relativist, subjectivist ontology emphasises the social construct and understanding through actions and interactions (Orlikowski and Baroudi, 1991)

The research and this thesis emphasise the view of clinicians on their understanding of clinical handover, essential elements for clinical handover improvement and the development of interventions and guidelines for clinical handover improvement through the research process. Furthermore, this thesis aims to develop a model to discuss clinical handover improvement. A review of the literature available in Chapter 2 suggests that various strategies have been adopted in different research studies, including surveys, interviews, observations and interventional studies. Most of these are single ward, single institution studies. All these publications regarding clinical handover provide an understanding through the lens of their own clinical practice and socio-cultural setting. The generalisability of these findings has been brought into question. As such, a clinical handover improvement program at one institution needs to take into consideration the socio-cultural context of that particular organisation.

Clinical handover is a practice which cannot be discussed and does not have a clear existence independent of human emotions, thoughts and experience. As such, the study of clinical handover in this study, adopts a relativist, subjectivist ontology.
3.2.2 Epistemology

Epistemology refers to the underlying assumption of how knowledge is constructed (Cavaye, 1996). Epistemology also determines how researchers communicate the knowledge in relation to their view of the world and their view of research (Burrell and Morgan, 1985).

Traditional clinical science is based on the epistemology of positivism in which research is seen as logical and mathematical (Scott and Elshaug, 2013). Reports of experiments and research are independent of the researchers and therefore reproducible. Introspective and intuitive knowledge is rejected as knowledge (Scott and Briggs, 2009). In this world view, the only knowledge that is valid is scientific knowledge (Denzin and Lincoln, 1994). Researchers therefore conduct experiments to understand the truth in order to change the world (Denzin and Lincoln, 2005).

The interpretivist approach argues that the truth is a social construct (Darke et al., 1998). The truth and knowledge is interpreted by humans, their beliefs, their emotions and their values (Guba and Lincoln, 1994). The belief of an interpretivist researcher is that the truth about the world is related to human interactions. As such, researchers conduct studies to understand the world rather than to change the world (Boland and Schultz, 1995). In an interpretivist research, the researcher aims to understand the holistic phenomenon and acknowledges the subjectivity associated with it (Guba and Lincoln, 1994).

More recently, the positivist epistemology has been challenged to be the only epistemology suitable for clinical science (Scott and Briggs, 2009, McCann and Clark, 2003a, McCann and Clark, 2003b). New and emerging data and evidence have suggested that in clinical care improvement, context and human interactions are important (Wears and Berg, 2005, Heath and Cowley, 2004, McCann and Clark, 2003b). By using a purely mathematical model, rich contextual insights into improvement are lost (Wears and Berg, 2005, Taylor and Bogdan, 1998). The interpretivist approach, however, does not advocate improvement (Scott and Elshaug, 2013, Denzin and Lincoln, 2005). Instead, the interpretivist approach advocates understanding. As such a new paradigm has emerged in clinical improvement science, the pragmatism paradigm.

Pragmatism is defined as the approach to understand what works in the world, taking into account context and human behaviours (Scott and Briggs, 2009, Backman and Kyngas, 1999). It has been suggested that the influences of pragmatism traces back to Kant, Darwin and the British Empiricists in the 1800’s (Backman and Kyngas, 1999). Pragmatism is often used as the epistemology to guide mixed method research (Watling and Lingard, 2012, Scott and Briggs, 2009). It has been suggested that pragmatism is the middle ground for the paradigm war (Sinuff et al., 2007). The view of pragmatism is that research is always situated in the condition and context (Watling and Lingard, 2012). Importantly pragmatism encompasses socially produced knowledge (Watling and Lingard, 2012). Knowing and knowledge is based on prior knowledge and knowing begins from a practical stand point rather than a theoretical stand point (Papachristou et al., 2004). Pragmatism supports mixed method research as far as the research method can provide a coherent system of knowledge to justify a particular belief (Kennedy et al., 2004).
This research adopts a pragmatist epistemology. The research aims to develop a situated and rich contextual understanding of clinical handover from the perspective of clinicians. It then aims to further formalise clinicians' understanding of clinical handover improvement into critical factors and interventions to help the improvement process. As such, prior knowledge from research and literature review, as well as situated knowledge and know-how are all important in supporting the publications and thesis outcomes and discussion. Qualitative research methods using various data collection techniques are used as the data collection process. The outcome of the development of safety value alignment model is a combination of prior knowledge and knowing with analysis and reflection. As such, the most appropriate epistemology is one that emphasises “whatever works”: the pragmatist epistemology.

3.2.3 Qualitative research methods and improvement science

Clinicians often view double-blinded control trials as the gold standard to support clinical practice (Berwick, 2005). This is seen as important to advance medical understanding and treatment by reducing confounding factors and bias. The translation of evidence to clinical practice however, is complex (Scott and Glasziou, 2012). More recently, arguments have been proposed to explain these observations (Scott and Elshaug, 2013). Quality and safety work is often influenced by environment and actors (Marshall et al., 2013). As such, the translation of research data from one institution to the other is impossible given the need to fully control the environment, human emotions and behaviours. The need to further examine data collected through other methods, such as qualitative research methods is recognised in recent literature (Marshall et al., 2013, Taylor et al., 2011, Scott and Briggs, 2009, Berwick, 2008, Ovretveit et al., 2007, Marshall and Rossman, 1995).

Qualitative research methods are utilised to understand the interaction between human beings, socio-cultural context, emotions and behaviours. In quality and safety improvement work, qualitative research methods are increasingly being used due to the complexity of phenomena being studied (Berwick, 2008, Wears and Berg, 2005). The qualitative research approach allows the in-depth understanding of interactions between healthcare professionals and environments (Tripp-Reimer and Doebbeling, 2004). Qualitative research methods might serve different roles, such as the identification of salient features to improve quality and safety of care delivery, the identification of barriers and activators for change and the development of theory and understanding of the phenomenon being observed.

Quality and safety in healthcare research often faces the dichotomy between these two schools of thoughts. On one hand, the research needs to address evidence required by clinicians to act. On the other hand, the research needs to take into account human behaviours, human interactions, emotions and environments. The intersection of clinical care, sociological understanding and quality and safety is the domain that this thesis addresses. The clinical handover research project conducted by the PhD candidate and research team utilised qualitative research methods in order to achieve improvement and to understand improvement science. It is acknowledged that the preconception of improvement might diminish the rich, contextual data collected through qualitative research methods. The primary goal of the study, however, is to understand improvement and the research is guided by pragmatist epistemology.

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3.3 Research design and procedures

The research project consisted of two parts, using similar research design, data collection and data analysis techniques. The first part of the research project was conducted from October 2005 till May 2007. The second part of the research project was conducted between July 2007 and December 2008, with part of the data analysis and interpretation occurred in 2009.

The first part of the research project, conducted between October 2005 and May 2007, only involved medical practitioners at the Department of General Internal Medicine (DGIM). The main objective of this part of research was to understand clinical handover, clinical handover improvement and to design and trial an electronic tool to improve clinical handover for medical practitioners. The data collected in the area of information systems and electronic tools formed the basis of another candidate’s PhD in Information Systems, awarded by the University of Tasmania in 2011. The first part of the research included a clinical component to understand clinical handover and clinical handover improvement from the perspective of clinicians. This component contributes to this thesis.

The first part of the research project was conducted by the information systems researcher and the PhD candidate, who at the time of research was a junior medical registrar. Data collection techniques included observations, interviews and clinical handover notes analysis. Observation sessions were conducted during the Christmas and New Year period for 2005-2006 and Easter period in 2006. A total of 25 observations were conducted. Interviews were conducted with medical interns, registrars and consultants. A total of 10 interviews were conducted in 2006. Based on these preliminary data and data analysis, 6 design workshops were conducted to understand requirements to design and implement an electronic tool to assist in medical handover. This occurred in first part of 2007. This part of research forms the platform for the second part of research project to occur from 2007-2009.

The second part of the research project was conducted between 2007 and 2009. The data collection was conducted over a period of 18 months from July 2007 to December 2008. This research project was conducted in 6 different clinical settings with 2 groups of healthcare professional, namely medical shift-to-shift handover for general medicine, general surgery and department of emergency medicine; and nursing shift-to-shift handover for general medicine, general surgery and department of emergency medicine.

The second part of the research project was conducted in two stages. The first stage of data collection was conducted to investigate medical shift-to-shift handover at DGIM. This research built upon previous research (the first part of the research project) which had already been done in the same area. The focus of previous research was to investigate the use of an electronic clinical handover support tool (Wong et al., 2008b). The aim of the second part of the research project was to understand clinical handover improvement without an electronic tool in different clinical handover settings for broader applications.

The first stage of the second part of the research project was conducted at the pilot site (i.e the DGIM) in order to understand the data requirements for data collection and data analysis. This pilot site study also facilitated the development of a clearly defined procedure for the other 5 sites. The PhD candidate conducted all observations and some of the interviews at the pilot site. This
work was carried out towards the end of 2007. These observations were conducted during the Christmas-New Year break, when clinical handover sessions were arguably most important to maintain continuity of patient care as the patient care was transferred from one team to the other over a 3-5 day public holiday without involvement of the team that the patient was admitted under. 2-3 handover sessions were observed per day. These observation periods were between 24th to 27th December 2007 and 31st of December 2007 to 3rd of January 2008. That was a total 20 observations. During week days, there were 3 handover sessions in DGIM, between 08:00-09:00, 16:30-17:00 and 21:30-22:00. During public holidays and weekends, there were only 2 handover sessions, between 08:00-09:00 and 21:30-22:00.

Through the initial pilot site study, the PhD candidate had the opportunity to refine the data collection techniques for stage two of the second part of the research project. The pilot site provided evidence that in order to achieve engagement from clinicians, observations and interviews should be in part conducted by clinicians working within the ward and clinical setting. Observations must be conducted at a time when researchers were not working clinically. Consecutive day observations were important in order to understand information utilisation from clinical handover sessions for patient care. The pilot site observation work suggested that 20 observations were adequate to provide data analysis. In the pilot site study, some clinicians, especially senior clinicians did not agree to participate in the interview process. The pilot site suggested that 10-15 interviews would provide adequate data analysis. Initial invitations for interviews therefore included all clinicians for a particular clinical area, if appropriate.

These insights from the pilot site provided a research plan for the whole project. Firstly, in order to achieve engagement as well as provide good quality analysis of the research data, the research team decided to involve nurses who worked in each of the 3 wards to collect data for the project. Three senior nurses, one from the DGIM, one from the DGS and one from the DEM were recruited to join the research team in order to assist in collecting and analysing data for nursing handover. The nurse unit manager of each ward was contacted. All nurse unit managers provided strong support for the research to be conducted in their wards.

As the PhD candidate was working as a junior doctor at the time of data collection and had regular contacts with all 3 medical wards and staff members, it was thought that buy-in was not a problem with the PhD candidate conducting the research for medical professionals. A fellow researcher also conducted some of the research when power relationship was considered important and might impact on the data collection. Heads of departments and senior clinicians from all 3 medical departments were briefed about the project. The project had the support of the Chief Executive Officer and senior management team of the hospital.

The PhD candidate, with the assistance of a fellow researcher, developed a training manual regarding the data collection and analysis process in order to train the three recruited nurses to conduct data collection and data analysis in their own wards. A two day workshop was conducted for the three nurses in order to discuss research techniques, including observations, interviews and clinical handover notes analysis. The PhD candidate and the fellow researcher also conducted a workshop for data analysis and interpretation. The plan was for the three nurse researchers to
conduct data collection and to perform the first level analysis, prior to the PhD candidate and the fellow researcher analysing and interpreting the data.

Data collection for the remaining 5 clinical areas was conducted in a staggered manner. This was due to the fact that the PhD candidate wanted to conduct some observations in all these wards to ensure validity of data collection. Data collection for nursing handover in the DGIM was conducted in March 2008. Data collection for medical handover for the DGS was conducted towards the end of March during the Easter public holiday period in 2008. Data collection for nursing handover in the DEM was conducted in April followed by data collection for medical handover in the DEM in May 2008. Finally, data collection for nursing handover for the DGS was conducted in June 2008, due to a concurrent project to improve clinical handover at the surgical ward by changing nursing handover to bedside.

Data analysis and interpretation occurred from June to September 2008, with a preliminary report submitted to the Australian Commission in Safety and Quality in Health Care. A revised report was submitted in January 2009 after the initial feedback from the Commission. The initial academic report was subsequently been edited and revised, primarily by the PhD candidate, with the assistance of staff members from the Australian Commission in Safety and Quality in Health Care as the foundation for the Australian National Clinical Handover Improvement Guideline, known as the OSSIE guide (Australian Commission on Safety and Quality in Health Care, 2010b). Further analysis of the primary data occurred in 2009, resulting in Publication 6 as presented in Chapter 4.

The PhD candidate has since participated in national clinical handover improvement committees as well as local healthcare institution clinical handover improvement committees. In 2013, the PhD candidate re-analysed and reviewed the primary data with fellow colleagues, providing a different view for clinical handover improvement based on the experience in the participation of clinical handover improvement programs and committees. This resulted in two publications, one of them was included as part of this thesis (Yee et al., 2013) as Publication 7 in Chapter 4.

3.4 Data collection techniques

This section describes the data collection techniques utilised by the researcher and the research team for both parts of the research project in all 6 clinical areas. The techniques used included observations, semi-structure one to one interviews and clinical handover notes analysis. Semi-structured interviews form the primary data source. Other data collection, including observations and clinical handover notes analysis supplement and validate the results of interviews. This approach was well described in the literature (Walsham, 1995).

3.4.1 Sample selection

For both first and second part of the research project, the same sample selection process occurred with medical handover. All medical consultants, medical registrars and medical interns working within each of the 3 departments were invited to participate in the research. All medical staff were provided with information sheet and consent forms and information sessions were conducted to explain the project. All staff members agreed to participate observations. A selected number of staff agreed to participate in interviews. This is further explained and discussed in the interview section (see Section 3.4.3).
There were differences regarding subject recruitments for nursing staff due to the number of staff members involved and working patterns. In DGIM, an information session was conducted with nurses who would be working during the observation period. All nurses provided consent for observations. The majority of the nurses provided consent for interviews. Invitations for interviews were extended to all senior nurses in the department in order to gain support from the department. In DGS, information sessions were conducted with nurses and consent obtained from nurses. As the ward was already planning to improve clinical handover, it was not hard to gain support. All nurses working during the observation period as well as senior nurses within the department were invited for interviews. In DEM, it was impossible to run sessions for all nurses due to the number of nurses working in DEM. As such, nurses who were scheduled to work during the observation period were contacted and provided within information sheet and consent forms. Furthermore, senior nurses within the department were invited to participate in the interview process.

3.4.2 Observations
Observations were used as the first data collection technique during both first and second part of the research project in all 6 clinical areas. This was designed to understand the context of clinical handover practice, the environment that clinical handover sessions were conducted in and the nature of clinical handover practice within a particular clinical area. These observations provided an introduction to clinical staff regarding the research project being conducted.

It has been well recorded in the research literature as well as clinical literature that differences are common between what people said they did, what they perceived they did and what they actually did (Nøhr and Botin, 2007). Observations were therefore necessary and important as part of the data collection process in order to understand organisational issues and team interactions as well as uncovering the actual practice of clinical handover within the specific clinical setting (Pope et al., 2002).

In social science research, a distinction was drawn regarding the participation of the researcher in routine work (Atkinson and Hammersley, 1994). Researchers could act as a complete observer without any participation in the process or a complete participant. In the design literature, it appeared that it was important for the researcher to be able to dissociate from the actual clinical work in order to conduct proper observations (Wears and Berg, 2005). As this research aimed to design clinical handover improvement interventions, observations were conducted during a time when the researchers were not working in their clinical capacity.

While unstructured, unguided observations were important to explore issues and insights of a phenomenon, in this research, researchers with varying research experience conducted observations in different wards. It was therefore important to provide some guidance for observations with the view of improving clinical handover. The PhD candidate therefore suggested the following aspects for observations:

- Time, punctuality, duration and how this might impact on handover
- Location of handover and how this might have affected handover
• Environment of handover and the impact on handover
• Participants at handover and their impact on handover
• Information artefacts being used and their role in handover
• Organisational issues and their impact on handover
• Communication practice during handover and how this could be improved

The PhD candidate conducted a selection of observations of all the wards during the data collection period in order to understand the context of clinical handover as described in Chapter 1, Section 1.4. Furthermore, this process allowed the PhD candidate to confirm the findings from the nurse researchers who conducted the majority of observations in the relevant wards from broader organisational perspective. Field notes were taken during all observations for analysis.

3.4.2.1 Medical shift to shift handover observation

The PhD candidate took on the role of a complete observer for all medical shift-to-shift handovers. These included 20 general medicine handovers, 20 general surgery handovers and 20 emergency handovers.

At the DGIM, there were 3 medical handover sessions: morning handover from 08:00 to 08:30, evening handover from 16:30 to 17:00 and night handover from 21:30 to 22:00. These observations were conducted between 24th and 28th of December 2007 and 31st of December 2007 and 3rd of January 2008. Some of these observations were conducted with a second researcher as research has shown that a system perspective could be generated by the inclusion of an information systems researcher together with a clinician during observations. (Yee and Wong, 2007).

Observations in DGS were conducted towards the end of March during Easter holiday in order to gain better understanding on continuity of patient care during public holiday handover. The PhD candidate observed surgical handover for 10 consecutive days (from the 19th of March 2008 till the 28th of March 2008) for morning handover from 07:30 to 08:00 and night handover from 21:30 to 22:00. It is worth noting that no consultant handovers were observed as there were no consultants present during any of the observed handover sessions. Registrar and intern handovers were observed for 12 sessions, and the remainder of the handover sessions were intern handover as the registrar was working in theatre and registrar handover occurred over the phone.

Observations in DEM were conducted in May 2008. The main handovers were morning handover from 08:00 to 08:30 and night handover from 22:30 to 23:00. The afternoon handover tended to be between junior staff finishing their shifts to senior staff who continued to work until 23:00. As such, afternoon handovers were very short. 8 morning and night handovers were observed and 4 afternoon handovers were observed. Observations were conducted for all morning handovers and night handovers from Saturday the 10th of May 2008 to Saturday the 17th of May 2008. The afternoon handovers observed included the 10th and 11th of May 2008, the 13th of May 2008 and the 16th of May 2008.
For all observations, the PhD candidate arrived five minutes prior to the start of handover to familiarise with the environment as well as the participants of the handover session. The PhD candidate would answer any questions participants might have regarding the research if appropriate. Observations were conducted away from the actual handover activities in order to reduce interference and the Hawthorne effect associated with observations.

During these observations, field notes were taken in accordance with the guide provided in Section 3.4.2. At the end of each observation, the PhD candidate stayed behind to observe any other discussions related to handover. Some participants provided opinions regarding their thoughts on how clinical handover could be improved during and/or after the observation. These were documented in the field notes. The PhD candidate would then collect clinical handover notes from the outgoing team and incoming team to de-identify the notes from patient information. A copy of the de-identified clinical handover note was obtained and collected for data analysis. The PhD candidate only left the field after all the participants had left.

3.4.2.2 Nursing shift to shift handover observation

Three senior nurses were recruited as main researchers to collect data and to assist in the interpretation of the observation data. These nurse researchers were provided with training regarding data collection techniques. The PhD candidate supported nurse researchers by conducting 5 observations himself together with these nurse researchers on every ward. Observations that the PhD candidate were present included the first and the second observations and 3 more sessions selected at random in negotiation with nurse researchers.

Observations were conducted in March for DGIM, April for DEM and June for DGS. Observations in DGIM were conducted between 1st and 7th of March 2008. There were 3 nursing handovers in DGIM: morning handover from 07:30 to 08:00, afternoon handover from 14:15 to 14:45 and night handover from 22:00 to 22:30. The PhD candidate was present for the 1st of March 2008 morning and afternoon handovers, 4th of March 2008 morning and afternoon handover and the 6th of March 2008 night handover. The DGIM used a print-out of a word document to help with the handover process and these sheets were collected, de-identified and a copy of that was kept for data analysis.

Data collection for DEM nursing handover occurred from 21st to 27th of April 2008. There were 3 nursing handovers in DEM: morning handover from 07:30 to 07:45, afternoon handover from 12:45 to 14:45 and night handover from 21:45 to 22:30. The PhD candidate observed all 3 handovers on the 21st of April 2008, as well the afternoon handover on the 24th of April 2008 and night handover on the 26th of April 2008.

Data collection for DGS nursing handover occurred from 1st to 7th of June 2008. There were 3 nursing handover in DGS: morning handover from 06:30 to 07:00, afternoon handover from 13:15 to 15:00 and the night handover from 23:00 to 23:30. The PhD candidate observed all 3 handovers on the 1st of June 2008, as well the afternoon handover on the 5th of June 2008 and morning handover on the 7th of June 2008. During these observations, field notes were taken in accordance with the guide provided in Section 3.4.2.
3.4.3 Semi-structured interviews

Semi-structured interviews were conducted for both first and second part of the research project. There were five sections of interview questions used in the first part of the research project. The fifth section was about electronic tool to support clinical handover. The first four sections of the interview questions were used in the second part of the research project as this part of the research project did not focus on the role of electronic tool in clinical handover improvement.

Semi-structured interviews were conducted within 4 weeks after the observations for all clinical areas to maintain momentum. The interview duration on average was 30 minutes. Semi-structured interviews allowed the researcher to gain adequate information regarding the research questions. This technique also allowed the use of further questioning to clarify statements made and to explore the experiences of clinical handover practices among clinicians. (Pope et al., 2002).

In semi-structured interviews, the questions were formulated to encourage the discussion of the issue without imposing restrictions on how these could be answered (Doolin, 1996). In this format, the rich contextual data could be gathered and analysis, applying grounded theory principles.

The interview questions were grouped into four parts, based on the literature review analysed in Chapter 2 as well as previous experience and publication in the field by the PhD candidate. These four parts were perception of clinical handover, clinical handover process and information requirement, education and training, information technology and improvement process. These questions are listed as below:

Part 1: Perception of clinical handover

1. How would you define the term clinical handover?
2. What is your role in the clinical handover process?
3. What are the functions that clinical handover serve?

Part 2: Process and information transfer

1. What are your experiences of clinical handover and how that could be improved?
2. What type of information do you require from handover? How could the information transfer be improved?
3. What is your vision of what an ideal handover process should be?

Part 3: Handover education

1. Have you been taught how to conduct clinical handover?
2. How do you learn the process of handing over patients?

Part 4: Clinical handover improvement

1. What factors would you identify as influencing clinical handover? How could this be improved?
2. What are your suggestions to improve clinical handover?
Part 5: Electronic tool and clinical handover (this is not included in second part of the research)

1. What do you think about electronic clinical handover support tool?
2. What are the main features of electronic clinical handover support tool that might help with clinical handover?

All medical staff who participated in clinical handover sessions were provided with information and they were invited to participate in semi-structured interviews. Once the participant agreed to an interview, the PhD candidate and the participant agreed on a mutually convenient time. Some interviews were conducted by the PhD candidate himself, while some interviews were conducted by other researchers recruited for the research project when there was a perceived conflict of interest and power-relationship involving the PhD candidate and the interviewee.

These interviews took place outside normal clinical hours, usually in a separate area to clinical activities. This was to ensure minimal distractions and to ensure privacy of the process. At times, the interviewees attended the interview during their lunch break. Interviewees tended to carry their pager with them in these circumstances and sometimes, they chose to answer pagers. While these were not ideal circumstances, the PhD candidate worked within the boundaries of what clinicians felt comfortable with. These interviews were conducted face-to-face. They were either conducted in consultant’s office or a shared office for registrars and residents, with a telephone available for clinicians to answer pagers as required.

The interview process began with an explanation of the purpose of the research and the voluntary nature of the research. Written and verbal consent was obtained from participants prior to the interview process. These interviews were audio-recorded for transcription with consent. There were no interviewees who did not consent to audio-recording. The audio-recording of interviews is important for application of grounded theory in data analysis (Hansen and Kautz, 2005).

During the interview process, various techniques were used in order to explore clinical handover experiences from participants. These techniques included readback and reflection, pauses and probes (Denzin and Lincoln, 2005). Probes were used at times when justification or exploration was required. Pauses were used in order to let the participants consider more detail or broader responses. Readback and reflections were used in order to clarify statements made. Notes were taken regarding non-verbal expressions and/or reactions during the interviews. At the end of the session, the PhD candidate reflected on the session and the reflection was documented. All this information was drawn upon in the analysis phase.

All medical consultants, medical registrars and medical interns working at all the 3 wards were invited to participate in the interviews. 7 out of 11 medical consultants working in DGIM agreed to be interviewed. All 12 medical registrars working at the DGIM agreed to be interviewed. There were a total of 11 interns who worked medical shifts during the observation period and they all participated in the interview process. 2 surgical consultants out of 9 consultants working in DGS agreed to be interviewed. 3 out of 6 surgical registrars agreed to be interviewed and all 7 interns working at DGS agreed to be interviewed. 6 out of the 11 DEM consultants agreed to be interviewed. 6 out of the 15 DEM registrars agreed to be interviewed and all 6 interns working in
DEM at the time agreed to be interviewed. The pattern of acceptance for the interview process reflected the discussion regarding buy-in and familiarity with the researcher. The PhD candidate worked in the DGIM until January of 2008. As such, the PhD candidate had good rapport with staff members working in the DGIM. Furthermore, the PhD candidate participated in medical student education in 2007. These students graduated and worked as interns in 2008. As such interns were very willing to participate in the research project because of the rapport built during medical student training program with the PhD candidate.

Interviews for nurses were conducted by the three nurse researchers recruited for the project. The three nurse researchers were trained regarding the interview techniques and processes. The recruitment of nursing staff members for interviews, however, varied due to the staffing situation. There were 37 full time equivalent nursing staff in the DGIM. The total number of nurses who actually worked on the ward was around 50 as some worked part-time and agency nurses were used at times. The interview process invited all nurses who worked during the observation period and all senior nurses to participate. The process also included some part time nurses but did not include agency nurses. A total of 22 nurses were interviewed in the medical ward out of 30 nurses invited. There were 22 full time equivalent nursing staff in DGS. The total number of nurses who worked on the ward was around 35. 12 nurses agreed to the interviews process out of 21 nurses invited. The DEM nursing staff was a complicated issue. There were upwards of one hundred nurses who worked in DEM under different capacities. It was not clear to the nurse researcher the exact number of nurses in DEM. As such, nurses who were going to work during the observations were provided with information and invited to participate in the interview. All senior nurses were invited to participate in interviews. A total of 24 nurses participated in the interviews out of 49 nurses invited.

The transcript of the first two interviews by each of the nurse researchers were provided to the PhD candidate for review to ensure the interview techniques and processes were adequate for analysis. Suggestions were made to the process of probing and the nurse researchers completed all the other interviews by themselves. The transcripts of all these interviews were then compiled together for data analysis.

3.4.4 Clinical handover notes analysis
The third technique used in the first and the second part of the research project was clinical handover notes analysis. Clinical handover notes were collected and de-identified prior to a copy being obtained for data analysis and interpretation. The original copy was returned to the clinicians involved in patient care or destroyed through the confidential document system of the hospital.

The PhD candidate attempted to obtain medical handover notes of all patients from all the observations. The medical handover notes in DGIM were normally written on a piece of paper with either patient stickers or patient name. The de-identified copies provided patient handover notes for 382 patients. Some handover notes were from the same patient. It was however, not possible to eliminate duplication due to the de-identified nature of the data collection process. As the research was not conducted based on quantitative analysis of the data, duplication was not considered a significant problem. Similarly, 183 patient handover notes were collected from medical handovers conducted in DGS and 232 patient handover notes were collection from DEM. It
was worth noting that there was no clear documentation for clinical handover in DEM. The PhD candidate listened to the handover between the two teams and documented the messages on a notebook.

As print-outs from an updated word document were used as the clinical handover note for nursing handover in DGIM and DGS, a total of 488 patient handover notes were collected from DGIM nursing handovers. A total of 355 patient handover notes were collected from DGS with similar process. In DEM, however, no printed or written artefacts were used. Often a small piece of paper or paper towel was used to document handover. As such the nurse researcher either collected a de-identified version of the handover note or documented the verbal handover sessions for handover message analysis. There were therefore only 129 clinical handover notes collected for analysis.

3.4.5 Data integration and data reconciliation
As mentioned above in Section 3.4.1 and Section 3.4.2, the interview process was used as the primary data collection method. Observations were used to develop a contextual understanding to guide interviews as well as to develop relationship and rapport with the participants. As such, the observation data supplemented and supported the data obtained from interviews. The handover notes were collected after each observation. The data analysis process of clinical handover notes was long and time-consuming and it again supplemented and supported interview data.

In the first part of the research project, the PhD candidate was involved in the data collection, analysis and interpretation of a total of 25 observations, 10 interviews and 205 patient handover notes. These data were integrated, reconciled and analysed using the same process as part two of the research project.

In the second part of the research project, a total of 112 interviews were conducted, transcribed and analysed as described in Section 3.5. This was supplemented by a total of 120 observations. There were a total of 1769 patient handover notes collected for analysis.

For both parts of the research project, interviews were used as the primary data collection method to inform research outcomes. This is due to the fact that the research questions emphasised the need to understand clinical handover and clinical handover improvement from the perspective of clinicians. Interviews explore these topics through the lens of clinicians. The data from interviews, observations and clinical handover notes analysis was combined and integrated by the PhD candidate with the assistance of other researchers involved in the process. During the integration process, there were few instances at which there were discrepancies among different data sets. In these circumstances, the PhD candidate carefully considered the data and the data from observations and clinical handover notes analysis were deemed to be a more accurate representation of what really happened. An example was that interview data suggested that the handover process was relatively free from interruptions and interruptions did not affect handover. Observations however showed the effect of interruptions. The discrepancy between data collected from interviews, observations and other data collection techniques was well described in the literature and the literature supported the reconciliation process used by the PhD candidate as described (Wears and Berg, 2007).
3.5 Data Analysis

Qualitative data collection technique provides useful insight. The challenge with qualitative data collection is the management and analysis of data. Qualitative data are unstructured and there is a massive volume of data available, from transcripts of interviews, field notes as well as significant amount of de-identified clinical handover notes.

The data analysis process aims to provide some structure to the unstructured data and reduce the masses of text data to a meaningful pattern and framework to communicate the data without losing the rich contextual insights and understanding of qualitative data (Marshall and Rossman, 1995). Various different techniques and methods have been described regarding analysis of qualitative data (Denzin and Lincoln, 2005, Morse, 2003, Pope et al., 2002, Coffey and Atkinson, 1996). Analysis of qualitative data is an iterative process. This is especially important when data from all wards which are collected by different researchers are combined together for analysis. Different perspectives and views from the descriptive data emerge over these iterations (Dey, 1993). Over time and multiple iterations, the data form a pattern and a framework so that the researcher can communicate the meaning of the data.

This research uses grounded theory as guiding principles to analyse data collected from observations, interviews and clinical handover notes analysis. Grounded theory was initially proposed as the data analysis method that allows the generation of significant insights and theory from qualitative data (Glaser and Strauss, 1967). Subsequently, a detailed data analysis method, using open, axial and selective coding procedures, was described by Strauss and Cobins (1980). Grounded theory analysis has been used in medical research, in particular nursing research (McCann and Clark, 2003a, McCann and Clark, 2003b), health informatics research (Cummings and Borycki, 2011), medical and healthcare educational research (Watling and Lingard, 2012) and patient related research (Pope et al., 2002). More recently, grounded theory has been used in clinical research, including those to explain human behaviours of healthcare professionals (Kennedy et al., 2004) and patients (Papachristou et al., 2004). In the quality and safety area, grounded theory research has been used to generate insights and understanding as well as theory of phenomena observed (Sinuff et al., 2007). While grounded theory in its initial form is a strict method to generate insights and theory, it is increasingly being used more flexibly in recent times (Cummings and Borycki, 2011). Grounded theory is being considered as a set of guidelines to help with the analysis of qualitative data rather than a structured methodology especially in medical research (Urquhart and Fernandez, 2006, Urquhart et al., 2000).

This research, in dealing with improvement science, applied grounded theory principles to guide data analysis. As the data analysis process involved multiple iterations, common and recurrent themes emerged. As the data analysis progressed, new themes became less frequent. The researcher applied the principles of theoretical saturation (Eisenhardt, 1989) to guide the depth of data analysis and iteration cycles.

3.5.1 Analysis of observation data

This section provides a discussion regarding the process of data analysis of the collected observational data. The analysis process of data collected through observations began with the organisation and documentation of the researcher's view of the clinical handover process into field
notes (Spradley, 1980). Field note documentations were obtained during and after observations and this required analysis of the situation, interaction with the players and reflection of the researcher's part (Jorgensen, 1989). As such, the analysis of observation data was an integral part of the data collection process. Figure 3 presents an illustration of the analysis of the field notes obtained.

### Observation notes 25 December 2007 8:00am

- Interns (INT S and INT M) and night interns (INT A) arrived just before 8:00am ➔ early preparation.
- Intern of the day shift (INT M) print out patient list from computer ➔ requirement for handover
- Incoming interns (INT M and INT S) sit at the far end of left side of the table ➔ power and position
- Outgoing interns (INT A) sit on the opposite side of the table ➔ team
- Day registrars (REG M and REG K) arrived just before 08:00 and sits on the left side closest to the end of the table ➔ team, power and responsibility.
- Night registrar (REG A) arrived just past 08:00 with night resident (RES D) and sits on the right side ➔ team dynamics
- Consultant (CON E) arrived at 8:15 am ➔ punctuality, power relationship.
- Night registrar (REG A) started to present patients by reading through the admission notes ➔ Tools required for memory aids.
- The consultant (CON E), and the registrar (REG M) wrote down notes on their patient list, near patient names ➔ documentation of handover, duplications?? Should be standardise?
- A surgical registrar came in to use computer with an intern, loud discussion ➔ distraction.
- Intern M wrote down tasks to be performed ➔ role and task focus
- CON E asked Intern S a clinical question ➔ value, function.
- REG M asked INT A any problems overnight that needs to be discussed ➔ situational awareness, responsibility.
- Formal handover finished, CON E and REG M went outside, but INT A talked to INT S and handed over a pile of handover notes ➔ side handover, why? Not important?
- Handover finished at 08:45 am ➔ completion

Figure 3: Demonstration of data analysis for observations.

#### 3.5.2 Analysis of semi-structured interview transcripts

The analysis of semi-structured interviews was conducted applying the grounded theory principles (Glaser and Strauss, 1967). Interview transcripts, together with field notes obtained during the interview process were analysed together to provide an in-depth understanding of the data, interviewees and their responses and the context of their responses.

Applying the grounded theory principles, the researcher went through multiple cycles of reading and re-reading, coding and re-coding of the collected data in order to explore the themes and connections between themes that emerged within the data, in order to generate a theory from the data (Neuman, 2000). Different techniques were used, including open, axial and selective coding process, constant comparison process and memoing.

#### 3.5.2.1 Coding

Qualitative research produces a vast volume of data in the form of texts, from observation field notes, interviews and clinical handover notes analysis in this research. The analysis process therefore reduces the data and groups the data into categories in order to derive meaning from these data. Coding is the process of assigning a symbol to a word, a segment of words, a phrase, a sentence or a paragraph to provide meaning to the data (Corbin and Strauss, 1990). These codes
therefore provide the link required for the data from research to the formation of theory and concepts. (Seidel and Kelle, 1995). In grounded theory, the coding process provides a systematic evaluation of the data collected in order to provide an explicit explanation of the process of conceptualisation and theory formation. The research project adopts the open, axial and selective coding process (Corbin and Strauss, 1990).

**Open Coding**

Open coding was the first pass analysis of the data for both parts of the research project. All field notes, handover notes and interview transcripts went through the open coding process. An open code formed a unit of analysis for the subsequent data analysis process. Each open code might be generated from a word, a phrase, a sentence, a paragraph or an idea which emerged from the paragraph (Creswell & Plano Clark, 2007). All collected data however, were analysed word by word and sentence by sentence through the open coding process to produce a basic unit of data for further analysis.

These open codes were documented in a spreadsheet. In order to allow the researcher to re-examine the data, each open code was assigned two characteristics to the code: the data source (interviews, field notes or handover notes with an identifier) and the line number of the text that the open code was derived from. This allowed the researcher to conduct further analysis of the data and to re-assign open codes as appropriate in subsequent data analysis cycle.

All collected data, including field notes, interview transcripts, notes documented during interviews and clinical handover notes were analysed multiple times. The analysis process was guided by predefined research questions of clinical handover processes and clinical handover improvement. There were the research questions and objectives for publications included in this thesis as well as the research questions and objectives of this thesis.
An illustration of some of the open codes generated from a semi-structured interview is provided in Figure 4.

<table>
<thead>
<tr>
<th>uncertainty</th>
<th>prediction</th>
<th>information as a tool</th>
<th>responsibility of care</th>
</tr>
</thead>
<tbody>
<tr>
<td>54</td>
<td>I guess the answer will be all the information required to care for that patient in a proper way.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>exchange</td>
<td>information transfer</td>
<td>role</td>
<td></td>
</tr>
<tr>
<td>55</td>
<td>there are two people involved in the handover, one person has to give a handover, but is is also your role</td>
<td></td>
<td></td>
</tr>
<tr>
<td>duties</td>
<td>essential role</td>
<td>acceptance of care</td>
<td>Face-to-face</td>
</tr>
<tr>
<td>56</td>
<td>if are you receiving it to make sure that you get the information that you need. It is an interactive process</td>
<td></td>
<td></td>
</tr>
<tr>
<td>uncertainty</td>
<td>receiver focus</td>
<td>hesitation?unknown</td>
<td>receiver focus</td>
</tr>
<tr>
<td>57</td>
<td>But, I guess what you need from the handover is umm........... (long pause)...if you are getting the jobs,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identity of patient (only ID)</td>
<td>Situation</td>
<td>Cognitive/diagnosis</td>
<td></td>
</tr>
<tr>
<td>58</td>
<td>the name of the patient,... What they present with ....... and we thinking is going on and ,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Follow up action recommendation</td>
<td>situational specific</td>
<td></td>
<td></td>
</tr>
<tr>
<td>59</td>
<td>and what we are planning on doing for the person. That's for an admission.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Situational specific</td>
<td>background history</td>
<td>current problem</td>
<td></td>
</tr>
<tr>
<td>60</td>
<td>For review, why the patient is in the hospital, what the problems are and</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Situation</td>
<td>time specific?? Handover characteristics</td>
<td>important</td>
<td></td>
</tr>
<tr>
<td>61</td>
<td>What they presented with now. And.... In the morning, when you receive handover, you really need to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Identify background current situation</td>
<td>relevance</td>
<td></td>
<td></td>
</tr>
<tr>
<td>62</td>
<td>the patient, their past medical history, why they presented, their current history, any</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Relevance</td>
<td>objective findings</td>
<td>diagnosis/issues</td>
<td></td>
</tr>
<tr>
<td>63</td>
<td>examination findings, any laboratory findings, what do you think is going on and what you have</td>
<td></td>
<td></td>
</tr>
<tr>
<td>action</td>
<td>sounds simple</td>
<td>standardization</td>
<td>primary task (interesting word)</td>
</tr>
<tr>
<td>64</td>
<td>done for them. So, basically all that information you need to receive so that you can treat or</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Role and responsibility continuation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>65</td>
<td>take over care for that patient</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 4: Demonstration of open coding process from interview transcripts.

Due to the large volume of primary data, the open coding process generated a large number of open codes. These open codes were then re-categorised and reduced in different ways. Firstly, these open codes were listed alphabetically in order to detect same or similar open codes. When needed, the primary data was referred to in order to confirm the meaning of the open code. Secondly, due to the lengthy open coding analysis process, the same phenomenon might be assigned different codes in the open coding process. The codes were re-categorised by condensing similar codes together and re-analysing primary data as necessary. Finally the research questions and objectives guided the categorisation of the code, around the broad topic of clinical handover and clinical handover improvement. Each code was assigned properties and dimensions and through this process, the consistency and reduction in redundancy of the code improved over multiple analysis cycles. The data went through different data analysis cycles and new codes were
formed. These codes were then compared and condensed with initial codes. As the consistency of the open coding process improved, no new codes emerged through further analysis of the primary data. The researcher therefore proceeded to the second phase of the data analysis process which is axial coding.

**Axial Coding**

The second stage of data analysis was axial coding, which involved “intense analysis done around one category at a time, in terms of paradigm items” (Strauss and Corbin, 1990). Axial coding process took each category and identified the condition of each category, the context that the category was related to, the action, interactions and consequences (Strauss and Corbin, 1997, Corbin and Strauss, 1990, Strauss and Corbin, 1990, Glaser and Strauss, 1967). The axial coding process provided a representation of the “phenomenon” and expanded our understanding and knowledge of each category (Walker and Myrick, 2006, Strauss and Corbin, 1997). In this coding process, the codes were examined for patterns, similarities and differences. This process was similar to Glaser’s theoretical coding (Glaser and Strauss, 1967). The axial coding process was the process of relating categories to subcategories in order to generate conceptual themes to answer the research questions, around the topics of clinical handover and clinical handover improvement. An example of the axial coding process was demonstrated in Figure 5.

<table>
<thead>
<tr>
<th>Examples of open codes</th>
<th>Initial axial code</th>
<th>Axial code</th>
</tr>
</thead>
<tbody>
<tr>
<td>lead, modeling, suggestions, guidance, instruction provision, supervision, command,</td>
<td>Leadership</td>
<td>Role and responsibility</td>
</tr>
<tr>
<td>influence, empowerment.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>task completion, checking, patient care focused, assurance of task, research on</td>
<td>Responsibility</td>
<td></td>
</tr>
<tr>
<td>options, discussion of tasks, double checking,</td>
<td></td>
<td></td>
</tr>
<tr>
<td>task management, cognitive processing, power, relationship, fill-in, task distribution,</td>
<td>Position</td>
<td></td>
</tr>
<tr>
<td>acceptance of command, &quot;just do it&quot;, seek clarification.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Selective Coding**

At the end of the axial coding process, the PhD candidate had to decide on a theoretical concept that could summarise the data into a “coherent, readable story and best of all, something interesting.” (Davis, 1974). In adopting a pragmatist epistemology, the PhD candidate aimed to create something that was not only interesting but also could potentially provide a solution to a real-life problem. This was the final stage of data analysis, the selective coding process.

The selective coding process involved three steps. The first step involved the selection and provision of an analytical description of the core category. The analysis process involved refining these core categories. The second step involved comparing and contrasting the core categories in order to identify the relationship between these core categories. The final step involved the...
validation of these core categories and relationship with the theoretical story for the research questions and research objectives (Strauss and Corbin, 1997). This process is demonstrated in Figure 6.

<table>
<thead>
<tr>
<th>Axial codes</th>
<th>Core categories</th>
</tr>
</thead>
<tbody>
<tr>
<td>Role and responsibility</td>
<td>Clinical handover understanding</td>
</tr>
<tr>
<td>Accountability</td>
<td></td>
</tr>
<tr>
<td>Information transfer</td>
<td></td>
</tr>
<tr>
<td>Function</td>
<td></td>
</tr>
<tr>
<td>Socio-cultural context</td>
<td>Organisational requirements</td>
</tr>
<tr>
<td>Documentation</td>
<td></td>
</tr>
<tr>
<td>Value re-alignment</td>
<td></td>
</tr>
<tr>
<td>Synchronicity</td>
<td></td>
</tr>
<tr>
<td>Identity</td>
<td>Information requirements</td>
</tr>
<tr>
<td>Situational awareness</td>
<td></td>
</tr>
<tr>
<td>Objective observations</td>
<td></td>
</tr>
<tr>
<td>Background</td>
<td></td>
</tr>
<tr>
<td>Action</td>
<td></td>
</tr>
<tr>
<td>Recommendation</td>
<td></td>
</tr>
<tr>
<td>Education and training</td>
<td>Interventional requirements</td>
</tr>
<tr>
<td>Policies</td>
<td></td>
</tr>
<tr>
<td>Procedures</td>
<td></td>
</tr>
<tr>
<td>Insights enlightenment</td>
<td></td>
</tr>
<tr>
<td>Tools and artefacts</td>
<td></td>
</tr>
<tr>
<td>Feedback</td>
<td>Continuous improvements</td>
</tr>
<tr>
<td>Critical mass</td>
<td></td>
</tr>
<tr>
<td>Priority</td>
<td></td>
</tr>
<tr>
<td>Engagement and encouragement</td>
<td></td>
</tr>
</tbody>
</table>

Figure 6: Demonstration of selective coding process.

3.5.2.2 Constant comparison

Constant comparison was a data analysis technique used throughout the data analysis process, in combination with open, axial and selective coding process. Constant comparison was described in grounded theory analysis by Glaser and Strauss (1967). The constant comparison technique was a useful technique to develop theory and concept during coding process (Taylor and Bogdan, 1998, Taylor and Bogdan, 1984). Constant comparison was described and proposed as a useful technique in grounded theory by Glaser and Strauss (1967): “while coding an incident for a category, compare it with the previous incidents in the same and different groups coded in the same category”. There were two steps used in constant comparison: “comparing incidents applicable to each category, integrating categories and their properties, delimiting the theory and writing the theory” (Glaser and Strauss, 1967). Throughout these two steps, the PhD candidate continuously analysed data, coding, conceptualisation and theory generation. The constant comparison process allowed theory to emerge from the data analysed.

Constant comparison was considered as the main intellectual activity underlying analysis of qualitative data in grounded theory analysis (Tesch, 1990). Some researchers suggested that each piece of data must be compared with every other piece of data (Morse and Field, 1998). This
process is impractical for this research project as the volume of data was substantial. A more creative way of constant comparison has been proposed, which both “close-in” comparison and “far-out” comparison were used (Strauss and Corbin, 1997).

In this research, a practical way of doing constant comparison was used through the data analysis process. Constant comparison was carried out throughout the three steps of coding process. Categories and codes were compared and combined with differences noted. Furthermore, A five step process was used, inspired by the process described by Boeije (2002). These steps included:

1. Comparison within one interview
2. Comparison with other interviews in the same group
3. Comparison with interviews from other groups within the same disciplines
4. Comparison with interviews from other disciplines.
5. Comparison with observation field notes and handover notes

The constant comparison process in this research allowed the development of descriptive, analytic and explanatory categories for conceptualisation and theory development (Lincoln and Guba, 1985). These comparison processes were conducted with the topic of clinical handover improvement in mind.

3.5.2.3 Memoing
Memoing was a data analysis technique that was used throughout the data collection and analysis process. Memoing was a way of documenting and recording ideas and thoughts of the researcher during the data collection and analysis process. Memoing allowed reflections by the PhD candidate to be analysed and formed part of the theory formation and conceptualisation at the time of occurring (Groenewald, 2008). Memoing therefore contributed to the whole process of data analysis using grounded theory.

In order to derive meaningful concepts from the data, theoretical memoing was used in order to reflect thoughts and ideas during the coding process. This was described by Glaser as “Memos are the theorising write-up of ideas about codes and their relationships as they strike the analyst while coding” (Glaser, 1978). The documentation of ideas through memoing could then be used to develop theory (Elliott and Lazenbatt, 2005). The interaction between the coding process and memoing was described fully in the literature (Jones and Alony, 2011).

The PhD candidate used memoing to document reflection and ideas through the coding process. This process was used as a complementary process and occurred in parallel with constant comparison as described in the literature (Jones and Alony, 2011). Memoing formed an important part to consider the relationship between codes and to provide conceptual evidence in an attempt to answer research questions and objectives.
3.5.3 Analysis of clinical handover notes

The analysis of clinical handover notes followed the same process as the analysis of the interview transcripts. Handover notes were analysed together with field notes from observations of the handover session at which handover notes were obtained. The handover notes analysis utilised open, axial and selective coding, in order to derive axial codes to describe handover requirements. The constant comparison technique was useful, especially in reduction of the data into axial codes. Importantly, however, clinical handover notes analysis not only provided information transfer requirements for effective handover, but also provided significant insights into clinical handover improvement requirements for the clinical handover process. Memoing and reflections were the important steps taken in grounded theory analysis to generate concepts and theories from handover notes. These information and axial codes were then compared with that derived from interview data and field note analysis as described below.

3.5.4 Integration and triangulation of data

The use of qualitative research in healthcare has been met with some criticisms regarding the rigour of research. Various strategies have been proposed to improve rigour of qualitative research, including prolonged engagement, triangulation, member checking, audit trial, reflexivity, thick description and peer debriefing (Houghton et al., 2013). Triangulation has been suggested as the tried and tested means of offering completeness and rigour for qualitative research (Tobin and Begley, 2004). When multiple types of triangulation of data analysis are used, it allows better analysis of holistic data, approaching the concept of crystallisation and triangulation state of mind (Jones and Bugge, 2006, Tobin and Begley, 2004).

This research used all these strategies described by Houghton et al (2013) to improve rigor. The main strategy, was the tried and tested strategy of triangulation (Tobin and Begley, 2004). This research combined data from different data collection techniques, different sources, different clinical areas, different researchers through multi-level triangulation. The research analysed the data separately and then combined and integrated all data analysis to form the final results and discussion. This allowed peer debriefing, review and reflexivity. The study was conducted in a staggered fashion, allowing prolonged engagement and triangulation of spatially and temporally separate data.

As stated in Section 3.4.5, as the research emphasised the view of clinicians in clinical handover improvement, clinicians' view through semi-structured interviews formed the core data for conceptualisation and theory formation. Other data however, formed supporting view through the triangulation process.

The interview data was compared with other interviews within the same discipline, all other interviews, data collected and analysed during observations as well as clinical handover notes analysis. This comparison process was described in Section 3.5.2.2. While the comparison and integration of analysis of data from different sources tended to complement each other and therefore provided more in-depth and thorough view, there were also conflicting results. When conflicting results were detected, the PhD candidate went through memos in order to understand the documentation of concepts and thoughts at the time of data analysis as well as reflections. The resolution of these conflicts was possible by reflecting the true occurrence.
3.6 Publications, key findings and discussion of key findings

The research data and analysis process described above from the first part of the research resulted in Publication 1 of this thesis. The literature review process resulted in Publication 2 of this thesis. The second part of the research data collection and analysis resulted in Publication 3, Publication 4, Publication 5 and Publication 6. In 2013, the PhD candidate re-analysed and reviewed the data after acquiring the experience of clinical handover improvement longitudinally and this process has resulted in Publication 7.

Key concepts emerged from analysing and reviewing these 7 publications and reflecting on these publications, taking into consideration the experience and knowledge of the PhD candidate through his involvement in clinical handover improvement projects and committees over the last few years. These key concepts are presented as key findings in Chapter 4.

The five key findings were then discussed in comparison to the current knowledge regarding handover. A further in-depth literature review and analysis was conducted in 2014 and in combination with Publication 2, formed the basis for discussion of key findings in Chapter 5. The main focus of the discussion regarding key findings included the understanding of the process of clinical handover as well as clinical handover improvement. The discussion of key findings is presented in Chapter 5.

After reviewing the literature, including current literature, all publications and reflections of the publications and research, the thesis then presents a new proposed model to consider clinical handover improvement, the safety value alignment model as presented in Chapter 5.

After these key findings are discussed in relation to the literature, the research question and objectives are addressed in Chapter 6.
3.7 Chapter reflections

This chapter provided a discussion regarding the research philosophy adopted. This chapter discussed the research ontology and epistemology that is most suitable for this particular research. This research adopted subjectivist ontology and pragmatist epistemology. This chapter then provided an overview of improvement science research and suggested that this research was at the interface between clinical improvement research, social science research and system design research.

The research included two parts. The first part of the research project was conducted from 2005 to 2007 and informed the second part of the research project, conducted from 2007 to 2009. The second part of research project was conducted in a staggered fashion, using a familiar pilot site to understand data collection process. The data collection process involved observations, interviews and clinical handover notes analysis. This chapter explained the rationale of data collection process, including the use of other researchers in the project.

The data obtained were analysed applying grounded theory principles, using a range of data analysis techniques, including open, axial and selective coding, constant comparison and memoing. The data analysis was then integrated and triangulated across different clinical sites. Multiple different strategies were used to improve the rigours of the research, including triangulation, audit trial, member checking, prolonged engagement and reflexivity. The data analysis process resulted in 18 publications in the field of clinical handover and clinical handover improvement. A total of 7 publications were selected to be included as part of this thesis as they contributed to the research questions and research objectives.

Five key concepts, presented as key findings emerged after review and analysis of these 7 publications. The overview of these 7 publications, the publications, in part or in full and the synthesis of these publications into five key findings are presented in Chapter 4.
Chapter 4  Publications and key findings

4.1 Introduction
This chapter presents the 7 publications and the synthesis of these publications as key findings. This chapter presents a summary of each publication, followed by the publication itself in accordance with the PhD submission requirement of the University of Tasmania. All publications are included in full, other than Publication 2. The summary and synthesis of literature review of Publication 2 are included. Publications 1, 2, 6 and 7 are based on different research projects and research data. Publications 3-5 are based on the same research project and the same research data. These 7 publications have been re-formatted to achieve consistency with this thesis.

This chapter then presents the five key findings which emerge from the analysis of 7 publications. These five key findings are further discussed in relation to the literature in Chapter 5.

- Section 4.2 presents a summary of each of the 7 publications and how they contribute to the key findings as described below. Each of these publications is then presented in part or in full.

- Section 4.3 presents the five key findings which emerged from the 7 publications derived from data collection process described in Chapter 3. The five key findings are:

  Key finding 1: Clinical handover is a complex process, with varied understanding and practices among different clinicians and healthcare settings. The unifying underlying purpose of clinical handover is the transfer of responsibility and accountability of patient care.

  Key finding 2: Local socio-cultural context and clinical practice need to be taken into consideration in standardising clinical handover processes.

  Key finding 3: Clinical judgement and communicative practices among clinicians affect the outcomes of standardisation of clinical handover.

  Key finding 4: An effective education and training program, developed based on a standardised procedure and tool, is essential to improve clinical handover.

  Key finding 5: Clinical handover improvement requires continual commitment from the organisation and continual engagement of clinicians working towards the common goal of safe patient care.

- Section 4.4 provides a summary reflection of the chapter.
4.2 Publications

This section provides a summary of each publication, followed by the publication itself. The format and font of these publications have been changed for consistency. The in-text references of these publications were combined at the end of the thesis to form one single bibliography as per requirement of PhD submission by the University of Tasmania. The summary of the publication discusses how each publication contributes to the key findings discussed in section 4.3. All publications are included in full other than Publication 2. The summary and synthesis from Publication 2 are included but the tables describing each of the studies included in the literature review in Publication 2 are not included in this thesis, as these tables list the study design, results and conclusions without an analysis from the PhD candidate and research team.

4.2.1 Publication 1


This publication sets the scene for further work conducted in the field of clinical handover research by the PhD candidate and colleagues. This publication describes the intersection between clinical handover, patient safety and the need to further investigate clinical handover in order to improve patient care. This publication also describes the field of clinical handover work and provides the rationale for mixed method research, subsequently used in all clinical handover research work conducted by the PhD candidate and colleagues. Publication 1 suggests that clinical handover is a complex process with varying functions and factors that impact on clinical handover even within one profession and one clinical setting. This publication emphasises the need for an effective education and training program, especially for junior medical staff in combination with systemic changes to improve clinical handover. It further emphasises the need for continual engagement of clinicians in the process of clinical handover in order to achieve the outcome of clinical handover improvement.

Publication 1 contributes to Key finding 1, 2, 4 and 5. Publication 1 shows the complexity and variability of clinical handover practice within a single clinical area (Key finding 1). Publication 1 further argues the importance of the complexity of clinical handover practice when improvement strategies are considered (Key finding 1). In subsequent research, when standardisation is concerned, this publication forms the basis for consideration of local socio-cultural context in standardisation (Key finding 2). Publication 1 strongly emphasises the need for education and training program as a key to improve clinical handover (Key finding 4). It also suggests the need to combine systemic changes with an education and training program (Key finding 4). Finally, Publication 1 emphasises continual engagement of clinicians in clinical handover improvement. In subsequent research, this has then been developed into iterative feedback cycle (Key finding 5).
Medical error management and the role of information technology – A new approach to investigating medical handover in acute care settings

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Abstract While identifying reasons why medical errors occur and constructing models of how to manage them has proved relatively straightforward, implementing and meaningfully evaluating solutions in 'real-world' settings has proven considerably more difficult. From an information systems (IS) perspective, although the promise of technology remains powerful, the continuing high incidence of medical errors suggest that eHealth approaches are struggling to acquire a clear understanding of the complex, dynamic and multi-layered nature of acute care settings and clinical practices, and to respond effectively to address the range of errors that actually occur. Using medical handover as a field-site, this research-in-progress paper presents an adaptation of James Reason's 'Swiss Cheese Model' to conceptualize the complex factors at play in medical errors in terms of human, system and informational elements. This research paper then examines how drawing on this model it is possible to generate and implement a methodological approach that both enhances holistic understanding of medical error management and illuminates criteria that can be used to meaningfully identify an appropriate role for information technology in medical error mitigation. This research-in-progress paper aims to make a significant contribution to research into medical error management in 'real-world' acute care settings. This research is part of a bigger project that aims to develop, implement and evaluate an information technology artefact as part of an holistic information systems approach to improving medical error management at medical handover.

Keywords: Medical Informatics, Medical Errors, Medical Handover, IS Methodology

1. Introduction

Medical errors cost around 4500 lives in Australian hospitals every year (Armstrong, 2004)! While various countries cite different statistics in regard to the frequency of medical errors in acute care settings, studies from Australia (Wilson et al., 1995), USA (Kohn et al., 1999) and UK (Department of Health, 2001) have all shown that medical errors remain a common occurrence resulting in significant costs. Despite considerable efforts to identify the causes and implement solutions, medical errors continue to be an ongoing problem (James, 2004, Belloma et al., 2002). Two important factors have been thought to be important in the prevention and management of
medical errors, namely, human factors and the availability of information (Reason, 2000). From the human factors point of view, fatigue amongst clinicians has been identified as most important in causing medical errors (Wilson et al., 1999). It has been shown that current work practices of medical professionals; with excessively long hours, are incompatible with safe healthcare delivery (Gaba and Howard, 2002). The effort to reduce working hours, however, has been hindered by the concerns among health care workers on discontinuity of patient care due to inadequate clinical handovers. Recent studies have shown that inadequate medical handovers are associated with discontinuity of care and medical errors (Roughton and Severs, 1996).

From the availability of information point of view, the information model used assumes that delivery of the “right information, to the right people, at the right place and time” will solve the problem (Turner et al., 2005). To support this information delivery, many approaches have advocated the introduction of information and communication technologies (ICTs) as a means to implement solutions to medical error management.

At one level, these perspectives appear to suggest that there is a simple solution to medical error management - restrict medical professionals working hours and utilise technology to assist in medical handover. Indeed, this approach has merit and there are examples of where it is being recommended in guidelines (British Medical Association, 2004, Junior Doctors Committee, 2004). Unfortunately, there are always differences between theory and practice in the field and there is increasing evidence to suggest that there is a need for a more holistic understanding of the complex, dynamic and multi-layered nature of clinical practices and acute care settings in which errors occur.

This research-in-progress paper presents an adaptation of James Reason’s ‘Swiss Cheese Model’ (Reason, 2000) to conceptualize the complex factors at play in medical errors in terms of human, system and informational elements. Drawing on the ‘King Island Brie’ Model (Yee, 2005) the paper then examines how this has been utilised to generate and implement a methodological approach that both enhances understanding of medical error management and illuminates criteria that can be used to meaningfully identify an appropriate role for information technology in medical error mitigation. This approach is based on research into medical handover processes on 5 general medical wards in a major public hospital in Tasmania, Australia.

The authors anticipate that this research-in-progress paper makes a significant contribution to research into medical error management in ‘real-world’ acute care settings. More broadly, this on-going research is part of a bigger project that aims to develop, implement and evaluate an information technology artefact as part of a holistic information systems approach to improving medical error management, especially during medical handover.

2. Models of medical errors management

Traditionally speaking, the medical field advocates personal perfectionism. This personal approach has tended to create a “blame and shame culture” in the false belief that medical errors only happen because of inadequately trained practitioners. The application of this model has, to a major extent, directed attention towards more extensive training being required of
healthcare practitioners. Unfortunately, because of systemic inadequacies and human fallibilities, medical errors continue to cost lives. More recently, Professor Reason proposed the Swiss Cheese Model of medical errors, drawing our attention to latent systemic factors in error causation (Reason, 2000). In this model, it is argued that there is a need to investigate and manage these latent factors in order to build a safer system (Reason, 2003). This model has created a paradigm shift towards systemic factors management with the famous saying from Professor Reason: “We cannot change the human condition, but we can change the condition under which humans work.”

Significantly, most parts of patient care (and, arguably most medical errors) are delivered by junior doctors and nurses who spend most of their time in hospitals. However, they have little power to reform the system that they work in. The importance of creating “medical error awareness” among healthcare workers at the “sharp end” has, therefore, recently been discussed (Reason, 2003). A recent model of combining systemic and human factors simultaneously has been proposed, known as the “King Island Brie Model” (Vee, 2005). If we are to change the systemic factors, then not only do we need to educate the human actors on the impact and the technicality of the new system, but also the boundaries and limitations of the new system. This concept enhances our conceptualisation of the role of informational factors as well as systemic and human factors.

While incidences of medical errors are attributed to the absence or over-abundance of information at different points in the process of delivering care, the problem of determining the distinction between what is too much or too little is fraught with difficulties. When applying the informational perspective to medical handovers, it could be argued that a good medical handover is simply ‘right information, right person, at the right time’. To date, there is little evidence of whether this is actually the case. However, it is clear from studies that discontinuity of care arising from inadequate medical handover increases the risk of preventable adverse events (Roughton and Severs, 1996) and patient mortality (Junior Doctors Committee, 2004). While some studies (Cheah et al., 2005, Morris and Baker, 2005) and guidelines (Australian Council for Safety and Quality in Health Care, 2005, Junior Doctors Committee, 2004) have emerged recently that investigate and/or advocate processes to improve medical handovers, the focus to date has been on ensuring the continuity of clinical information. The underlying assumption is that continuity of information equals continuity and safety of care. Information technologies designed to improve clinical information flow have often been introduced into the health care system to assist with medical handover and medical error management (Cheah et al., 2005, Morris and Baker, 2005, Turner et al., 2005). There remains, however, little or no research to establish the agreement on what is meant by ‘good’ or ‘accurate’ information and ‘effective’ medical handover. Consequently, the cornerstone of decision-making remains the autonomy of clinical judgement. From the experience of clinical practice we are aware that information is usually only one factor (often not the most significant) amongst many that influence medical error. The various factors that affect medical handovers, however, have not been established.
3. Developing a methodological approach for medical handover

The process of effective medical handover obviously warrants further investigation. This research project aims to obtain a clearer understanding of the complex dynamic medical handover process, to reveal the range of various factors that affect the effectiveness and efficacy of medical handover and to investigate a potential role for ICTs in medical handover. It is argued that a mixed methodology is required given the need to address the interplay among this complex set of interrelated factors, together with the need to provide “hard evidence” for clinicians and guidance for ICT design.

Qualitative research is increasingly being used in health research due to the complexity of the phenomena being studied which includes social and cultural norms and perceptions that impact on behaviour and medical practice (Sayer, 2000). This is particularly useful in the investigation of medical and socio-technical interactions in the field site of medical handovers. Therefore to investigate this complexity of interrelated factors a qualitative research methodology was deployed. Clinicians, however, working within the more conventional scientific paradigm request proof of a repeatable measures of favourable outcomes in relation to any intervention in order to encourage them to participate in the change. It is therefore imperative for this research design to also include “controlled trials” in order to be able to complement rich qualitative insights with the “hard evidence” that clinicians prefer. As researchers in IS, this research also has to be able to provide adequate information for the designing, building, and implementing an information system through the use of a systems development life cycle (Valacich et al., 2004) to guide information systems practice.

With these considerations the approach developed utilised a mixed methodology drawing on both qualitative and quantitative research techniques to investigate the underlying assumptions implicit within medical handover practices and to reveal the range of factors potentially impacting on the effectiveness and efficiency of medical handovers. This data contributes to being better able to determine the nature of, and appropriate for any information systems to support improvements in medical handover improvement and medical error management. The approach also aims to allow the generation of research data of significance to three different stakeholders – clinicians, IS researchers and sociologists.

3.1 Details of study design

This study is being carried out over three phases.

Phase 1 involves utilising three different techniques. Firstly, 25 non-participant observations were conducted over a time frame of between 15 minutes to 45 minutes each. Some of these observations were consecutive and some of them were random in order to minimise the Hawthorn effect. Secondly, 10 semi-structured interviews each consisting of 6 questions and lasting between 20 minutes to 45 minutes were conducted with the JMOs in the Department of General Medicine. These interviews were audio recorded and transcribed within 48 hours. Both
the non-participant observation and the interviews were analysed using open axial semantic coding, drawing on the principles of grounded theory. A questionnaire survey was then carried out eliciting the perception of the observation and interviews. This triangulation method aims to improve dependability and credibility (Denzin and Lincoln, 1994)

Phase 2 involves following three cohorts of JMOs, during the weekends and over the extended public holiday periods, when arguably, good handover is most important in ensuring patient safety and continuity of care. This phase is a repetition of what was done in Phase 1, other than the participants involved. The first cohort being the participants involved in the phase 1 study. The second cohort is a brand new group inexperienced JMOs and the third cohort will consist of experienced JMOs towards the end of 2006, after the introduction of the new system. This comparison is valid as we will be utilizing exactly the same study protocols, researchers and analysis technique as in phase 1 study. The comparison of three cohorts will provide us with “hard evidence” in regards to the effectiveness of the intervention.

In Phase 3, we intend to carry out a detailed information audit and perform a requirements analysis (conventional IS techniques) with the aim to develop and implement a technology that is designed for doctors. This trial involves not only them using the technology but critically understanding the limitations of the technology so that they can utilize their own clinical autonomy in decision-making. The participants will be educated in medical handover, information management and the use of the new information system. The effects of this customed-designed ICT, coupled with education will be addressed through the third cohort in phase 2 study.

3.2 Preliminary results – Phase 1

Non-participant observation results revealed that medical handovers serve multiple functions apart from information transfer. This included discussion about difficult cases, second opinion, clarification of roles and protocols, debriefing of difficult situation and seeking supervision. These functions are important for the well-beings of patients and doctors. It is imperative that any new intervention or system will allow the continuation of these various functions carried out under the broad banner of medical handovers.

Our observation study also revealed that multiple factors (cultural, environmental, organizational, information and human) affect the efficiency and effectiveness of medical handovers. Many of these factors have not been identified or clarified in previous studies [18]. More importantly, our results highlight the importance of human factors and the importance of the provision of feedback to JMOs for process improvement and change management. The analysis of the interviews confirms the observation findings of multi-factorial influences on medical handovers. The interviews suggest that JMOs think that while systemic changes are required, improvement in human performance through feedback and education is more important. The supports the idea that while JMOs often know about the procedures and limitations of the procedures, they feel disinterested and/or disempowered to be able to effect change.
Our triangulation of the observation and interview data revealed multiple factors that were not obvious or easily explicable to all participants. These “other” factors are often associated with human and cultural factors, which might be seen as cultural norms within medical practice. These have a significant impact on the effectiveness and efficacy of medical handovers. During the research it became apparent that human factors need to be taken into account when carrying out research in health informatics as participant cooperation determined the usefulness of information and analysis obtained.

Our preliminary data supports the need to include both systemic and human factors in the change process. While systemic factors are important, in order to empower and encourage JMOs to get involved in improvement in patient safety and quality of care, we need to provide them with feedback, encouragement and education. Whilst we might not be able to change human conditions, we definitely can change human practice.

We believe that our Phase 1 study has contributed significantly to the understanding of the medical handover process. The results provide a clearer understanding of the functions of handover and various factors that affect effectiveness and efficiency of medical handover. The phase 1 study serves as an important platform for Phases 2 and 3 of the study clarify the role of ICT in medical handover and medical error management. Our project will provide designing principles for ICT in health care, which will not only be integrated into the clinical practice, but also the information system within the clinical practice framework. Our research methodology will provide adequate detailed information for clinicians, IS professionals and qualitative researchers, whilst maintaining a holistic view of the problem.

Conclusions

In this research-in-progress paper, we presented our views on the role of ICT in medical error management emphasising on the importance of both systemic and human factors. We then presented our mixed research methodology which will cater to the medical, IS and sociology audiences. We presented our Phase 1 research results on medical handover using this methodology. This paper aims to make a significant contribution to research into medical error management in ‘real-world’ acute care settings. This research is part of a bigger project that aims to develop, implement and evaluate information technology artefacts as part of an holistic information systems approach to improving medical error management at medical handover.
4.2.2 Publication 2


Publication 2 in its original format is a very lengthy publication. It not only includes the summary, analysis and brief description of each publication selected from the literature, it also includes a detailed description of the study design, results and conclusions in a table format. These tables are not included in this PhD, as the tables list research designs, results and conclusions without an analysis from the PhD candidate and research team.

Publication 2 reports on an extensive literature review in the field of clinical handover and strategies to improve clinical handover till 2008. The literature review focuses on publications in the preceding 5 years, although the literature review includes all significant prior publications in the field of clinical handover conducted in healthcare settings. A total of 1004 publications and resources were identified. A total of 218 publications and resources fulfilled the inclusion criteria and all these were analysed and examined by the PhD candidate and colleagues. A total of 110 publications were selected for detailed analysis in the literature review. Publication 2 firstly identifies high risk areas of clinical handover practice reported in the literature. Shift to shift handovers have been identified as one of the high risk areas attracting attention in the literature. Publication 2 then summarises all the interventional studies in clinical handover improvement. Interventions described in the literature include the standardisation of information transfer, the standardisation of clinical handover practice through operating protocols, electronic tools, education and training programs and finally, a variety of methods to engage clinicians, such as a new role in leading clinical handover, reflective methods and change management methods in clinical handover. Publication 2 then discusses research gaps in clinical handover at the time.

Publication 2 forms the background to the major research project undertaken from 2007 to 2009. More importantly, Publication 2 forms the conceptual ideas contained in this thesis, after analysing the available literature. Contents of Publication 2 form part of Chapter 2 of this thesis and those publications are used to discuss key findings in Chapter 5. Most importantly, Publication 2 identifies that the most important research gap in clinical handover research is the need to consider a conceptual model in clinical handover improvement, from the perspectives of clinicians and the perspective of healthcare organisations. Subsequent research has helped the development of this model, as described in Chapter 5 of this thesis.
A Structured Evidence-based Literature Review regarding the Effectiveness of Improvement Interventions in Clinical Handover

Prepared by

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April 2008
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Executive Summary

This document provides a structured evidence based literature review regarding the effectiveness of improvement interventions in clinical handover covering Australian and International published works. The review is presented in a manner that includes summaries of papers, reviews the strength of evidence and synthesizes major themes and issues. This review is specifically focused on clinical handovers within the healthcare sector, especially concentrating on literature published in the last five years and covering both quantitative and qualitative research. While the primary source of materials on clinical handover interventions is from within the Medline collection, the review also includes materials in journals outside that collection as well as other published material on the topic, including non-peer-reviewed papers, opinions and published reports.

This review is focused on identifying and analysing available clinical handover literature in relation to five key questions:

1. What are the clinical handover situations that carry the most risk for patients?
2. What are the handover interventions that are most effective?
3. What are the critical success factors and limitations of successful handover interventions?
4. For which handover interventions, is there evidence of sustainability and transferability?
5. What are the gaps in the evidence base on handover?

The approach to the identification and analysis of literature relevant to addressing these questions was guided by the Australian Medical Association (2006a) clinical handover definition:

"the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis" (Australian Medical Association: Safe Handover Safe Patients’ Guidelines).

In conducting the review it was acknowledged that this definition is not universally recognised and that there remains a lack of common understanding of the term “clinical handover”. Some research included routine communication interactions between healthcare professionals as part of clinical handover, while other research restricted the term to particular clinical settings. The clinical handover process is also sometimes described by a range of other terms, for example, hand-offs, shift reports, patient transfers.

Following an introduction and description of the methodological approach utilised, this report structures analysis and discussion of literature on clinical handover and the effectiveness and transferability of improvement interventions into three main sections: High Risk Scenarios in Clinical Handover; Interventions, Critical Success Factors and Effectiveness; and, Evidence Gaps in Clinical Handover. In each section, key issues are identified and relevant peer-reviewed literature reviewed and discussed. Each section also contains a summary table including all materials identified as relevant for that section including non-peer reviewed materials, published reports and opinions. To assist in assessing the nature and type of literature reviewed including the strength of evidence and level of transferability, table entries are sorted into one of 5 categories covering the range of literature identified from multi- or single-site evidence-based interventions.
through pre-intervention studies to published opinions and reports. This literature review concludes with a comprehensive bibliography of all relevant materials identified during the conduct of this literature review.

This literature review highlights that despite the proliferation of published literature on clinical handover in the last 3-5 years, the numbers of high quality evidence based interventions that display a high level of potential for transferability remains relatively low. More positively, there are now a large number of studies that have investigated various aspects of clinical handover and improved understanding of its complex and dynamic nature. These studies clearly confirm clinical handover is a high risk scenario for patient safety with dangers of discontinuity of care, adverse events and legal claims of malpractice. Many of the studies focus on clinical handover scenarios involving high acuity patients and/or high acuity environments but only a few studies address guidelines, protocols or education/training as a response to the challenges identified. Overall this review highlights a growing awareness of the importance of clinical handover initiatives for improving safety and quality. The insights generated from conducting this review suggest that an emerging trend in the near future will be towards increased intervention focused studies based on more structured approaches. It is anticipated that this literature review will make a contribution to this direction and assist in the development of efforts to improve clinical handover into the future. The key themes identified in the 3 major sections of this report are summarised below:

**High Risk Scenarios in Clinical Handover:**

The major themes identified in the literature relating to high risk scenarios in clinical handover can be summarised as follows:

- **Handover Risks:** risks identified in the literature linked to seniority/experience of medical staff; nature/type of communication behaviours; quality/content of information recorded and/or exchanged; discontinuity in patient care; lack of standardised protocols; and, health professional fatigue.
- **Inter-profession Handover:** risks identified in the literature linked to handover between theatre/post-anaesthesia care; ambulance/emergency department.
- **Inter-departmental Handover:** risks identified in the literature linked to handover between emergency department/Intensive care; emergency department/in-patient team; and also where inter-departmental boundaries/responsibilities are unclear.
- **Shift to Shift Handover:** risks identified in the literature linked to lack of structure/policy/procedures; role of medical discretion particularly during weekend handover; poor quality of information in emergency department handover; uncertainty over responsibility in an intensive care unit; the importance of the maintenance of core values/relationships in nursing handover; the lack of guidelines for handover of anaesthetised patients; impact of fragmentation of handover amongst mental health nurses; information overload and the dangers of overly long handovers;
- **Hospital to community Handover:** risks identified in the literature linked to poor hospital to community discharge processes due to shift to shift handover; poor communication and differences in information quantity/quality depending on a patient’s community destination; increased incidence of medical errors and re-hospitalisations.
Providing verbal Handover only: risks identified in the literature linked to engaging in verbal handover only highlight the vagaries of human memory and the loss of information across each/every handover.

The use of abbreviation in Handover: risks identified in the literature linked to usage by paediatric clinicians of non-standard abbreviations not understood by other health professionals.

Patients characteristics affect handover: risks identified in the literature linked to varying responses by emergency staff to handover information from paramedics depending on patient condition; complex patient problems receiving poorer quality handover than more defined patient conditions; failures in communicating patients mental health status during transfer between hospital and residential aged care.

Characteristics of Handover: risks identified in the literature linked to lack of clarity over the effectiveness of verbal, tape recorded or face-to-face handover and how this effectiveness is impacted by different contexts; critical incident analysis highlights communication failures in hospital sign-out amongst interns. Handover is complex and cognitively taxing, in emergency departments interruptions are also a risk for patient safety.

Interventions, Critical Success Factors and Effectiveness:

The major themes identified in the literature relating to interventions, critical success factors and effectiveness can be summarised as follows:

- Minimum data sets and information management: literature points to improvements in information exchange at handover with examples amongst junior medical officers by using word processors; at weekends through use of a handover sheet; for nurses by standardising information through a minimum data set. Literature also highlights minimum data sets were implemented with electronic tools; at weekends to improve documentation and for enhancing the quality of information transfer. Minimum data sets, discharge checklists, standardised handover cards were also generated and implemented with positive impacts. Communication techniques including minimum data sets such as SBAR and JUMP were also developed. Interestingly a standardised information exchange approach between ambulance staff and emergency department staff did not improve the accuracy of information transferred.

- Creation of a new role to assist handover: literature points to improvements in learning outcomes around handover from the creation/training of a peri-operative specialist practitioner.

- Standard operating protocols (SOPs): literature points to a range of positive benefits from developing and implementing SOPs including in paediatric surgery to intensive care with improvements in relation to technical errors, information omission and team-work; in accountability transfer and patient care amongst Canadian hospital nurses. Literature also points to comprehensive approaches to the development and evaluation of SOPs.

- Education and Training: literature points to the positive benefits of appropriate handover education and training. Key elements of how to ensure effective handover are identified and the benefits of improved staff confidence in undertaking handover based on a 1 hour curriculum highlighted. The role and utility of feedback and reflective learning for junior medical officers to support quality improvement are identified.

- Electronic Tools: literature highlights electronic handover tools including hand-holds having been developed, implemented and evaluated to improve handover. Positive impacts reported were high usage and perceptions of utility amongst junior staff in
medicine and surgery; improved information transfer at handover amongst nurses; for shift-to-shift handover by residents; improved continuity of care, reductions in adverse events and reduced time taken for ward rounds. Potential problems of electronic tools are also identified; as well as the utility of user-centred design approaches for optimising patient safety features.

- **Reflective Methods**: literature points to the utility of a range of reflective methods for stimulating change in handover practice; improving user perceptions of handover; improving handover outcomes. The range of methods include personal reflection, appreciative inquiry; reflective dialogue;

- **Change Management**: literature points to the positive contribution change management can make to challenges faced in transforming handover where: working hour changes increase the numbers of handovers in a surgical residency; nursing bedside handover is implemented in gynaecology ward; nurses in acute medical ward transformed patient interactions. The change process around the introduction of an electronic handover tool is also examined.

- **Handover types**: literature highlights the benefits of addressing the different types of handover where: nurses move towards clear documentation and non-verbal handover in an elderly care ward; tape recorded interviews improve efficiency of handover communication amongst nurses in a hospice during shift-to-shift handover; SBAR and voice recording improve communication; action research supports the change to nursing bed-side handover; and, bed-side handover leads to better informed nursing staff and positive feedback from patients.

**Evidence Gaps in Clinical Handover:**

The major themes identified in the literature relating to evidence gaps in clinical handover can be summarised as follows:

- **Patients perception and involvement in clinical handover**: literature highlights that the role of patients during handover remains complex and under-researched; Patients perceptions in relation to care management and its impact on trust and care satisfaction is identified as an area requiring further investigation.

- **Morning report format**: literature highlights that morning report is not common in Australia and has been under-researched. Literature indicates positive potential for reducing length of stay and increased availability from engaging in morning report based on a single pilot study.

- **Private Hospital settings**: literature on private hospital handover is very limited with only one study identified. This study focused on nursing handover reporting improved overall efficiency and effectiveness from implementing change based on action research principles.

- **Professional anxiety and Handover**: literature on professional anxiety during handover is limited with only one study identified. This study explored the issue in relation to nursing change of shift handover and points to the need for further research.

- **Frameworks and Handover**: literature on holistic frameworks to assist in improving handover is explicitly identified as being required. A few studies in this direction have developed approaches that have been implemented with handovers in general medicine; safety transitions in emergency care; and, socio-technical approaches to developing tools.

- **Work process mapping and design methods**: literature examining the use of work process mapping to understand handover and to assist with technology design for tools.
to improve handover remains under-researched. Experimental methods for identifying information and its recall by health professionals are also limited.

- **Education and training of students:** literature frequently mentions the role of education and training in handover but detailed studies on their structure, implementation or evaluation remain limited.

- **Inter-Hospital and Patient Transfer:** literature examining inter-hospital transfer is common but investigations of the handover aspects of the transfer are limited. Similarly although literature on patient transfer and retrieval are common, studies examining handover aspects are limited.

- **Electronic Documentation and medical records:** literature explicitly investigating electronic handover documentation and/or links with integration into broader electronic health records systems remains limited.

- **Legal dimensions:** literature exploring the variety of legal dimensions pertaining to clinical handover continues to remain limited in the health literature.
1. Introduction

The Australian Commission on Quality and Safety in Health Care (the Commission) has identified clinical handover as one of its top priorities (Priority Area 5) for work in 2007-2008. This priority is in the context of Australia taking a lead role in producing a standard operating protocol for clinical handover as part of its participation in the World Health Organisation's 'High Fives' initiative. The Commission has identified seven projects to form Phase 1 of the National Clinical Handover Initiative. The Commission has also released a tender to involve the private hospital sector and to develop strategies to include electronic clinical handover tools as part of the standardised solution to clinical handovers.

In 2005, the former Australian Council on Safety and Quality in Health Care contracted the Australian Resource Centre for Healthcare Innovations to undertake a comprehensive literature review on clinical handover. This 2005 review was based on 27 papers only due to its strict inclusion criteria, with 8 of the papers focused on non-health industries. Subsequently, there has been a proliferation of improvement work and research into clinical handovers in the healthcare sector. In this context, the Commission contracted the eHealth Services Research group (eHSRG), University of Tasmania to undertake a new literature review. This literature review may inform the development of Phase 2 of the National Clinical Handover Initiative and will provide a general resource for those working on improving or researching clinical handover.

The eHealth Services Research Group (eHSRG), University of Tasmania, has been working together with Royal Hobart Hospital (RHH) for the last few years on a number of projects to improve clinical handover, particularly shift-to-shift clinical handover. These clinical improvement initiatives require a continual identification, review and appraisal of the published peer-reviewed literature and other published materials on research and quality improvement initiatives nationally and internationally. The eHSRG has also established a strong collaborative network with various organisations and institutions that have expertise in research and implementation of clinical handover initiatives both nationally and internationally. Significantly, the existing RHH clinical handover initiative deploys a holistic socio-technical approach to understanding and improving clinical handover. The eHSRG clinical handover team has contributed to the peer-reviewed literature in the field of clinical handover and has highlighted the complexity of the clinical handover process and the need to consider the interaction between people, technology and environment when developing interventions to improve clinical handover.

This document provides a structured evidence based literature review regarding the effectiveness of improvement interventions in clinical handover covering Australian and International published works. The review is presented in a manner that includes summaries of papers, reviews the strength of evidence and synthesizes major themes and issues. This review is specifically focused on clinical handovers within the healthcare sector, especially concentrating on literature published in the last five years and covering both quantitative and qualitative research. While the primary source of materials on clinical handover interventions is from within the Medline collection, the review also includes materials in journals outside that collection as well as other published material on the topic, including non-peer-reviewed papers, opinions and published reports.
This review is focused on identifying and analysing available clinical handover literature in relation to five key questions:

1. What are the clinical handover situations that carry the most risk for patients?
2. What are the handover interventions that are most effective?
3. What are the critical success factors and limitations of successful handover interventions?
4. For which handover interventions, is there evidence of sustainability and transferability?
5. What are the gaps in the evidence base on handover?

Following this introduction, a description of the methodological approach utilised including inclusion/exclusion criteria and the search strategy is provided. The remainder of the report then provides a structured analysis and discussion of literature on clinical handover and the effectiveness/transferability of improvement interventions in three main sections:

1. High Risk Scenarios in Clinical Handover;
2. Interventions, Critical Success Factors and Effectiveness;

In each of these three sections, key issues are identified and relevant peer-reviewed literature reviewed and discussed. Each section ends with a summary table including all materials identified and selected as most relevant for that section including non-peer reviewed materials, published reports and opinions. To assist in assessing the nature and type of literature reviewed including the strength of evidence and level of transferability, table entries are sorted into one of 5 categories covering the range of literature identified from multi- or single- site evidence-based interventions through pre-intervention studies to published opinions and reports. This categorisation is described in more detail in the methodology section of this report.

1.1. Background

In approaching the identification and analysis of literature relevant to addressing the questions listed above, the Australian Medical Association (2006a) clinical handover definition was a useful guide:

"the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis" (Australian Medical Association: Safe Handover Safe Patients' Guidelines).

However, in conducting the review it was acknowledged from the outset that this definition is not universally recognised and that as a result one major challenge faced in examining the intervention literature remains the lack of common understanding of the term "clinical handover". Some research includes routine communication interactions between healthcare professionals as part of clinical handover, while other research restricts the term to particular clinical settings. The clinical handover process is also sometimes described by a range of other terms, for example, hand-offs, shift reports, patient transfers. This review also confirms that good
handovers do not happen by chance and that they require the support of significant structural and organisational efforts (Australian Medical Association, 2006a). The literature also highlights the importance of leadership, time commitment, human resource commitment and appropriate structures and processes being in place for effective clinical handover to occur (Australian Medical Association, 2006a). Above all this literature review highlights that clinical handovers involve a complex set of dynamic processes (Turner et al., 2006, Yee et al., 2006) (Yonge, 2008) that need to be taken into account in any interventions aimed at improving clinical handover (Wong et al., 2007).

2. Methodology

This section provides information on the approach used in conducting this literature review. It details the approach to scoping the focus of the study including inclusion/exclusion criteria; search terms; the search strategies deployed to identify peer-reviewed publications, non-peer reviewed publications, reports and other materials; the analytical approach and categorisation developed to assist understanding of the nature and type of literature reviewed and the strength of evidence and transferability of results, approaches and insights. The approach utilised in conducting this review draws on the principles of the UK's Quest for Quality and Improved Performance research initiative [www.health.org.uk/QQUIP].

2.1 Scopes

In developing the methodological approach for undertaking this review the following inclusion and exclusion criteria were applied:

- Based on the Australian Medical Association (Australian Medical Association, 2006a) definition of handover detailed above, the focus of this review was on identifying research literature, reports and other materials concerned with processes involving the transfer of information, responsibility and accountability of a patient's care from one team to another team. More specifically, this review has identified the following key handover scenarios in the literature:
  - Ambulance to Emergency department handover;
  - Inter-departmental transfer (such as Emergency Department to Intensive Care Unit) handover;
  - Shift-to-shift Medical and Nursing handover;
  - Inter-profession handover;
  - Inter-hospital handover;
  - Hospital to Community handover;
- Literature identified as describing clinical communication only, without the transfer of care of patients from one team of healthcare professionals to the other, were generally excluded from this review. In this regard, clinical communication scenarios that were identified but not covered in this review are:
  - General Practice to outpatient clinic referrals,
  - Medication re-conciliation processes,
  - Specific high risk medication communication (e.g. Warfarin) and electronic clinical communication tools including electronic health records, electronic patient records, electronic notification of pathology.
or radiology results, hospital paging systems, Medical Emergency Team interventions,

- Communication tools and approaches in case management and chronic disease management.

- Literature published in the form of abstracts, short reports or reviews are included in the comprehensive bibliography but were not formally analysed in the body of the report, except where they offered a new or unique contribution.

- Literature published in languages other than English are not included in this review.

- This review is focused primarily, but not exclusively, on clinical handover literature and other materials published within the last 5 years.

This literature review was conducted in a period of just over 4 weeks throughout April 2008.

2.2 Search strategy

The search strategy used in undertaking this review aimed to ensure the identification of both:

- Peer-reviewed publications providing quantitative and/or qualitative evidence on the effectiveness of clinical handover improvement interventions and their transferability; and,

- Other peer-reviewed and non-peer reviewed publications, opinions and reports on clinical handover, particularly where these identified high risk handover scenarios, interventions, and critical success factors; and, evidence gaps.

The keywords used in conducting the searches were as follows:

- Handover; Hand-over; Handovers;
- Clinical handover;
- Medical handover;
- Hand-off; “Hand off”; “Hand offs”, handoff, handoffs
- Shift-to-shift communication;
- Inter-shift;
- Shift-to-shift transfer
- Inter-professional transfer;
- Inter-departmental transfer;
- Inter-hospital transfer;
- Hospital to Community transfer;
- Patient transfer;
- Sign off;
- Sign out.

The formal search strategy targeted a number of potential sources of materials on clinical handover including full text databases; citation databases; web-based search engines and direct analysis of output from known centres of excellence, government agencies and individuals.

- The key databases searched to identify and collect original peer-reviewed publications and reviews on clinical handover were: MEDLINE (PUBMED), OVID, PROQUEST, Cochrane Library, EMBASE and TRIP. Additional publications were identified and
collected following citation searching on the multiple databases available through ISI Web of knowledge;

- The key web-based search engine utilised was Google (Scholar). This was backed-up by complementary searches on the following search engines: Altavista, Yahoo!Search and InfoSeek;
- Based on eHSRG knowledge of existing centres of excellence, international, national and state-based government agencies and individuals working in the medical handover domain, searching and direct communication were engaged in to identify any recent publications, reports or opinions.

Results of this search strategy produced a list of 621 indexed resources and 382 web-based resources comprised of peer-reviewed and non-peer reviewed papers, opinions and reports. Following examination of these materials for suitability (using the exclusion criteria outlined above) a total of 217 source materials were identified for assessment, categorisation and presentation. From these materials a subset of 110 publications were selected for discussion and presentation within the body of this report. All remaining materials are recorded in the comprehensive bibliography. The selection and categorisation rationale for these core 110 publications is discussed below.

2.3. Assessment, categorisation and presentation

The process of assessment, categorisation and selection for presentation from amongst the 217 clinical handover source materials identified by the search strategy was guided by three principle aims;

1. To identify, categorise and assess key materials providing quantitative and/or qualitative evidence on the effectiveness of clinical handover improvement interventions and their transferability;
2. To identify, categorise and assess key materials on clinical handover, particularly those addressing high risk handover scenarios; interventions and critical success factors; and, evidence gaps;
3. To ensure the review was user-friendly and avoided duplication in the identification and presentation of clinical handover issues found amongst the source materials.

All 217 source materials were independently assessed and categorised separately by two members of the eHSRG. The assessment process involved reviewers analysing the clinical setting of the material, the scope/focus of the material, the research methodology (if any), the results/outcomes reported and the implications/insights of the material (particularly in relation to limitations and transferability/sustainability). These materials were categorised into one of five broad categories. These categories were constructed to enable readers to quickly and easily: differentiate between different types of intervention based studies; and, also to differentiate intervention based studies from pre-interventional studies, opinions and reports. The five broad categories are as follows:

- **Category 1:** Comprehensive intervention based study: Clear articulation of entire approach to improve clinical handover covering data collection, intervention design, implementation and evaluation and insights into lessons learned. High level of potential transferability.
• **Category 2**: Intervention based study: Approach to clinical handover improvement intervention not comprehensive or limited in depth/clarity in published study. Medium to Low level of potential transferability.

• **Category 3**: Pre-intervention study: Studies variously engaging in data collection, analysis and evaluation to investigate different aspects of clinical handover. Focused on: enhancing understanding, identifying issues/gaps/challenges or the utility of particular research approaches. Some studies provide recommendations for change management, handover improvement interventions or system reform. High to Low level of potential transferability of pre-intervention approaches.

• **Category 4**: Published Opinions or Reviews: Publications not involving any primary research often non-peer-reviewed. Can provide potentially useful insights/perspectives on different aspects of clinical handover including high risk scenarios, evidence gaps, and factors imposing limitations on sustainability/transferability of handover initiatives.

• **Category 5**: Published Reports: Reports produced by Government or non-government agencies, health associations, professional bodies and/or centres of excellence.

Following the independent assessment and categorisation of the 217 source materials, the two reviewers compared their results and agreed upon a selection of 110 materials across all categories to be presented and discussed within the three main sections of this report. This selection process was guided by a number of factors including:

- Ensuring the presentation of key intervention based studies (citation scores and potential for transferability were considered);
- Answering the five Commission identified research questions;
- Providing a representative selection of materials across all five categories;
- Avoiding duplication in the identification and presentation of clinical handover issues found amongst the source materials; and,
- Optimising the utility and usability of this document.

The remainder of this report structures the presentation, analysis and discussion of literature on clinical handover and the effectiveness and transferability of improvement interventions into three main sections:

1. **High Risk Scenarios in Clinical Handover; Interventions,**
2. **Interventions, Critical Success Factors and Effectiveness;**
3. **Evidence Gaps in Clinical Handover.**

In each section, key issues are identified and relevant peer-reviewed literature reviewed and discussed. Each section also contains a summary table that includes all materials identified as relevant for that section including non-peer reviewed materials, published opinions and reports. To assist in assessing the nature and type of literature reviewed including the strength of evidence and level of transferability, table entries are sorted into one of the 5 categories identified above.

The literature review concludes with a comprehensive bibliography of all materials identified and selected during the conduct of this literature review.
3. **High risk scenarios in clinical handover**

This section presents and discusses the major themes, issues and results identified within the literature pertaining to high risk scenarios in clinical handover. The section begins with a summary of major themes, followed by a presentation of key issues and results reported in the peer-reviewed literature relating to each of these themes. The section ends with a summary table that presents a structured review of all materials selected and categorised as relevant across all themes including non-peer reviewed materials, published opinions and reports.

The major themes identified in the literature relating to high risk scenarios in clinical handover can be summarised as follows:

- **Handover Risks**: risks identified in the literature linked to seniority/experience of medical staff; nature/type of communication behaviours; quality/content of information recorded and/or exchanged; discontinuity in patient care; lack of standardised protocols; and, health professional fatigue.
- **Inter-profession Handover**: risks identified in the literature linked to handover between theatre/post-anaesthesia care; ambulance/emergency department.
- **Inter-departmental Handover**: risks identified in the literature linked to handover between emergency department/Intensive care; emergency department/in-patient team; and also where inter-departmental boundaries/responsibilities are unclear.
- **Shift to Shift Handover**: risks identified in the literature linked to lack of structure/policy/procedures; role of medical discretion particularly during weekend handover; poor quality of information in emergency department handover; uncertainty over responsibility in an intensive care unit; the importance of the maintenance of core values/relationships in nursing handover; the lack of guidelines for handover of anaesthetised patients; impact of fragmentation of handover amongst mental health nurses; information overload and the dangers of overly long handovers;
- **Hospital to community Handover**: risks identified in the literature linked to poor hospital to community discharge processes due to shift to shift handover; poor communication and differences in information quantity/quality depending on a patient’s community destination; increased incidence of medical errors and re-hospitalisations.
- **Providing verbal Handover only**: risks identified in the literature linked to engaging in verbal handover only highlight the vagaries of human memory and the loss of information across each/every handover.
- **The use of abbreviation in Handover**: risks identified in the literature linked to usage by paediatric clinicians of non-standard abbreviations not understood by other health professionals.
- **Patients characteristics affect handover**: risks identified in the literature linked to varying responses by emergency staff to handover information from paramedics depending on patient condition; complex patient problems receiving poorer quality handover than more defined patient conditions; failures in communicating patients mental health status during transfer between hospital and residential aged care.
- **Characteristics of Handover**: risks identified in the literature linked to lack of clarity over the effectiveness of verbal, tape recorded or face-to-face handover and how this effectiveness is impacted by different contexts; critical incident analysis highlights communication failures in hospital sign-out amongst interns. Handover is complex and cognitively taxing, in emergency departments interruptions are also a risk for patient safety.
A summary of key issues and results reported in the peer-reviewed literature relating to each of these major themes is presented below. Within each theme papers are ordered by date of publication with the most recent at the beginning of each theme.

3.1 Handover risks

- Borowitz et al (2008) used a prospective confidential survey to investigate the effectiveness of the handover process between residents on a paediatric acute care ward in the US. Based on 158 (81%) surveys analysed they found that 31% of residents indicated something happened while on call they were not adequately prepared for. In most cases, residents did not receive information during handover which would have been helpful and most importantly, these instances could have been anticipated. Significantly, the only variable which was found to be affect the perception of preparedness for the night shift was the quality of handover received.

- Arora et al (2007) conducted a retrospective cohort study to describe the frequency, types, and harm potential of medication discrepancies in resident-written sign-outs as compared to daily medication lists in patient charts. 186 patients (75%) and 10 (100%) interns consented to participate. From 165 patient charts abstracted and compared: 27% of medication chart entries had discrepancies with sign-outs; 63% of index errors persisted past the first day and 54% of index discrepancies were moderate or severely harmful.

- Singh et al (2007) investigated ten years of USA malpractice claims to examine types and causes of medical errors involving trainee clinicians. From 240 cases 70% involved errors from team-work breakdowns. Lack of supervision and handoff problems were the most prevalent types of teamwork problems, and both were disproportionately more common among errors that involved trainees than those that did not (respectively, 54% vs 7% [P<.001] and 20% vs 12% [P=.0091].

- Horwitz et al (2006) used a self-administered survey of 324 US internal medicine residency programs outside of NY State to investigate patient sign-out between resident physicians. Results revealed most centres (55%) did not have a system in place for handover, for informing nurses regarding change of care (59%) and most did not provide any workshops or teaching on handover (60%).

- Sabir et al (2006) conducted a national UK survey of obstetric anaesthetic handovers to record routine practice and perceptions of handover. 168 (70%) anaesthetists responded with 4% (7 incidents) recording critical incidence occurring within the previous 12 month period as a result of poor handover.

- Jagsi et al (2005) conducted a survey of trainees at 2 US teaching hospitals about experiences with adverse events, mistakes and near misses. From 821 (57% response rate) results found that 15% of mistakes were associated with handover.

- Sexton et al (2004) conducted detailed content analysis of 23 nursing handover sessions covering all shifts audio-taped on an Australian hospital general medical ward. Results show only 5.9% of handover content involved discussions related to ongoing care or ward management issues that could not be recorded in an existing documentation source. Some handovers analysed also appeared to promote confusion and often did not clarify issues regarding patient status, treatments or management.

- Roughton and Severs (1996) conducted a survey study in the UK to investigate current junior doctor handover practices and JMOs perspectives and needs. From 60 (51% response rate) returned surveys results found only 17% felt current handover process was good and that written handover was only rarely received (6% of occasions) with (verbal handover on 94% of occasions).
• Petersen et al (1994) used data from a self-reported adverse event system to analyse 3146 patients admitted to a US medical service over a 4-month period and found that there were 54 (44% of total reported and confirmed) potentially preventable adverse events. Significantly patients with potentially avoidable adverse events were more likely to be covered by a physician from another team at the time of the event than the controls (26% compared with 12% [odds ratio, 3.5; P=0.01]).

3.2 Inter-profession handover

• Budd et al (2007) sent a postal questionnaire to 100 emergency departments and 32 ambulance service trusts in England and Wales. Results (based on 34% and 50% responses rates respectively) found only 26.7% of ambulance service responders acknowledged using a trauma scoring system. Furthermore, while 53.3% of ambulance service responders believe that they used a standardised format, only 39.4% of emergency department responders believed so. This study illustrates the need for improvements in inter-professional handover practices.

• Jenkin et al (2007) conducted a descriptive questionnaire to 4 emergency department and 1 ambulance service in the UK to investigate ambulance to emergency department handover. Results (80 (68%) survey response rate) found that emergency staff lacked active listening skills causing frustration among ambulance staff; ambulance staff must expect to repeat their handovers; and, handovers for critical ill patients should be delivered in two phases.

• Anwari (2002) conducted a survey of nurses on the quality of handover related to the admission of 276 patients from theatre to a post-anaesthesia care unit in Saudi Arabia. Results found that only 42% of patient handovers were rated as good.

• Thakore and Morrison (2001) conducted a descriptive survey using two anonymous questionnaires to medical staff in emergency departments at two Scottish teaching hospitals and one ambulance service. This survey investigated perceptions amongst staff about ambulance to resuscitation room handover. Results (based on 30 medical staff and 67 ambulance staff responses) found that medical and ambulance staff thought the handover practice was good. But 69% of medical staff felt quality of handover varied considerably between ambulance crews. Medical staff were also less positive about handover of patients with self poisoning and chest pain. Both types of staff were also less confident with regard to paediatric emergencies.

3.3 Inter-departmental handover

• Apker et al (2007) conducted in-depth interviews to identify the problems of emergency department to inpatient team handover in a US hospital. Results found that these two professions have very different expectations of handover that often lead to increase risks to patient safety.

• McFetridge et al (2007) used a multi-method design to explore nursing handover of patients from emergency departments to intensive care units in 2 acute care hospitals in Northern ireland. The results found multiple problems with the handover process including the lack of a structured and consistent approach. This was identified as leading to confusion of individual roles and expectations during the process of handover.

• Bruce and Suserud (2005) conducted a qualitative descriptive study involving interviewing of 6 emergency nurses in an emergency department of a Swedish hospital concerning ambulance to emergency department handover. Results found 3 parts to the handover,
verbal, documentation and symbolic. Handover tended to involve very structured verbal communication although depending on the patient condition boundary definition of the roles sometimes was unclear. Also where ambulance staff assumed more responsibility than was expected by the emergency department this caused delays in patient care by delaying accurate diagnosis and management. It should be noted that there was a specific role of ambulance nurse in this study.

3.4 Shift to shift handover

- Alem et al (2008) conducted a two phase study involving a pilot survey and a case study involving an intervention at an Australian metropolitan teaching hospital. The study focused on improving understanding of information sharing at handover and designing and testing information tools to support weekend handover in an emergency department and a general medical ward. Results found that discretion of registrars in handover emerges as a risk; that information tools can have an impact but that any tools need to be designed carefully so as not to weaken complex functions of handover that could lead to poorer patient outcomes.
- Yonge (2008) conducted an exploratory ethnographic study of nursing shift handover in an adolescent residential psychiatric unit in Canada. Results found that verbal, informal shift reporting allows for an environment that was important for nursing care. The study argues that certain socio-cultural aspects of nursing handover and nursing care are important and involve a 'ritual play' around core values, roles and relationships that are important in supporting good practice.
- Ye et al (2007) conducted a prospective study involving observations and surveys at 3 large Australian metropolitan emergency departments to determine problems, deficiencies and risks from shift to shift handover. Results found in 15.4% of cases, not all required information was provided. Among these cases, 56.9% lead to adverse effects for emergency department doctors and 30.3% to adverse effects on patient care. No adverse medical events were reported.
- Buus (2006) conducted an ethnographic study of mental health nurses regarding their shift to shift handovers on 2 adjacent hospital wards in Denmark. This study revealed three aspects to handover: Informal, non-interactive formal, and interactive formal. The study revealed that the written record did not provide the type of information the nurses needed to present a more formally exact case. This often led to uncertainties that nurses resolved by various strategies. The study suggests uncertainty nurses face regarding actually having accurate and reliable up-to-date knowledge about patients.
- Philpin (2006) conducted an ethnographic study of nursing handover in an intensive therapy unit in the UK. Results found that there was a period of uncertainty (liminality) about the exact handover of responsibility for patient care. The study also noted that informational tools/artefacts, such as a paper towel that nurses used to document preliminary information contained in the chart was disposed subsequently in order maintain some privacy within the profession.
- Sabir et al (2006) [Refer to section 3.1 above] found that while the majority of obstetric anaesthesia units across the UK allocated time for handover, only 10% had a specific handover policy and only 1 unit had a written checklist for handover with 94% of handover being conducted purely verbally.
- Bomba and Prakash (2005) utilised a multi-method approach to investigate medical shift-to-shift handover at an Australian metropolitan hospital. Results found that there was high safety risk resulting from a lack of structure, lack of standard or formal procedure for
documentation and communication prone to error. Most medical staff recognised the benefit of formalising and computerising the handover process.

- Horn et al (2004) conducted a postal questionnaire of UK College tutors of anaesthetics and specialist Registrars in the Yorkshire region to evaluate current practice and opinion on handover of anaesthetized patients. Results found that only 14% of departments have guidelines for the handover of anaesthetised patients. The survey also found support for handover of clinical responsibility to be a formal and standardised procedure with appropriate documentation.

- Manias and Street (2000) conducted an ethnographic study of handover amongst 6 nurses in an Australian critical care unit. Results found that nurses involved in bedside handover did not actively participate in global handover conducted by nurse managers. The study also revealed the fear and anxiety experienced by staff during the bedside handover. The study also reported that nurses experiences of being examined as part of the study affected their sensitivity to the need to convey accurate patient information during handover.

- Sherlock (1995) conducted a qualitative investigation into the nature and experience of nursing handover by junior nurses on two medical wards in the UK. The study found that handovers were often long and there was often a sense of information overload. The study also highlighted that the quality of handover was variable and lacked any supporting framework.

3.5 Hospital to community handover

- Atwal (2002) utilised a qualitative case study to investigate nurses’ perceptions of hospital discharge processes at a London teaching hospital. The study found that aspects of the discharge process were often ignored or neglected. The ward shift-to-shift handover process often hindered the discharge planning of patients. The study identified significant inter-professional communication barriers including lack of time, that inhibited/prevented contributions from nurses to the patient discharge planning.

- Anderson and Helms (1998) conducted a retrospective study analysing medical record referrals to compare patient care communication between staff in hospitals: and, nursing homes and home health agencies. Results found that greater amounts of referral data were transferred from hospital to nursing homes than to home health agencies. Some organisational factors in the hospitals and in the information recipients organisation resulted in discrepancies in patient care communication that potentially inhibit continuity of care in the community.

3.6 Providing verbal handover only

- Bhabra et al (2007) utilised a simulated handover to compare the reliability of three handover methods (verbal handover only; verbal with note-taking; and, printed handout containing all patient information). Results highlighted that verbal handover only was a very poor method for handover and without documentation was a high risk strategy. The study found that in the simulated handover the printed sheet supported 99% of information being retained, but recognised this relies on the printed sheet being updated correctly.

- Pothier et al (2005) utilised a simulated handover pilot study to compare the reliability of three handover methods for nursing handover (verbal handover only; verbal with note-taking; and, typed handout containing all patient information). Results highlighted that purely verbal handover led to a complete loss of data after three handover cycles. The note-
taking style resulted in 31% of data being transferred correctly after 5 cycles and the typed sheet demonstrated minimal loss of data.

3.7 The use of abbreviation in handover

- Sheppard et al (2008) conducted an audit of abbreviation use in paediatric handover notes and medical notes at a large UK metropolitan hospital to assess frequency, nature and understanding. Results found that only 14-20% of the abbreviations used were recognised in the standard medical dictionary. Most importantly, these abbreviations were not well recognised by other doctors or healthcare professionals.

3.8 Patients characteristics affect handover

- Yong et al (2008) utilised survey methods and observations in an exploratory study of handover from paramedics to emergency staff at an Australian Metropolitan hospital. Results found varying responses amongst emergency department staff to handover from paramedics depending on the patient condition. Only 50% of emergency department staff reported referring to ambulance sheets for patient care.

- Boockvar et al (2005) conducted a retrospective study of hospital and nursing home medical records and inter-facility transfer documents for individuals transferred between 5 long-term and 2 acute care facilities in the US. Results found that 31% of patients did not have mental status handover even though the majority of them were suffering from dementia.

- Bruce and Suserud (2005) [Refer to 3.3 above] found that in ambulance to emergency department nurse handover patients with defined illness received better handover than patients with complex problems, mental health problems or indistinct medical diagnoses complicated by deterioration.

3.9 Characteristics of handover

- Laxmisan et al (2007) conducted an ethnographic study involving analysis of emergency department handover in a US hospital. The study found that interruptions within the emergency department were prevalent and diverse in nature and that there were gaps in information flow due to multi-tasking and shift changes. The communication process is complex and cognitively taxing during and after team handover, that can compromise patient safety. The study also discusses the need to tailor generic electronic tools to support adaptive processes like multi-tasking and handoffs in time constrained environments.

- Arora et al (2005) conducted interviews using the critical incident technique to handover failures between inpatient physicians in a US hospital. The study interviewed 26 interns and found 25 discrete incidents. The 21 worst events are described. Omitted contents and failure prone communication processes were identified as a major category of failure in communication. These may result in inefficient or sub-optimal care, leading to patient harm.

- O'Connell and Penney (2001) conducted a qualitative grounded theory approach to explore the use of three types of handover techniques commonly used (verbal office handovers, tape recorded handovers and face-to-face bedside handovers) in 5 acute care settings at an Australian teaching hospitals. The study found that each type of handover had its own strengths and weaknesses. The effectiveness of each type of handover remained unclear and no one type was appraised as being more effective. The study recommends taking into account the socio-cultural context of handover and exploring more creative ways to conduct handovers to ensure it fulfils its multiple goals.
4. Interventions, critical success factors and effectiveness

This section presents and discusses the major themes, issues and results identified within the literature pertaining to interventions, critical success factors and effectiveness. The section begins with a summary of major themes, followed by a presentation of key issues and results reported in the peer-reviewed literature relating to each of these themes. The section ends with a summary table that presents a structured review of all materials selected and categorised as relevant including non-peer reviewed materials, published opinions and reports.

The major themes identified in the literature relating to interventions, critical success factors and effectiveness can be summarised as follows:

- **Minimum data sets and information management**: literature points to improvements in information exchange at handover with examples amongst junior medical officers by using word processors; at weekends through use of a handover sheet; for nurses by standardising information through a minimum data set. Literature also highlights minimum data sets were implemented with electronic tools; at weekends to improve documentation and for enhancing the quality of information transfer. Minimum data sets, discharge checklists, standardised handover cards were also generated and implemented with positive impacts, as was the SBAR technique. The JUMP technique was also developed for shift to shift medical handover. Interestingly a standardised information exchange approach between ambulance staff and emergency department staff did not improve the accuracy of information transferred.

- **Creation of a new role to assist handover**: literature points to improvements in learning outcomes around handover from the creation/training of a peri-operative specialist practitioner.

- **Standard operating protocols (SOPs)**: literature points to a range of positive benefits from developing and implementing SOPs including in paediatric surgery to intensive care with improvements in relation to technical errors, information omission and team-work; in accountability transfer and patient care amongst Canadian hospital nurses. Literature also points to comprehensive approaches to the development and evaluation of SOPs.

- **Education and Training**: literature points to the positive benefits of appropriate handover education and training. Key elements of how to ensure effective handover are identified and the benefits of improved staff confidence in undertaking handover based on a 1 hour curriculum highlighted. The role and utility of feedback and reflective learning for junior medical officers to support quality improvement are identified.

- **Electronic Tools**: literature highlights electronic handover tools including hand-helds having been developed, implemented and evaluated to improve handover. Positive impacts reported were high usage and perceptions of utility amongst junior staff in medicine and surgery; improved information transfer at handover amongst nurses; for shift-to-shift handover by residents; improved continuity of care, reductions in adverse events and reduced time taken for ward rounds. Potential problems of electronic tools...
are also identified; and, the utility of user-centred design approaches for optimising patient safety features.

- **Reflective Methods**: literature points to the utility of a range of reflective methods for stimulating change in handover practice; improving user perceptions of handover; improving handover outcomes. The range of methods include personal reflection, appreciative inquiry; reflective dialogue;

- **Change Management**: literature points to the positive contribution change management can make to challenges faced in transforming handover where: working hour changes increase the numbers of handovers in a surgical residency; nursing bedside handover is implemented in gynaecology ward; nurses in acute medical ward transformed patient interactions. The change process around the introduction of an electronic handover tool is also examined.

- **Handover types**: literature highlights the benefits of addressing the different types of handover where: nurses move towards clear documentation and non-verbal handover in an elderly care ward; tape recorded interviews improve efficiency of handover communication amongst nurses in a hospice during shift-to-shift handover; SBAR and voice recording improve communication; action research supports the change to nursing bed-side handover; and, bed-side handover leads to better informed nursing staff and positive feedback from patients.

A summary of key issues and results reported in the peer-reviewed literature relating to each of these major themes is presented below.

### 4.1 Minimum data sets and information management

- Alem et al (2008)[Refer to section 3.4 above]. conducted a two phase study involving a pilot survey and a case study involving an intervention at an Australian metropolitan teaching hospital. A weekend handover sheet/information tool was implemented, and analysis revealed that the likelihood of a patient being discussed in a handover after having being discussed at a previous handover improved after the implementation of the information tools.

- Wong et al (2008b) present details of the minimum data set for developed for clinical handover messages at an Australian hospital. The paper reports on the benefits for improving information transfer of patient care.

- Mikos (2007) reports on the use of the SBAR technique in combination with phone recordings of nursing handover at a US hospital medical centre. The paper reports improvements in patient safety and quality of care since the implementation of the system. Other benefits reported include a streamlined handoff process, reduced patient falls during shift change, increased response times to patient call lights and reduced reporting time by 70%.

- McCann et al (2007) describes a study conducted in New Zealand that found handovers among nurses were better perceived than those among junior medical officers. The paper describes the development of the ‘JUMP’ minimum data set for shift to shift medical handover.

- Talbot and Bleetman (2007) describe the development, implementation and evaluation of a standardised method for verbal communication between ambulance officers and emergency department staff in two large UK hospitals. Evaluation conducted found that information retention did not improve as a result of this intervention.
Wilson (2007) presents the design and development of a minimum data set for inclusion in a nursing handover report template and the implementation of this template in to 5 units within a US hospital. The study evaluated the use of this template and found that it was useful for junior staff, improved information transfer but met with some resistance from senior nurses who felt their handover to already be good.

Wong et al (2007) describe the development and implementation of a minimum data set within an electronic handover tool incorporating a number of patient safety features at an Australian hospital.

Fenton (2006) describes the development of a handover guide incorporating minimum data sets to assist standardisation of handover drawing on the essence of care as a guide. Evaluation conducted reports improved information transfer after the implementation of the minimum data set.

Halasyamani et al (2006) reports on the development and outcome of process to produce a comprehensive checklist of processes and elements considered necessary for optimal patient (particularly the elderly) handoff at hospital discharge. The paper does not present information on the implementation or evaluation of this discharge checklist.

Cheah et al (2005) describes the development of a minimum data set and its incorporation into an existing electronic system at an Australian hospital. The paper reports on results of a survey of doctors on the adequacy of the handover system and the use of free-text fields.

Grainge et al (2005) reports on the outcomes of using a weekend standardised minimum data set for handover among medical doctors at a UK Hospital. The results of the study found improvement in the documentation including a weekend plan and resuscitation decisions. User feedback recorded found the minimum data set form to be straightforward and user friendly.

Harrison et al (2005) designed, implemented and evaluated the use of a simple handover list using a word processor package containing information on tasks and priorities to be performed on patients at a hospital in the UK. The paper reports improved flow of information for junior clinicians.

Currie (2002) presents the use of a questionnaire method to generate six areas of priority for emergency department nursing handover at a UK hospital. Based on data analysis the paper recommends the ‘CUBAN’ five step handover guideline to improve quality. CUBAN is not evaluated in this paper.

Lee et al (1996) describe the use of a standardised handover card within a prospective randomised controlled trial amongst interns at a Mayo Clinic in the US. The paper reports significant improvement in the quality of handover amongst the active arm as compared to the control.

Patterson et al (1995) describes the use of a consensus quantitative survey method to derive minimum data set across different disciplines of nursing staff at a large US hospital. The paper does not present information on the implementation or evaluation of this minimum data set.

4.2 Creation of a new role to assist handover

Nestel et al (2005) reports on the creation of a new role to assist handover at a UK hospital. The new role, the peri-operative specialist practitioner delivers care at either side of the operative period and routinely transmits patient information to consultant surgeons and anaesthetists. The paper also reports on a training programme on handover presentation skills developed around this role using adult learning theory. The paper reports the program successively achieved the goals of learning outcomes for staff fulfilling the new role.
4.3 Standard operating protocols (SOPs)

- Catchpole et al (2007) uses formula 1 pit-stop and aviation training models to report on the development of a new clinical handover standardised operating protocol for paediatric surgery to paediatric intensive care unit handover in a UK hospital. The paper presents findings showing significant improvements in technical errors, information omissions and teamwork.
- Arora and Johnson (2006) report on an interactive workshop hand-off clinic for developing a standardised process for hand-off, creating a checklist of critical patient content, and plan for dissemination and training. Implementation of this model and evaluation of this process are clearly demonstrated and discussed.
- Benson et al (2007) present a detailed standardised operating protocol for nurses based on a literature review, quantitative survey and discussion forums. Developed in Canada the protocol includes multiple steps including principles of handover, guidelines, documentation tools, educational strategies, evaluation and project completion.
- Singer and Dean (2006) present a review of the effectiveness and efficiencies of emergency department inter-shift handovers and recommendations for parameters for pre-handover, inter-shift meeting, and post-handover activities.
- Bourne (2000) describes the development and presentation of a standardised operating protocol for nursing handover. This UK paper provides an overview of standard statements on handovers and on handover standard monitoring tools. The paper does not present any results of the implementation of the protocol presented.

4.4 Education and training

- Horwitz et al (2007) presents the development of a 1 hour curriculum program to improve verbal sign out skills of medical house staff. The paper describes the implementation of the program curriculum at 3 US hospitals. The paper also presents results of the program’s evaluation revealing significant improvement in confidence of participants.
- Yee et al (2006) describes a research-in-progress paper outlining the provision of education and training through feedback and reflective learning for junior medical officers on clinical at an Australian hospital. The paper argues that systemic changes may not be adequate and that provision of training and incentives to engage junior doctors in clinical handover improvement are essential to ensure quality improvement. The role and utility of these approaches are presented.
- Hoban (2003) presents a concise summary of a five step communication model to enhance nursing handover whether face-to-face, written or recorded.

4.5 Electronic tools

- McGee-Lennon et al (2007) describes the implementation of a handheld computer system for nursing handover within three Scottish hospitals emergency care teams. The paper also reports on evaluation of how the system was used and accepted by nurses. The paper describes positively rated features of the tool including generation of a printed handover sheet.
• Wong et al (2007) describes a methodological approach deploying user-centred design principles to develop an electronic clinical handover support tool. The paper emphasises the role that incorporating six patient safety features into the electronic handover tool had in improving junior medical officer acceptance and use of the tool at an Australian hospital.

• Chacko et al (2006) describes a electronic handover tool ‘eHand-offs’ produced by IBM, Lotus and Domino designed for electronic patient sign outs at US hospitals. The paper claims that the tool helps improve continuity of care, reduce medical errors and improve resident supervision and training.

• Morrison (2006) presents details of the development and implementation of the iHandover junior doctor electronic clinical handover system at an Australian hospital. A one year evaluation of the implemented system found that 66% of respondents perceived that the new system supported improved handover.

• Turner et al (2006) presents unique insights into the potential problems of information technology in clinical handover. The paper describes the utilisation of a mixed methodology in an Australian hospital setting. Results highlight that clinical handovers serve multiple different functions affected by a range of factors and inter-relationships amongst those factors. The study highlights clinicians being sceptical of the value of electronic handover tools and displaying resistance to change.

• Cheah et al (2005) describes the development of a minimum data set and its incorporation into an existing electronic system at an Australian hospital. The paper reports on results of a survey of doctors on the adequacy of the handover system and the use of free-text fields which indicates the electronic system was useful and well utilised by junior staff in medicine and surgery.

• Morris and Baker (2005) describe the development of a handover module within an existing multi-hospital clinical information system in Australia. The paper presents the development and pilot study design/implementation of the existing information system to incorporate clinical handover.

• van Eaton et al (2005) conducted a prospective, randomised, cross-over 5 month study to evaluate the effect of computerised handover system on continuity of patient care amongst 14 inpatient resident teams. The results found that the computerised system improved patient care and reduced time taken for ward rounds.

• van Eaton et al (2004) presents a multi-step method to design and implement an electronic system to improve shift-to-shift handover among residents at two US teaching hospitals. The electronic handover system consisted of automatic data retrieval from the existing clinical information system and from data entry by residents. The system was widely utilised and adapted by residents for handover. The paper does not present results of any evaluation of the impact of the system on patient care.

• Petersen et al (1998) report on the evaluation of a 4 month computerised handover program intervention to improve continuity of care. The study found that the computerised system reduced adverse events related to cross-coverage, although the number of events was small and statistical significance was difficult to demonstrate.

4.6 Reflective methods

• Broekhuis and Veldkamp (2007) describe the use and feasibility of the reflectivity method for stimulating learning and change amongst doctors at a hospital in the Netherlands. The method has several stages and is reported as being useful in affecting positive change in clinical handover structure, rules, protocols and ‘atmosphere’.
• Shendell-Falk et al (2007) describes the use of the appreciative inquiry 5-D Cycle change framework to improve nursing handover from an emergency department to a telemetry unit in a US hospital. The paper reports improve outcomes and presents inpatient handoff scripts and a standardized transfer form.

• Davies and Priestley (2006) present a study into the use of a personal reflection method in combination with literature review to derive a care sheet for nursing handover in a UK hospital User evaluation of the care sheet implementation reports staff commitment and support, perceived reduction in handover duration and increased efficiency.

4.7 Change management

• Wong et al (2007) [Refer to section 4.1. above] describes the change process around designing and implementing an electronic clinical handover tool to support clinical handover in an Australian hospital. The paper emphasises the approach to engaging clinicians early and involving clinicians in the every step of the project design, development, implementation and on-going evaluation in an iterative feedback loop. This study stresses the need to include both proponents and opponents of new changes around electronic handover tools. A framework and strategy for sustainable engagement is provided.

• Kellogg et al (2006) describes the changes from long-shift to shorter shift in surgical residency in a US hospital. Deploying ethnographic methods over a 15 month period the paper studies reveals resistance to change on handover resulting from work hour restrictions and highlights how resistance can be addressed to improve handover.

• Kassean and Jagoo, (2005) conducted a study to implement bed-side nursing handover to allow patient participation on a gynaecological ward at a hospital in Mauritius. The approach outlined adapted Spradley's 8-step model and Lewin's 3-step model of unfreezing, moving and refreezing as a change management framework. The paper reports the change management process was successfully implemented to the satisfaction of patients and staff.

• Kelly (2005) describes the change of handover from office-based to walk-around, bedside based handover in a 12-bed rehabilitation ward. Four months after the trial, an evaluation survey found that nurses thought that they were better informed of patient's care. Evaluation from the perspective of patients indicated that they were more involved in their own care because of the new handover system.

• Williams (1998) describes how nurses on an acute medical ward in a UK hospital changed the way patient information was shared between patients and nurses. Following 4 months, a survey questionnaire recorded perceptions of improved consistency and continuity of patient care.

• Watkins (1997) provides a thorough review of change management and change strategy as well as a narrative description of the introduction of nursing bedside handover at a UK hospital. The evaluation was informal and demonstrated most patients welcomed the bedside handover and staff reported increased job satisfaction.

4.8 Handover types

• Mikos (2007) [Refer to section 4.1 above] reports on the use of the SBAR technique in combination with phone recordings of nursing handover at a US hospital medical centre. The paper reports improvements in patient safety and quality of care since the implementation of the system. Other benefits reported include a streamlined handoff process, reduced patient falls during shift change, increased response times to patient call lights and reduced reporting time by 70%.
• Anderson and Mangino (2006) describes in detail a change management strategy for implementing bedside handover for nurses in a US medical centre. This study also evaluated the program and produced results showing significant positive perceptions from patients and staff alike.

• Kennedy (1999) reports on a project to improve nursing handover at a UK hospital by promoting the use of clear documentation and non-verbal nursing handovers. The study reports on findings that show improved documentation of handover provides stronger continuity of care.

• Webster (1999) reports on the use of an action research methodology to improve handover from traditional office based handover to bedside handover amongst nurses at a UK hospital. The study was undertaken on a medical ward for people over 65 years old and aimed to identify whether after 6 months of bed-side handover staff felt issues previously identified had been addressed. Results point to improved interaction/satisfaction amongst both patients and staff.

• Prouse (1995) describes a pilot study using tape-recorded nursing handovers at a Community Hospice in the UK. The paper reports on resulting improvements in financial, reporting and time efficiency of handover.
5. **Evidence gaps in clinical handover**

This section presents and discusses the major themes, issues and results identified within the literature pertaining to evidence gaps in clinical handover. It should be noted that this section is not attempting to provide a conceptual map of existing evidence gaps on clinical handover rather it is presenting themes that were identified in the literature either explicitly as evidence gaps or as emerging directions for future activity and/or research. It is worth noting that no materials were identified that had 'evidence gaps in clinical handover' as the focus of the publication and no materials clearly addressed the issue of sustainability. The section begins with a summary of major themes, followed by a presentation of key issues and results reported in the peer-reviewed literature relating to each of these themes. The section ends with a summary table that presents a structured review of all materials selected and categorised as relevant including non-peer reviewed materials, published opinions and reports.

The major themes identified in the literature relating to evidence gaps in clinical handover can be summarised as follows:

- **Patients perception and involvement in clinical handover**: literature highlights that the role of patients during handover remains complex and under-researched; Patients perceptions in relation to care management and its impact on trust and care satisfaction is identified as an area requiring further investigation.

- **Morning report format**: literature highlights that morning report is not common in Australia and has been under-researched. Literature indicates positive potential for reducing length of stay and increased availability from engaging in morning report based on a single pilot study.

- **Private Hospital settings**: literature on private hospital handover is very limited with only one study identified. This study focused on nursing handover reporting improved overall efficiency and effectiveness from implementing change based on action research principles.

- **Professional anxiety and Handover**: literature on professional anxiety during handover is limited with only one study identified. This study explored the issue in relation to nursing change of shift handover and points to the need for further research

- **Frameworks and Handover**: literature on holistic frameworks to assist in improving handover were explicitly identified as being required. A few studies in this direction have developed approaches that have been implemented with hand-offs in general medicine; safety transitions in emergency care; and, socio-technical approaches to developing tools.

- **Work process mapping and design methods**: literature examining the use of work process mapping to understand handover and to assist with technology design for tools to improve handover remains under-researched. Experimental methods for identifying information and its recall by health professionals are also limited.

- **Education and training of students**: literature frequently mentions the role of education and training in handover but detailed studies on their structure, implementation or evaluation remain limited.
Inter-Hospital and Patient Transfer: literature examining inter-hospital transfer is common but investigations of the handover aspects of the transfer are limited. Similarly, although literature on patient transfer and retrieval are common, studies examining handover aspects are limited.

Electronic Documentation and medical records: literature explicitly investigating electronic handover documentation and/or links with integration into broader electronic health records systems remains limited.

Legal dimensions: literature exploring the variety of legal dimensions pertaining to clinical handover continues to remain limited in the health literature.

A summary of key issues and results reported in the peer-reviewed literature relating to each of these major themes is presented below.

5.1 Patients perceptions and involvement in clinical handover
• Fletcher et al (2008) examines perceptions of patients and concerns of patients about treatment by either the same clinician who may be tired, or by a different clinician following handover that might cause discontinuity of care. The paper suggests the need for more research into how to design systems to minimize fatigue and discontinuity.
• Greaves (1999) explores patients perceptions of nursing bedside handover and their desire to be more involved (passively) and their recognition of confidentiality, continuity and neglect as key dimensions. This pilot study identifies the need for more research to investigate how this involvement can be addressed during handover.
• Cahill (1998) identifies gaps in understanding patients perceptions of handover and their implications for bedside handover.

5.2 Morning report format
• Fassett and Bollipo (2006) investigated various methods of conducting morning report, involving night team handing over to the day team at an Australian hospital. The study found that a format focusing on a brief presentation is the best way of providing an overview of patients and reported a reduction in bed access blocks, reduced average length of stay and increased bed availability from this pilot study. The paper recommends formal training on morning report and for more comprehensive studies into impact of bed management on morning report.

5.3 Private hospital settings
• McKenna and Walsh (1997) present an action research method aimed at improving nursing handover at a private Australian hospital. The study focused on an approach to facilitate conduct of handover in a 30 minute time-frame. The study highlights the need for more studies into differences in handover between private and public hospitals.

5.4 Professional anxiety and handover
• Evans et al (2008b) report on the conduct of a psycho-analytical case study to demonstrate the importance of the implicit functions of nursing handover. The handover ritual is described as contributing to a reduction of professional anxiety that assists nurses to be able...
carry out their duties. Paper points to the need for more research into anxiety and relief mechanisms during handover.

- Manias and Street (2000) [Refer to section 3.4 above] highlighted the fear and anxiety experienced by staff during bedside handover. The study also reported that nurses' experiences of being examined as part of the study affected their sensitivity to the need to convey accurate patient information during handover. Paper points to the need for more research into anxiety and relief mechanisms during handover.

5.5 Frameworks and handover

- Arora et al (2008) builds on social science constructs and a case study of the implementation of a night float service at a US hospital. The authors present a theoretical framework to describe how handoffs affect both patients and physicians and suggest it contributes to filling a gap in competency based approaches to improving handoffs.

- Wilson et al (2007) use their evaluation of simple technological artefacts to argue for the need to take an holistic system based view of handover. The paper recommends using 'in use, in situ' evaluation, rather than pure usability testing when evaluating technology artefacts in supporting clinical handover. The paper points towards the need for holistic frameworks to evaluate socio-technical aspects of handover.

- Behara et al (2005) describe a conceptual framework for characterising handover events. The paper suggests that the framework may help future studies to acquire a deep understanding of the multidimensional nature of handover and help develop interventions that fit the context of clinical work. They argue the lack of understanding of this multidimensionality in the 'one size fits all' approach to many handover interventions has contributed to their failure.

5.6 Work process mapping and design methods

- Tang and Carpendale (2006) describe an initial observational study method for understanding workflow and technology design problems. The paper points to the need for more research into techniques for linking workflow and technology designs for handover systems.

- Dowding (2001) describes the use of experimental methods to study the effects that manipulating information given in the change of shift report has on nurses' care planning ability. Paper points to a lack of evidence around the utility of experimental study designs for guiding handover interventions.

5.7 Education and training of students

- Arora et al (2008) [Refer to section 5.5 above] recommended core competencies in both communication training and professionalism training based on the conceptual (theoretical) framework described. The paper advocates the development of training materials and using "train the trainer" dissemination approaches.

- Yurkovich and Smyer (1998) highlight limited emphasis on education and training on clinical handover for medical and nursing students. The paper describes a learning project and its use of reflection and analysis of audiotape records during the psychiatric rotation and how this prepared the students to engage in professional nursing practice and behaviours.
5.8 Inter-Hospital and patient transfer

- Shirley and Hearn (2006) and Hearn and Shirley (2006) provide a review and opinion guide in two parts. The paper provides an overview of this emerging field of medicine and the need to develop better protocols and guides for handover. Although literature on patient transfer and retrieval are common, studies examining handover aspects are limited.
- Wong and Levy (2005) examines 22 patients who required transfer from rural and peripheral metropolitan areas and found that, among other factors, inadequate transport processes and delays in transfers directly contributed to adverse patient outcomes. Although there are numerous papers examining inter-hospital transfer, investigations of the handover aspects of the transfer are limited.

5.9 Electronic documentation and medical records

- Sarkar et al (2007) reports on a design process for the development of a problem based patient tracking tool called “Synopsis” (sign-out, information retrieval and summary) to support patient tracking, sign-outs and daily rounds at a US hospital. The handover tool described has direct links with the electronic medical records system and produces electronic documentation. Literature explicitly investigating electronic handover documentation and/or links with integration into broader electronic health records systems remains limited but is clearly an emerging area.

5.10 Legal dimensions

- Forrester et al (2005) provide an opinion article with good supporting legal arguments covering the communication requirement, documentation requirement and handover requirement. This area will require further research to enhance understanding and provide guidance for future handover interventions. Legal dimensions are not extensively covered in the health literature.
4.2.3 Publication 3


Publication 3 is the first of a series of publications related to the second part of the research project. The research project delivers 3 main publication outcomes: a standardised information transfer platform (also known as the minimum data set), an overarching standardised operating protocol and education and training manuals. The minimum data sets for all 6 clinical areas are contained within the same document, presented as Publication 3. Each of the 6 clinical areas has developed a standardised operating protocol and an overarching standardised operating protocol has been developed and presented in this thesis as Publication 4. There are four separate education and training manuals, one for nurses in DEM, one for nurses in DGIM, one for nurses in DGS and one for medicine. There is only one training manual for medical handover due to the similarities between 3 clinical areas in medical handovers. The medicine training manual is the primary source with variability built in for nursing training manuals. As such, the medicine training manual is included in this thesis as Publication 5. These three publications were reviewed by staff members of ACSQHC and the Australian National Clinical Handover Improvement Initiative Committee, chaired by Professor Dorothy Jones. Publications included here have been through three rounds of peer reviews and revisions.

Publication 3 describes the process of data collection, analysis and presentation of minimum data sets across 6 clinical areas. Publication 3 then presents an overarching minimum data set taking into consideration all the local clinical and socio-cultural factors. There are three main findings contained in Publication 3, which are important for this thesis. Firstly, despite the variability of clinical practice, the underlying purpose of clinical handover is the need to transfer responsibility and accountability of patient care through the transfer of information. The transfer of information is seen as the surrogate for the transfer of responsibility and accountability of patient care. Secondly, the standardisation of information transfer during clinical handover needs to consider flexibility to include local clinical and socio-cultural context. Finally, the process of clinical handover improvement, including the development of minimum data set is continuous and requires commitment from organisation and continual engagement of clinicians.

Publication 3 contributes to Key finding 1, 2 and 5. Publication 3 validates the view that clinical handover practices and the understanding of clinical handover are highly variable across different clinical areas, clinical disciplines and healthcare professionals. Publication 3 however, further elaborates the underlying purpose of clinical handover being the transfer of responsibility and accountability of patient care (Key finding 1). Publication 3 shows that while standardisation of clinical handover information transfer and therefore the transfer of accountability and responsibility of patient care is essential and possible, there needs to be some flexibility to include and incorporate local practice and local socio-cultural context into the standardised practice (Key finding 2). Finally, Publication 3 emphasises the need to continuously evaluate, validate and improve on clinical handover practices (Key finding 5). This forms the basis for discussion of iterative feedback cycle discussed in Publication 4 and Publication 6.
National Clinical Handover Initiative:

Nursing and Medical Handover in General Surgery, Emergency Medicine and General Medicine at the Royal Hobart Hospital

Minimum Data Sets

Submitted to Australian Quality Commission on Safety & Quality in Health Care (ACSQHC)

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1. Introduction

1.1 Project background

This report constitutes the second project deliverable of the ACSQHC funded project "Clinical Handover Initiative: Nursing and Medical Handover in General Surgery, Emergency Medicine and General Medicine at the Royal Hobart Hospital".

The project forms part of the ACSQHC’s National Clinical Handover Initiative.

1.2 Project aims

The primary aims of this project are to deliver robust and replicable comprehensive clinical handover solutions: standardised clinical handover protocols for nursing and medical staff and associated training programs for the implementation of the handover protocols.

This involves engaging in work to achieve the following objectives:

- Understand the approach to engage stakeholders for clinical handover improvement processes.
- Understand the complexity of clinical handover, especially socio-cultural, personal and organisational factors to develop the framework required for clinical handover solutions.
- Develop minimum data sets for the standardised operating protocols, in order to reduce the communication gaps and discontinuity of patient care for shift-to-shift nursing and medical handover.
- Develop standardised operating protocols incorporating minimum data sets complemented by flexible components for clinical handover processes for shift-to-shift, medical and nursing handover.
- Develop an approach to incorporate the standardised operating protocols into local settings to improve clinical handover and patient safety.
- Develop training manuals and workshops to enable transfer of skills for implementation and sustainability of standardised operating protocols.
- Understand the barriers to, and activators for, the adaptation and implementation of standardised operating protocols for clinical handovers.

1.3 Project deliverable: Minimum data sets

This report presents the minimum data sets for clinical handover developed at the Royal Hobart Hospital for the:

- Department of General Medicine - (Medical and Nursing)
- Department of General Surgery - (Medical and Nursing)
- Department of Emergency Medicine - (Medical and Nursing)

These minimum data sets constitute the second project deliverable for this ACSQHC funded project.
This report also presents the methodology the project team utilised including a summary of key literature reviewed and details of the process of data collection, analysis and iterative trialling and refinement of the minimum data sets produced. The report also provides information on the challenges experienced by the project team in deploying the methodology and the approaches utilised to overcome them.

Most significantly, this report presents an over-arching minimum data set that was generated through the methodological approach. This over-arching minimum data set emerged from a detailed analysis of similarities and differences across the six minimum data sets produced. This over-arching minimum data set provides a coherent frame of reference for supporting transferability of clinical handover improvement initiatives in different clinical settings. The ability of this over-arching minimum data set to support ‘flexible standardisation’ is validated by its ability to accommodate all six minimum data sets presented in this report. It is anticipated that further validation of the capacity of the over-arching minimum data set to support flexible standardisation and transferability will be generated during the production of the standardised operating protocols in the six clinical areas (project deliverable 3).

2. Literature review

As part of the work conducted to support the generation of this deliverable, a review of key literature was conducted to identify previous research on clinical handover and minimum data sets. The databases - Medline, Ovid, Proquest, on-line web searching of known handover centres/researchers and web-based search engines were used to identify peer-reviewed articles and reports and other types of publications relevant to the project.

A total of 135 articles and 65 web pages were scanned through to identify work on minimum data sets supporting either medical or nursing handovers. A further 72 abstracts and 24 web pages were identified and their associated full text articles and reports analysed to identify information relevant to understanding, generating and evaluating minimum data sets.

From this review it is evident that a large volume of literature exists that identifies clinical handover as a problematic area and supports the perspective that developing standardised processes with good quality minimum data sets are an essential part of improving handovers. Noticeably however, the availability of published and tested standardised operating protocols and minimum data sets remains very limited. A number of the minimum data sets that have been published lacked any validation process and few details were available on the experience of their implementation in real clinical settings. More importantly, no minimum data sets available appeared to address both the transfer of responsibility and transfer of accountability during clinical handover.

A summary of the key findings of this literature review on minimum data sets is provided. These findings aided the project team as they moved forward into field work and assisted in refining the approach and in the avoidance of mistakes/duplication of effort. Overall five key sets of guidelines around the development and use of minimum data sets were identified that had direct relevance to this project. These minimum data sets appear to have been used to provide some
guidance for clinical handovers among junior medical officers and/or nursing staff, although from the materials reviewed the exact manner in which these data sets have been used was not always very clear. Literature not related to the focus on developing and validating minimum data sets are not included below.

2.1 SBAR

In the United States of American, a team of physicians at Kaiser Permanente of Colorado developed the SBAR technique for improving communication between members of healthcare teams about patient's conditions. This technique has been used in handover situations (Haig et al., 2006b), such as emergency department handover (ED management, 2007) between medical staff. SBAR stands for:

- Situation
- Background
- Assessment
- Recommendation

Further information regarding this handover technique is available through the Institute of Healthcare Improvement website http://www.iom.edu/

2.2 JUMP

A New Zealand based team have developed a four step process, known as the "JUMP" technique (McCann et al., 2007). JUMP stands for:

- Jobs to be completed
- Unseen patients
- Medical contacts (phone numbers of registrars/consultants)
- Patients to be aware of

The JUMP technique is currently being assessed for national rollout in New Zealand.

2.3 Medicine and surgery, medical staff specific

Cheah et al., (2005) utilised and assisted in the development of an electronic clinical handover tool for general medicine and general surgery. In the electronic clinical handover tool, the minimum data set reported included:

- Patient demographic (name URN), age
- Data of admission
- Location (ward and bed number)
- Consultant responsibility for care
- Treating unit
- Current diagnosis
- Results of recent investigations
- Recent procedures and dates
- Handover notes
2.3 Nursing specific

A handover guide was developed by Fenton (2006), based on the ‘Essence of Care’ benchmark in United Kingdom, for geriatric care. It aims to improve the quality of nursing handover. The handover guide includes:

- Name, age, resuscitation status
- Diagnosis and presenting problem
- Relevant past medical history
- Investigations pending/results
- Specific medical instructions
  - Continence: assessment, management, progress, bowel care
  - Pressure areas: condition and management
  - Safety: falls, wandering, self-harm, mobility
  - Self-care: discharge and rehabilitation
  - Hygiene and oral care: assistance and special requirement
  - Privacy and dignity
  - Communication
  - Nutrition and hydration: Assistance, food diary and special requirement

2.4 Generic handover minimum data set

Bernau et al. (2006), have expressed the view that potential improvements in clinical handover require a minimum data set that should include:

Essential information

- Patient name, age and location
- Presenting complaints
- Working diagnosis
- Treatment given

Relevant information

- Results of investigations and pending investigations
- Past medical history and drugs
- Key clinical findings
- Social issues
- Tasks which need to be done
3. Methodology

A review of the literature provides some guidance regarding minimum data set requirements for effective clinical handover. However, details on the extent to which these minimum data set requirements have been derived, tested and evaluated in clinical settings remains unclear. More significantly, the lack of clarity on a number of factors helped shape and refine the methodological approach of the project team to the generation and testing of the minimum data sets. These factors included the lack of clarity around:

- Whether and/or how end-users are involved in the process of deriving minimum data sets;
- Whether or not the minimum data sets developed to date were cognisant of the impact of the handover recipient's skills, knowledge and requirements;
- The process of validating minimum data sets;
- The extent to which minimum data sets derived for use in one specific clinical setting are generalisable;
- The focus on the transfer of information in minimum data sets. In many instances this appeared to be to the exclusion of the minimum data sets also clearly addressing the transfer of responsibility and accountability to support better and safer patient care.

In this context, the project team acknowledged the utility of working towards coherent checklists and information sheets but remained conscious of the need to ensure that the processes by which the minimum data sets were generated and iteratively tested should also be made explicit. The project team also remained aware of the need to ensure clarity around the factors identified above.

In generating and testing the minimum data sets the project team remained focused on achieving the objective of supporting patient safety through the transfer of information, responsibility and accountability from one team of healthcare professionals to the other. The overall approach draws on user-centred design principles to ensure consideration of the skills, knowledge and requirements of those actually using the data sets as well as the actual content, responsibility and accountability to be transferred.

The team approach for generating the minimum data sets integrates a range of qualitative research techniques and an awareness of clinical management frameworks with user-centred design principles. This holistic approach ensures sensitivity to the socio-technical factors at play in each clinical setting. In validating the minimum data sets generated through observations, interviews and handover notes the team employed an iterative feedback loop in each clinical setting that led to revision, refinement and agreement with staff in each clinical area on the final minimum data sets produced.

3.1 Project team approach

The over-riding methodological framework deploys a holistic socio-technical approach to understanding and improving clinical handover. This approach integrates clinical and information
systems expertise with qualitative field techniques and user-centred education and training in an iterative feedback loop to support continuous improvement.

This approach relies on the benefits and synergies of these interactions to optimise transferability and sustainability (see Figure below). By utilising observations, interviews, and analysis of handover notes in conjunction with iterative testing in each clinical area the project team were able to produce the minimum data sets presented in this report. Each of these elements of the project team approach are described in more detail in the next sections of the report.

![Figure showing Holistic Socio-Technical Approach](image)

### 3.2 Observations

In recognition of the complexity of clinical handover processes and to ensure that existing processes in each clinical area were understood the project team commenced data collection and analysis through observation sessions. These observation sessions were carried out by different researchers across the six clinical areas and in each case the researchers were members of the actual healthcare delivery team in that clinical area. This approach enabled the rapid identification and understanding of specific socio-technical sensitivities and all existing procedures, processes and challenges/issues in each clinical area.

Researchers had been trained to use a 'grounded' approach during the observation sessions that involved taking detailed field notes documenting the clinical context, factors affecting the clinical handover process as well as the nature and content of information transfer and the absence/presence of explicit mechanisms to transfer responsibility and accountability. Some sessions were recorded with the consent of participants. These assisted in the detailed analysis of clinical handover process.
The number of observation sessions required varied among the six clinical areas, not least, because of the different sizes of these areas. To determine when adequate data collection and analysis had occurred through observation researchers were encouraged to use the concept of ‘thematic saturation’ (i.e. where consistently observation sessions are no longer revealing significantly new insights). From the project team’s experience this required a minimum of ten observation sessions in each clinical area.

3.3 Interviews

Observation sessions were closely followed up with semi-structured interviews of key handover personnel. The project team utilised a purposeful sampling technique in order to achieve the goals of the project in the time-frame. In essence, this led to interviews being primarily conducted with doctors and nurses who were perceived by their peers to be good at clinical handover and where this had been cross-validated by their identification through observation sessions. Throughout the participation of clinicians in the interview process was completely voluntary. As a result some clinicians initially identified subsequently declined to be interviewed.

The interviews were conducted away from the clinical care area, commonly, during working hours. All interviews were audio-recorded, following consent being given by the interviewee. Researchers again took comprehensive notes during the interview covering not just the content but also other factors of relevance including body language and the amount of disruption. The audio-recordings were transcribed and analysed for information on minimum data sets and also insights for the development of standardised operating protocols.

An interview question frame divided into four sections was utilised to provide some structure to the flow of the interview and to focus analysis. This interview question frame is provided at the end of the document. It should be noted that interviewers had been trained to also use probes to draw out additional insights, comments and ideas from interviewees and to use the technique of summarisation to confirm and validate understanding of key points made by the interviewees.

The initial section of the interview encouraged interviewees to provide a holistic vision of the clinical handover process from their own perspective and aimed to specifically reveal any insights into the interviewees understanding and perceptions of responsibility and accountability, and its transfer amongst health professionals in their clinical area.

The second part of the interview aimed to re-construct the clinical handover process from the perspective of the interviewee. The data collected through these questions proved to be especially important when combined with the observational data in understanding the role of each individual healthcare professional from their own perspective. This section deliberately stimulated interviewees to engage in a process of self-reflection on the handover process as well as on their own role within it. The project team especially emphasised potential strategies to improve the current clinical handover process in order to achieve clinician engagement and empowerment. A specific question was designed to identify minimum data sets from the perspective of interviewee.
Acknowledging that the overall project has also has a focus on education and training, the project team also included questions in the interview designed to specifically obtain the perceptions of interviewees on the current status of education and training for clinical handover and also on their perspectives as to the most effective methods for the delivery of any training in their clinical area.

Noticeably many interviewees identified minimum data sets while describing their role and their perspectives on clinical handover processes within their clinical area. Interviewers were encouraged to challenge interviewees to identify minimum data sets that would also transfer responsibility and accountability from the perspective of the recipient of the handover (i.e. what information did they consider necessary to ensure this transfer was complete when accepting a patient’s care). The interview data was analysed using a coding process drawing on the principles of grounded theory and these codes were then re-analysed in the context of other analysed data produced from the observation sessions and analysis of handover notes.

3.4 Analysis of handover notes & messages

Handover messages (both written and verbal), were analysed for information content and structure as part of the process of developing minimum data sets for each of the clinical areas. Noticeably, some clinical areas already had typed handover sheets in combination with verbal handovers, while other areas had typed/written handover sheets or verbal handovers only. The project team combined all the handover information collected through data collection process as part of its approach to generating the minimum data sets.

For medical officers, written handover sheets were collected and analysed together with the aligned observation sessions to assist in validating the emerging minimum data sets. In some clinical areas, only written/typed handover sheets were transferred from one team to the other. The receiving team was asked to provide comments on the utility and completeness of these handover sheets and this data was analysed to contribute to the emerging minimum data sets. In other clinical areas, only verbal handover messages were available. Detailed field notes were obtained during these sessions and recipients of the handover talked to as part of the process of determining a minimum data set. Where both verbal and written/typed clinical handover notes were available analysis was conducted on both sources of information and again discussion held with handover recipients to assist in the generation of the minimum data sets. The project team’s experience of analysing medical officer handover messages is that a minimum of 50 handover messages needed to be analysed as part of the process of developing the minimum data set for each clinical area.

For nurses, a combination of typed handover sheets and verbal information transfer was analysed in order to contribute to the development of the minimum data sets in each area. In both general surgery and general medicine, a computerised clinical handover sheet was used to document essential information. These data sheets in combination with detailed recording and documentation of verbal handover sessions provided considerable value in determining the minimum data sets required. Nursing handovers in the department of emergency medicine were conducted primarily through verbal communication with essential information documented on
nursing care sheets. Some of these handover sessions were recorded in order to extract the content of nursing handover and contribute to the development of the minimum data sets. The project team's experience of analysing nursing handover messages is, again, that a minimum of 50 handover messages need to be analysed as part of the process of developing the minimum data set for each clinical area.

3.5 Iterative feedback and validation

Initial versions of the minimum data sets from all six clinical areas were developed through analysis of the observations, interviews and handover messages. These initial versions were then put into an iterative process of refinement and validation by trialling them in each clinical area. This trialling involved doctors and nurses using the minimum data sets and interacting with the project team researchers to provide comment and further feedback on improving the minimum data sets. This real-life clinical testing provided strong validation of the minimum data sets presented for each clinical area. This process of validation is now continuing through into the development of standardised operating protocols.

The project team expended considerable effort in engaging with staff in each clinical area to continually revise each individual minimum data set on the basis of their feedback from the real-life clinical testing and the analysis of the data collected. This process had the advantage of commencing the process of embedding this minimum data set into staff practice within each clinical area and it is anticipated that this will be further embedded as the standardised operating protocols are developed. It should be noted that the process of trialling some of these minimum data sets was affected by some systemic factors, such as the format of the computer generated handover sheets in some areas. Nonetheless, all these minimum data sets went through multiple iterative feedback loops and validation by end-users in real-life clinical scenarios.

The project team note, the current versions of the minimum data sets for all six clinical areas have been extensively validated prior to the development and implementation of standardised operating protocols or the delivery of the education and training programs that will form the deliverables for the second half of the overall project. The project team anticipate that there will be on-going revision of these minimum data sets although it is not anticipated that these revisions will be major.

Concurrent with the process of developing the minimum data sets for each of the six clinical areas, the project team also engaged in a comprehensive analysis of the similarities and differences between them. This analysis led to the development of an over-arching minimum data set that provides a coherent frame of reference for supporting transferability of clinical handover improvement initiatives in different clinical settings. More specifically, this over-arching minimum data set emphasises the transfer of information, responsibility and accountability. The ability of this over-arching minimum data set to support 'flexible standardisation' is validated by its ability to accommodate all six minimum data sets presented in this report. It is anticipated that further validation of the capacity of the over-arching minimum data set to support flexible standardisation and transferability will be generated during the production of the standardised operating protocols in the six clinical areas (project deliverable 3).
It should be noted that following the development of the over-arching minimum data set the project team re-designed each of the six minimum data sets using the same framework. The next part of the report presents the six individual minimum data sets followed by the over-arching minimum data set.
4. Minimum data sets

4.1 Introduction

Minimum data sets have been developed for the six clinical areas investigated across the departments of General Surgery, General Medicine and Emergency Medicine at the Royal Hobart Hospital. These minimum data sets aim to fulfil the needs of each individual clinical area in order to adequately and efficiently carry out clinical handover.

There are significant differences between these minimum data sets, which reflect differences in the role of each profession, as well as the role of each clinical area. These differences are also related to different communication methods and settings used in clinical handovers. For example, some clinical areas conduct bedside clinical handover, offering the opportunity for patient involvement, while others conduct clinical handover away from clinical care to facilitate sensitive information to be transferred from one team to another.

While keen to support efforts to improve clinical handover across different clinical areas and under different clinical contexts the project team also recognised the need for solutions that could be rapidly transferable and sustainable. As a result, analysis was conducted of the data sets to investigate the feasibility of an over-arching minimum data set. This over-arching minimum data set is presented after the six individual minimum data sets from which it has been generated and validated.

The project team view the combined individual minimum data sets and the over-arching minimum data set as a significant step in supporting flexible standardisation for clinical handover across a range of clinical settings. The team anticipate that this work will be strengthened with the development of standardised operating protocols (deliverable 3) and training materials for their implementation (deliverable 4) as the overall project matures.

4.2 Definition of responsibility and accountability

For the purpose of this standardised operating protocol (SOP), the definition of clinical handover from the United Kingdom National Patient Safety Agency (Junior Doctors Committee, 2004) and the Australian Medical Association in their 'Safe Handover: Safe Patients' guideline (Australian Medical Association, 2006a) is adopted:

“the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis”

It is important to emphasise that clinical handover requires a transfer of information, responsibility and accountability for patient care. This SOP in combination with the minimum data set has been developed to emphasise all of these elements of clinical handover.
In regards to the definition of responsibility and accountability, we have adapted the definition put forward by the Australian Nursing Council.

**Responsibility:** “The obligation that an individual assumes when undertaking to carry out planned/delegated functions. The individual who authorises the delegated function retains accountability” (Australian Nursing Council, 1990)

**Accountability:** “The state of being answerable for one’s decisions and actions. It can not be delegated” (Australian Nursing Council, 1990)

There are conceptual arguments regarding the possibility of transfer of accountability of patient care during clinical handover. For this SOP and minimum data set, it is accepted that responsibility and accountability for patient care cannot be always clearly and explicitly stated and transfer. This SOP and minimum data set, however, allows continuity of patient care to be achieved from one team of practitioners to the other. Therefore, the adoption and practice of this SOP and minimum data set will functionally transfer the responsibility and accountability of patient care.

### 4.3 Minimum data set: General medicine (Junior medical officers)

**Clinical setting**

The Department of General Internal Medicine at the Royal Hobart Hospital accepts care of patients who have medical issues requiring further investigation and management. It is important to note that medical specialty units (such as cardiology, gastroenterology) only accept selected groups of patients, normally requiring invasive interventions by their respective specialties.

The Department of General Internal Medicine has 5 sub-units, Medical unit B, Medical unit C, Medical unit E, Medical unit F and Medical unit PU. Each unit is serviced by an average of 2 consultants, 1 registrar and 1 intern. Each unit has an average of 10 inpatients at any one time. These units accept admissions on a rotating roster. From 17:00pm each day, all patients under the care of general medicine are serviced by an after-hours medical team, consisting of an on-call consultant, a registrar and two interns. This after-hours medical team works till 21:30pm. This team then conducts handover with the night team, consisting of an on-call consultant, a registrar and one intern. The intern covers ward calls for both general medicine and general surgery. During weekends, a medical team works from 08:00 am till 23:30pm. This medical team then conducts handover with the night team. There is a post-take registrar and a post-take consultant who work from 08:00 to 12:00. Saturdays and Sundays are serviced by different teams of medical professionals.

General medicine requires a great deal of cognitive activity in order to plan for future investigations and management of patients. Some of these patients are sick and have the potential to deteriorate rapidly. Some patients, however, may stay for a long time with little change to their clinical conditions. It is important to note that the after-hours team and the night team have to look after 50-100 inpatients. The after-hours and the night teams are not familiar with most of these patients, although it is acknowledged that most of these patients do not require special care during these shift periods. The handover of patient care is therefore temporary. The content of the handover mainly covers tasks required to be completed, rather
than cognitive analysis of their clinical presentation and diagnostic or management decision making processes.

While there are rooms, desk spaces and computer equipment available for medical registrars and interns, there are no designated rooms for registrars and interns of various medical units to work in when they are not delivering direct patient care. Furthermore, while there are designated wards for general medicine, many units have patients in multiple wards.

**Clinical handover description**

There are two or three clinical handover sessions per day (three during a normal working day and two during weekends). The morning clinical handover session is from 08:00-08:30 with a shift overlap between night and morning teams of 30 minutes duration. This is carried out in a meeting room away from clinical practice. The morning handover is generally attended by the post-take consultant, all registrars and interns. There is a structure for this particular handover session. The morning session tends to involve the registrars extensively.

Evening and night-time handover sessions are much less structured. On Friday afternoon between 16:30-17:30, there is a handover session from the home team to the weekend and after-hours teams. These sessions seem to involve interns more extensively than registrars.

**Objective**

The minimum data set for shift to shift handovers in general medicine for junior medical officers is therefore designed to achieve the following objectives:

- To provide an overview of the shifts and situations that might impact on patient care within the specific clinical setting.
- To alert the incoming team to patients who require special care during their shift within the specific clinical setting.
- To ensure that information regarding tasks to be completed during the next shift are communicated clearly to the next team.
- To ensure the transfer of responsibility and accountability of patient care, temporarily to the incoming team.
- To standardise the minimum data set according to the over-arching minimum data set.

**Content**

There are five sections to the minimum data set in order to achieve the aim of transferring information, responsibility and accountability.

1. **Environmental awareness**
2. **Patient identification and demographic details**
3. **History, evaluation and management**
4. **Responsibility, risk management and action plan**
5. **Accountability to ensure patient safety**
The general medicine shift-to-shift minimum data set for clinical handover among junior medical officers is presented below under these headings. It should be noted that these headings come from the over-arching minimum data set that is presented in section 4.7 below.

Environmental awareness

1. Alerts and Safety
   - Within the general medicine setting, all patients who may be at risk to themselves or other healthcare professionals should be handed over (e.g. Patients who are confused and wandering around the ward)

2. Advanced notice (especially high risk patient movements)
   - This is especially important regarding patients who are being discharged from intensive care units and all patients being transferred from the department of emergency medicine.

3. Attention (to sick/deteriorating patients)
   - All patients who had a MET call during the last shift and all patients who have the potential to deteriorate should be handed over.

Patient identification

As the handover sessions are conducted face-to-face, away from clinical care, patient identification can either be achieved through attaching the patient sticker to the handover sheet or writing at least two identification details on the handover sheet. Given that the handover process is away from patient care, the location of the patient needs to be included.

1. Textual identification (at least surname)
2. Numerical identification (hospital unique identifier or date of birth)
3. Location (ward and bed number)

History, evaluation and management

As the content of handover messages mostly can be classified as task based, it is important to not only hand over the task, but also the background information and the rationale for the task. It should therefore include history and issues that are important, the evaluation to date, especially the working diagnosis as well the management to date which is relevant for the transfer of responsibility to carry out the task.

1. History
   - Within the general medicine setting, this section should include current issues and relevant past medical history for the particular tasks required to be performed.

2. Evaluation
   - This section should include information regarding examination and investigation findings, as well as the current working diagnosis.

3. Management to date
   - A brief summary of the management to date should be provided.
Responsibility, risk management and action plan

While the current handover process tends to transfer the tasks required to be completed well, it does not provide adequate information to transfer the responsibility of care. Therefore, when a task is transferred, it is essential that the team provides some recommendations to the incoming team. The minimum data set also emphasises abnormal investigation results for follow up, in order to achieve the goal of patient safety improvement.

1. Tasks to be completed and recommendation
   - This should include a statement of the tasks required and recommendations related to the task.

2. Abnormal results and observations which require further follow up.
   - All abnormal results and observations should be included, with a clear plan for follow up arrangements.

Accountability

It is essential that accountability is transferred to the incoming team and in the setting of general medicine the transfer of accountability includes the following headings.

1. Patient
   - MET call and Code status

2. Profession and colleagues
   - Who to contact if there is a problem.
Examples

The minimum data set has been incorporated into the handover sheet. An example taken from handover sheets is provided here.

**DAY 1 (Friday)**

**Situational awareness**

Mrs XX might be discharged

**Patient identification**

Mrs Surname, given-name

**URN**

Location (ward and bed number)

**History and issues**

Age, IHD, angiogram date

Awaiting post-angio

**Cardio instruction**

**Responsibility, risk management and action plan**

Check U&Es. If normal + cardiology happy for D/C, then can go.

Needs cardioF/u as per their instruction.

**DAY 2 (comments added, Saturday)**

**Responsibility, risk management and action plan**

Checked on saturday

**Accountability**

Cardiology discharged patient

Having outpatient clinic and sestamibi

Also outpatient vascular appointment (cardiology will arrange). Needs discharge summary

**Day 4 (Monday)**

Handover sheets handed back to the home team to follow up discharge summary.
Situational awareness (Sick patient requiring attention, special instruction etc)

<table>
<thead>
<tr>
<th>Demographic: URN, name and location</th>
<th>History and issues</th>
<th>Responsibility (Actions required and recommendation)</th>
<th>Accountability (Code status etc)</th>
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4.4 Minimum data set: General surgery (Junior medical officers)

Clinical setting

The Department of General Surgery at the Royal Hobart Hospital accepts care of patients who have surgical issues requiring further investigation and management. The Department of General Surgery has 3 sub-units, Surgical unit A, Surgical unit B and Surgical unit C. Each unit is serviced by an average of 2 consultants, 1 registrar and 1 intern, other than surgical A unit which has two interns.

The number of patients per surgical unit varies significantly over time. At times, some units have more than 20 patients. Sometimes, however, some units have few inpatients. However, frequently many of these inpatients under surgical teams present with acute problems and their clinical status tends to change rapidly. The handover requirement therefore is quite different from that of general medicine or emergency medicine.

The three surgical units accept admissions on a rotating roster. From 17:00 each day, all patients under the care of general surgery are serviced by an after-hours surgical team, consisting of an on-call consultant, an on-call registrar, an on-site surgical senior assisting the admission process and one surgical intern. The surgical senior and the surgical intern work till 21:30. The surgical intern provides a handover to the night intern, who covers both medicine and surgery. The surgical registrar remains on-call for the night. During weekends, the on-call surgical consultant and registrar remain on-call for the whole weekend. There is one surgical intern working from 08:00 to 22:00 and the surgical intern conducts a ward-round with the surgical registrar in the morning.

It is important to note that most of the surgical patients, regardless of their surgical units, are being cared for in the same ward. There is also a common working room on the ward for all healthcare professionals. All surgical registrars and surgical interns spend a lot of their non-theatre time at the same place together. Furthermore, there is a private room for surgical registrars, complete with computer and printing facilities. Surgical interns sometime use the registrar room to carry out non-direct patient care activities.

Because of the close physical proximity of all the surgical teams, most of the patients, especially patients requiring extensive care, are familiar to all surgical registrars and interns. The professional and social networking opportunity throughout the day allows essential information to be passed on from the day team to after-hours team on a continual and opportunistic manner.

Clinical handover description

There are two or three clinical handover sessions per day (three during normal working day and two during weekends). As surgical teams normally start work around 07:30, the surgical interns obtain handover from night interns in the resident’s room. They then obtain handover regarding patients admitted overnight from their registrars during ward rounds. Most handovers are short and effective. Surgical interns and registrars handover to the after-hours and night teams at the
end of their shift. On Friday, a list of tasks for all surgical patients is normally generated and left in the surgical ward for interns. Surgical registrars on the other hand, type up a list of handover information and they are left in the surgical registrar room. Verbal parts of the handover can happen either at the end of the shift or during any part of the day when an opportunity arises.

Objective

The minimum data set for shift to shift handovers in general surgery for junior medical officers is therefore designed to achieve the following objectives:

• To provide an overview of the patients and the environment of their care.
• To alert the incoming team to patients who require special care during their shift, especially focusing on patients who require intensive medical observation and care.
• To ensure that information regarding tasks to be completed during the next shift are communicated clearly to the next team.
• To ensure the transfer of responsibility and accountability of patient care, temporarily to the next team.
• To standardise the minimum data set according to the over-arching minimum data set while allowing enough flexibility for the work pattern of general surgery teams to occur.

Content

There are five sections to the minimum data set in order to achieve the aim of transferring information, responsibility and accountability.

1. Environmental awareness
2. Patient identification and demographic details
3. History, evaluation and management
4. Responsibility, risk management and action plan
5. Accountability to ensure patient safety

The general surgery shift-to-shift minimum data set for clinical handover among junior medical officers therefore follows these headings.

Environmental awareness

1. Alert and safety
   o Within the general surgery setting, all patients who might have special instructions should be clearly identified.

2. Advanced notice (especially high risk patient movements)
   o All patients who are coming back from theatre or ICU or going to theatre or ICU should be clearly identified.

3. Attention (to sick/deteriorating patients)
   o All patients who had a MET call during the last shift and all patients who have the potential to deteriorate should be handed over.
Patient identification

As the handover sessions are conducted face-to-face, away from clinical care, patient identification can either be achieved through attaching the patient sticker to the handover sheet or writing at least two identification details on the handover sheet.

1. Textual identification (at least surname)
2. Numerical identification (hospital unique identifier or date of birth)
3. Location (ward and bed number), especially for surgical patients not in the surgical ward.

History, evaluation and management

As the content of handover messages mostly can be classified as task based, it is important to not only hand over the task, but also the background information and the rationale for the task. In general surgery, the diagnosis, operation and operation date, current issues, evaluation to date and management to date are most relevant for the transfer of responsibility.

1. History
   - Within the general surgery setting, this section should include the operation and operation date (or pending operation and time).

2. Evaluation
   - This section should include information regarding examinations and investigation findings, as well as the current working diagnosis.

3. Management to date
   - A brief summary of the management to date should be provided.

Responsibility, risk management and action plan

It is essential that the team provides some recommendations to the incoming team. The minimum data set also emphasises abnormal investigation results for follow up, in order to achieve the goal of patient safety improvement.

1. Tasks to be completed and recommendations
   - This should include a statement of the tasks required and recommendations related to the task, especially the preference of the surgeon.

2. Abnormal results and observations which require further follow up
   - All abnormal results and observations should be included, with a clear plan for follow up arrangements.

3. Risk management
   - It is very important that mobility, dietary management (i.e. fasting, clear fluid etc), wound care and DVT prophylaxis is transferred to the next team when appropriate.
Accountability

Within the general surgery setting, the following headings are important.

1. Patient
   o MET call and Code status

2. Profession and colleagues
   o Who to contact if there is a problem

3. Organisation
   o Discharge planning that requires organisation
4.5 Minimum data set: Emergency medicine (Junior medical officers)

Clinical setting

The Department of Emergency Medicine at the Royal Hobart Hospital looks after acute presentations of all patients, including paediatric, adult care, women’s health, mental health and trauma. The Department of Emergency Medicine differs from other clinical areas, especially with regard to the complex, dynamic and intensive nature of the communication required in health care delivery.

The Department of Emergency Medicine looks after many patients at any one time. Many patients are sick and have the potential to deteriorate rapidly, requiring rapid interventions. It is important to note that each medical professional looks after their own patients, with senior support provided by consultants or registrars. There is a common working area in the middle of the department, allowing constant interaction and discussion where necessary. Interruptions are extremely common and the communication load amongst doctors and other healthcare professionals are very intensive. Rapid response and efficient care delivery in the department of emergency medicine requires rapid communication and coordinated team work from doctors, nurses, and other healthcare professionals as well as across healthcare teams.

It is important to note the Department of Emergency Medicine requires continual on-the-ground care by medical officers and therefore, it is of critical importance that continuity of patient care is achieved during clinical handover.

Shifts of medical officers in the Department of Emergency Medicine are designed around a staggered approach, in order to meet the demand for medical care over each day (the full 24 hour period). There are always senior medical officers available throughout each 24 hour period (ie. consultants during day time and registrars overnight). There is always a consultant on-call 24 hours a day. Interns are supervised all the time by a senior medical officer. Residents have some clinical autonomy, but essentially they are under tight supervision.

The main task of the Department of Emergency Medicine is adherence to the on-going management plan developed for each patient (i.e. is it likely that the patient will require inpatient care or can a diagnosis be reached and a management plan derived in order to discharge the patient back into the community and/or community care). This work model has important implications for the minimum data set for clinical handover in emergency medicine.

Clinical handover description

There are three main clinical handover sessions per day, regardless of the day of the week. The morning handover session starts at 08:00 and normally finishes at 08:30. All medical staff as well as a senior nursing staff member gather around a computer screen to go through all the patients currently being looked after in the Department of Emergency medicine. It is normally the senior member of the team (eg. the registrar from night shift), handing over to the consultant of the day shift. Other members might participate in the handover session where appropriate. Evening
handover occurs at 15:00-15:30 and night handover starts at 22:30 and normally lasts till 23:00. It is mainly the senior member of the team handing over to the other senior member on the incoming team starting the new shift. It is important to note that some junior medical officers finish at 17:00. There is no formalised handover at that time.

It is very important to note that the outgoing team is handing over the patient permanently to the incoming team. Therefore, handover in the Department of Emergency Medicine requires a thorough and concise handover in order for the incoming team to accept the full care responsibility and accountability for the patients handed over.

**Objective**

The minimum data set for shift to shift handovers in the Department of Emergency Medicine for junior medical officers is therefore designed to achieve the following objectives:

- To provide an overview of the patients and the environment of their care.
- To alert the incoming team to patients who have the potential to deteriorate rapidly or patients who will require immediate and intensive medical attention.
- To ensure that information related to diagnostic cognition and tasks are clearly and thoroughly communicated to the next team and that the individual who is going to be responsible for the care delivery comprehensively understands the information transferred.
- To ensure the transfer of responsibility and accountability of patient care, permanently to the next team and the individual who agrees to accept the care of the patient occurs.
- To standardise the minimum data set according to the over-arching minimum data set while allowing enough flexibility given the above clinical setting.

**Content**

There are five sections to the minimum data set in order to achieve the aim of transferring information, responsibility and accountability.

1. Environmental awareness.
2. Patient identification and demographic details
3. History, evaluation and management
4. Responsibility, risk management and action plan
5. Accountability to ensure patient safety

The shift-to-shift minimum data set for clinical handover among junior medical officers therefore follows these headings.

**Environmental awareness**

1. Alert and safety
   - This is especially important for patients with mental health disorders or for other types of patients who might be at risk to themselves or other people.
2. Advanced notice (especially concerning movements of high risk patients)
Patients who are being brought in by ambulance or to be transferred to ICU.

3. Attention (to sick/deteriorating patients)
   - Any patient who has the potential to deteriorate or is currently deteriorating.

**Patient identification**

All available identifying data of individual patient's is displayed on the computer screen, the most important identification information are:

1. Textual identification (at least surname)
2. Numerical identification (the age of the patient)
3. Cubical number

**History, evaluation and management**

As there are many patients in the Department of Emergency Medicine at any one time, it is important that the handover is provided in an effective and efficient manner.

1. History
   - The most important part of the history is the presenting complaint/illness/injury and current working diagnosis.

2. Evaluation
   - This section should include any significant positive and negative findings that support the working diagnosis.

3. Management to date
   - A brief summary of the management of the patient to date should be provided.

**Responsibility, risk management and action plan**

It is essential that the individual conducting the handover provides some recommendations to the incoming team. The minimum data set also should emphasize abnormal or pending investigation results for follow up, in order to achieve the goal of patient safety improvement.

1. Tasks to be completed and recommendations
   - This should include a statement of the tasks required and recommendations related to each of the tasks.

2. Pending results and investigations which require further follow up
   - All pending results and observations should be included, with a clear plan for follow up arrangements.

3. Risk management: Abnormal observations and current vital signs
   - Due to the acuity and intensity of patients presenting to the Department of Emergency Medicine, the risk management strategy is the presentation of current vital signs, especially if they are abnormal.
Accountability

Within the Department of Emergency Medicine the following headings are important.

1. Patient
   - Patient’s likely discharge status and whether the patient/family has been informed.

2. Profession and colleagues
   - The inpatient team that will accept the patient’s care if they need to be admitted, whether they have been contacted and the approximate time that they will review the patient.

3. Organisation
   - The bed request status and availability and inpatient care.
4.6 Minimum data set: General medicine (Nursing)

Clinical setting

One of the general medicine wards, 2B South was utilised as the pilot site at the Royal Hobart Hospital for the purpose of this project. 2B South accepts care of patients who have medical issues requiring further investigation and management. The ward has special expertise in the management of acute strokes, endocrinological problems, rheumatological, renal and gastroenterological problems. The 2B South ward has three sections. Each section looks after approximately 10 patients. These patients are under that care of general medical units and other medical specialty units, such as gastroenterology, endocrinology, rheumatology, renal and stroke units.

There is a nurse manager in-charge of all patients and issues related to the ward. There are also two senior nurses who assist in the co-ordination of staff for patient care delivery during the daytime. There are normally 2-3 nurses per team and generally speaking, the most senior nurse of the team acts as the team leader.

As the care for patients is delivered via 3 teams of nurses over each 24 hour period, each shift-to-shift handover essentially needs to handover all relevant information in order to handover the care of responsibility. It is very important to note that while the same nurse may work a few days consecutively, she/he may not look after the same patients during these days. This is because patients may be moved due to bed availability and/or the nurse may be asked to work in different areas in order to achieve the skill mix required for patient care (ie. each team has to have at least 1 registered nurse).

Clinical handover description

There are three clinical handover sessions per day, regardless of the day of the week. The morning clinical handover session is from 07:30-08:00 with a shift overlap between night and morning team of 30 minutes duration. The afternoon handover is from 14:15 and the evening handover is from 22:00. Shift overlaps have been rostered in order to achieve good clinical handover. There is a computerised handover sheet for each of the sections, this delivers some of the minimum data set. Using the computerised handover sheet, verbal face-to-face handover occurs in order to maximise the chance of transferring responsibility and accountability, as well as in clarifying the care requirements of each patient. The clinical handover process is carried out near the clinical care delivery area and continuity of patient care is ensured during the handover period. Normally, all nurses from the incoming team and at least 1 nurse from the outgoing team gather at a location to conduct face-to-face handover, while referring to the handover sheet and to the patient’s notes when necessary.
Objective

The minimum data set for shift to shift handovers in general medicine for nurses is therefore designed to achieve the following objectives:

- To provide an overview of the shifts and situations that may impact on patient care within the specific clinical setting.
- To alert the incoming team to patients who require special care during their shift within the specific clinical setting.
- To ensure that information regarding tasks to be completed during the next shift are communicated clearly to the next team.
- To ensure the transfer of responsibility and accountability of patient care to the next team.
- To standardise the minimum data set according to the over-arching minimum data set.

Content

There are five sections to the minimum data set in order to achieve the aim of transferring information, responsibility and accountability.

1. Environmental awareness
2. Patient identification and demographic details
3. History, evaluation and management
4. Responsibility, risk management and action plan
5. Accountability to ensure patient safety

The general medicine shift-to-shift minimum data set for clinical handover among nurses therefore follows these headings.

Environmental awareness

1. Alert and safety
   - Within the general medicine ward all patients who might be at risk to themselves, other patients or healthcare professionals should be handed over (eg. Patients who are confused, wandering around the ward, exhibiting aggressive behaviours). Notification of any equipment/device failures should also be transferred.

2. Advanced notice (especially high risk patient movements)
   - This is especially important regarding patients who are being discharged from intensive care units and all patients being transferred from the Department of Emergency Medicine.

3. Attention (to sick/deteriorating patients)
   - All patients who had a MET call during the last shift and all patients who have the potential to deteriorate should be handed over clearly.
Patient identification

As the handover sessions are conducted face-to-face, away from clinical care settings, patient identification is normally provided on the computerised handover sheet, however, it is very important to confirm these details verbally to minimise commission error (due to handover sheets not being updated properly). Given that the handover process is away from patient care, the location of the patient needs also to be included.

1. Textual identification (at least surname)
2. Numerical identification (hospital unique identifier or age)
3. Location (bed/room number)

History, evaluation and management

As the content of handover messages mostly can be classified as task based, it is important to not only hand over the task, but also the background information and the rationale for the task. It should therefore include history and issues that are relevant, evaluations conducted to date, especially the working diagnosis as well the management of the patient to date which are relevant for the transfer of responsibility to carry out the tasks.

1. History
   o Within the general medicine setting, this section should include current issues and relevant past medical history for the particular tasks required to be performed.

2. Evaluation
   o This section should include the current working diagnosis.

3. Management to date
   o A brief summary of the management of the patient to date should be provided, especially from the nursing care’s perspective.

Responsibility, risk management and action plan

While the current handover process tends to transfer the tasks required to be completed well, it does not provide adequate information to transfer the responsibility of care. Therefore, when a task is transferred, it is essential that the team provides some recommendations to the incoming team. The minimum data set should also emphasize abnormal investigation results for follow up, in order to achieve the goal of patient safety improvement.

1. Tasks to be completed and recommendation
   o This is especially important for specimens and other tasks.

2. Abnormal results and observations which require further follow up
   o All abnormal results and observations should be included, with a clear plan for follow up arrangements.
3. Risk management (checklist)
   - Allergies
   - Bowel motion
   - Catheter (bladder)
   - Diet: fasting/enteral feeding
   - Emotion
   - Fluid balance
   - Glucose (BSL)
   - Healing of ulcers (wound care)
   - Infusion and medications
   - Juggle activities for procedures
   - Kill germs (infectious control)
   - Lines (especially IV lines)
   - Mobility issues
   - Nutrition (including NGT)
   - Oxygen therapy requirement
   - Physiotherapy/OT and social worker

**Accountability**

It is essential that accountability is transferred to the incoming team and in the setting of general medicine the transfer of accountability includes the following headings.

1. **Patient**
   - MET call and Code status
   - Patient education and information
   - Community nursing or nursing home

2. **Profession and colleagues**
   - Who to contact if there is a problem from nursing perspective, medical perspective and patient’s perspective (i.e. ensuring family member’s contact number is easily available)

3. **Organisation**
   - Discharge planning
   - Discharge script if appropriate
   - Transport organisation
4.7 Minimum data set: General surgery (Nursing)

Clinical setting

The Department of General Surgery at the Royal Hobart Hospital accepts care of patients who have surgical issues requiring further investigation and management. This project used the general surgery ward as the handover research site. The general surgery ward looks after general surgery and vascular surgery patients.

There are a total of 25 beds within the general surgery ward, with a step-down ICU care area, known as the special high observation unit (SHU room), which can cater for up to 3 patients requiring close observation and monitoring. Many of the inpatients under surgical teams, however, present with acute problems and their clinical status changes rapidly. The handover requirements are therefore quite different from those in the department of general medicine or department of emergency medicine. Furthermore, post-operative care normally requires complex and labour-intensive care from nursing staff.

It is important to note that as most general surgery patients are located on the same ward, many junior medical officers work in the same area on the ward. There is therefore constant communication between health professionals and associated changes in patient management plans within this clinical setting. Furthermore, whenever possible, the nurse manager or senior nurse is present during consultant ward rounds to minimise incorrect communication occurring.

There are a total of 34 nurses, consisting of part time and full time staff, working in general surgery. The morning shift has 6-7 staff, excluding the clinical nurse manager. The afternoon shift consists of 5-6 staff and night shift has 3-4 staff. Staff are allocated patients by the incoming in-charge nurse.

Clinical handover description

During the period of data collection for the development of a minimum data set, the general surgery ward already had a plan to implement bed-side clinical handover. Therefore, the minimum data set generated is geared towards the implementation of bed-side clinical handover. There are three clinical handover sessions per day regardless of the day of the week.

The general surgery nursing handover has a very good structure which has been established over a number of years. A handover sheet is firstly updated on the computer each shift and printed off for each incoming staff member. The handover sheet consists of:

- Patient name and age
- Admission data, unit and diagnosis
- Operation and operation date
- Medical history
- MET risk
- In situ devices
- Urgent nursing care and treatment
This handover sheet forms the guide to support verbal handover. Each patient chart also contains a nursing care plan with basic care details that are updated every day (e.g. hygiene, dressings, mobility, allied health referrals etc.). During the morning and night time handovers, there is a 30 minute overlap between shifts and in the afternoon, there is an overlap between incoming and outgoing teams of 1 hour and 45 minutes during which handover occurs.

Objective

The minimum data set for shift to shift handovers in general surgery for nurses is therefore designed to achieve the following objectives:

- To provide an overview of the patients and the environment of their care.
- To alert the incoming team to patients who require special care during their shift, especially focusing on patients who require intensive medical observation and care.
- To ensure that information regarding tasks to be completed during the next shift are communicated clearly to the next team.
- To ensure the transfer of responsibility and accountability of patient care to the next team.
- To standardise the minimum data set according to the over-arching minimum data set while allowing enough flexibility for the combination of handover sheet, bed-side and nursing care plan handover.

Content

There are five sections to the minimum data set in order to achieve the aim of transferring information, responsibility and accountability. It is important to note that the sequence of information delivery might need to be altered in order to fit into the handover format (i.e. bed-side handover with handover sheets as support). However, the following headings are still the most important minimum data set to allow adequate transfer of responsibility and accountability during handover.

1. Environmental awareness.
2. Patient identification and demographic details
3. History, evaluation and management
4. Responsibility, risk management and action plan
5. Accountability to ensure patient safety

Environmental awareness

1. Alert and safety
   - Within the general surgery setting, this is especially important due to the number of patients on the ward, equipment/device failures and other issues such as staffing issues.

2. Advanced notice (especially high risk patient movements)
   - All patients who are coming back from theatre or ICU or going to theatre or ICU should be clearly identified as well as patients who might be discharged.

3. Attention (to sick/deteriorating patients)
All patients who had a MET call during the last shift and all patients who are deteriorating should be highlighted.

Patient identification

As the handover sessions are conducted face-to-face it is important to identify key issues prior to moving to the bedside, as a result the following identification information is considered important.

1. Textual identification (at least surname)
2. Numerical identification (hospital unique identifier or age)
3. Check ID and alert at the same time

History, evaluation and management

This information in general surgery handover format (i.e. bedside clinical handover with a computerised handover sheet), is mainly transferred through the typed computerised clinical handover sheet, with the bedside clinical handover aiming to emphasize key information that is relevant to tasks/responsibility required.

1. History
   o Within the general surgery setting, this section should include the operation and operation date (or pending operation and time).

2. Evaluation
   o This section should include information regarding examination and investigation findings, as well as the current working diagnosis.

3. Management to date
   o A brief summary of the management of the patient to date should be provided.

Responsibility, risk management and action plan

It is essential that the team provides some recommendations to the incoming team. The minimum data set also emphasises abnormal investigation results for follow up, in order to achieve the goal of patient safety improvement.

1. Abnormal results and observations that require further follow up
   o Staff should make a clear statement regarding the stability of the patient’s current condition (i.e. stable, unstable, confused or deteriorating).
   o All abnormal results and observations should be included, with a clear plan for follow up arrangements.

2. Tasks to be completed and recommendations
   o This section should include medical issues and details of the management plan.
   o Ongoing nursing care and evaluation plans
3. Risk management and continual care plans
   - Mobility
   - Dietary management (i.e. fasting, clear fluid etc)
   - Wound care
   - Pain management
   - Allied health involvement
   - Education for patient

Accountability

1. Patient
   - MET call and Code status

2. Profession and colleagues
   - Clinical and medication charts checked
   - Who to contact if there is a problem.
   - Clarification and questions, especially sensitive issues addressed
   - Documentation
   - Communication and liaison with other teams

3. Organisation
   - Discharge planning that requires organisation (script, transfer, referral, appointments, education, family, etc.)

4.8 Minimum data set: Emergency medicine (Nursing)

Clinical setting

The Department of Emergency Medicine at the Royal Hobart Hospital looks after acute presentations of all patients, including paediatric, adult care, women’s health, mental health and trauma. The Department of Emergency Medicine looks after many patients at any one time and while nurses have been allocated to look after certain patients, the complex-dynamic environment and rapid change-over of patients mean that nurses need to multi-task on a continual basis. Many patients are sick and they require constant intensive observations. Furthermore, they have the potential to deteriorate and there is a high intensity of information transfer, between monitoring and other devices with nurses, among nurses and between nurses and other healthcare professionals. Constant interaction, discussion and interruption are the norms in the Department of Emergency Medicine. The pressure of efficient and effective care delivery dictates the need for rapid communication and team work from doctors and nurses, as well as other healthcare professionals and healthcare teams.

Due to the acuity and complexity of nursing care delivered in the Department of Emergency Medicine, continuity of care is essential during the handover period. It is also very important for nurses to understand the impact of the external working environment on their workflow and workloads. The main task of the Department of Emergency Medicine is the management plan of the patient (i.e. is it likely that the patient will require inpatient care or can a diagnosis be reached and a management plan derived in order to discharge the patient back to the community or
This working model has important implications for the required minimum data set for clinical handover among nurses as the most important role of clinical handover is to ensure the smooth transition and completion of tasks required for patient discharge planning.

**Clinical handover description**

There are three main clinical handover sessions per day, regardless of the day of the week. Varying times of 'shift overlap' were observed within the ED (i.e. day/afternoon 2hrs, afternoon/night 45 minutes, and night/day 15 minutes). At the commencement of evening and night shifts, the clinical handover always begins in the shift change room. There were minimum interruptions during handover. Most often, oncoming nurses arrived prior to the commencement of shift, with the additional presence of a Clinical Nurse Manager and Nurse Educators. The outgoing nurse co-ordinator was observed to perform a face-to-face, verbal report at the commencement of handover. This report generally included: a brief summary of the previous shift; a brief departmental overview. After the briefing, parallel handover occurs in each of the following areas: A-side (acute), B-side (non-acute), Resus, Short Stay Unit and the General Clinic and Triage.

Clinical handover in the general cubicle areas and in resuscitation rooms occurs most often outside the cubicle, near the computer terminal where patient notes are kept. In the Short Stay Unit and General Clinic areas, clinical handover takes place most often at the nurse’s desk where patient records are accessible. Nursing staff provide face-to-face, verbal handover on those patients occupying 'cubicles' or bed spaces allocated to them. It is very important to note that the outgoing team is handing over the patient permanently to the incoming team. Therefore, the handover in the Department of Emergency Medicine requires a thorough and concise handover in order for the incoming team to accept the full care and responsibility for the patient.

**Objective**

The minimum data set for shift to shift handovers in the Department of Emergency Medicine for nurses is therefore designed to achieve the following objectives:

- To provide an overview of the patients and the environment of their care.
- To alert the incoming team to patients who have the potential to deteriorate rapidly or patients who will require immediate and intensive medical attention.
- To ensure that information related to tasks is clearly and thoroughly communicated to the next team and to the individual nurse who is going to be responsible for the care.
- To ensure the transfer of responsibility and accountability of patient care, permanently to the next team and the individual who has agreed to accept the care of any specific patient.
- To standardise the minimum data set according to the over-arching minimum data set while allowing enough flexibility given the complex-dynamic and rapidly changing environment.
Content

There are five sections to the minimum data set in order to achieve the aim of transferring information, responsibility and accountability.

1. Environmental awareness
2. Patient identification and demographic details
3. History, evaluation and management
4. Responsibility, risk management and action plan
5. Accountability to ensure patient safety

The shift-to-shift minimum data set for clinical handover among nurses in the Department of Emergency Medicine therefore follows these headings.

Environmental awareness

1. Alert and safety
   - This is especially important for patients with mental health disorder or other patients who might be at risk to themselves or other people, as well as equipment/device availability, bed-blocks, staffing issues (including staffing allocation).

2. Advanced notice (especially high risk patient movements)
   - Patients who are being brought in by ambulance or to be transferred to ICU, or the pending arrival of category 1 patients.

3. Attention (to sick/deteriorating patients)
   - Any patient who has the potential to deteriorate or is currently deteriorating.

Patient identification

As the handover is carried out near the bed-side, it is important to involve the patient in process through ID band check. The most important identifications are:

1. Textual identification (at least surname)
2. Numerical identification (the age of the patient)
3. Check ID band and other issues (such as IO, violence, infectious disease)

History, evaluation and management

As there are many patients in the Department of Emergency Medicine at any one time, it is important that the handover is provided in an effective and efficient manner.

1. History
   - The most important part of the history is the presenting complaint and current working diagnosis, as well as other relevant past medical history and recent presentations to the Department of Emergency Medicine.

2. Evaluation
   - This section should include current observations and investigations.
3. Management to date
   o A brief summary of the management of the patient to date (both hospital and pre-hospital arrival).

Responsibility, risk management and action plan

It is essential that the individual conducting handover provides some recommendations to the incoming team. The minimum data set should also emphasize abnormal or pending investigation results for follow up, in order to achieve the goal of patient safety improvement.

1. Tasks to be completed and recommendations
   o This should include a statement of the tasks required and recommendations related to each of the tasks, such as admission/discharge, further investigations, treatment, follow up etc.

2. Pending results and investigations which require transfer or follow up.
   o All pending investigations should be included, with a clear plan for transfer (such as CT scan) or follow up.

3. Risk management: Abnormal observations and psycho-social issues
   o Any abnormal observations should be emphasized as well as any psycho-social issues which require further follow up.

Accountability

Within the Department of Emergency Medicine the following headings are important.

1. Patient
   o Patient’s likely discharge status and whether the patient/family have been informed, and whether transport needs to be organised.

2. Profession and colleagues
   o Check the medication chart, fluid orders and nursing care chart.
   o Establish the medical officer responsible for the care
   o Identify any communication requirements with inpatient team.

3. Organisation
   o The bed request status, availability and inpatient care, as well as requirements for and availability of allied health care.
4.9 Over-arching minimum data set

As discussed in section 3.5 above, concurrent with the process of developing the minimum data sets for each of the six clinical areas described above, the project team also engaged in a comprehensive analysis of the similarities and differences between them. This analysis led to the development of an over-arching minimum data set that provides a coherent frame of reference for supporting transferability of clinical handover improvement initiatives in different clinical settings.

More specifically, this over-arching minimum data set emphasizes the transfer of information, responsibility and accountability. The ability of this over-arching minimum data set to support ‘flexible standardisation’ is validated by its ability to accommodate all six minimum data sets presented in this report. It is anticipated that further validation of the capacity of the over-arching minimum data set to support flexible standardisation and transferability will be generated during the production of the standardised operating protocols in the six clinical areas (project deliverable 3).

It should be noted that following the development of the over-arching minimum data set the project team re-designed each of the six minimum data sets using the same framework as described above. This section presents the over-arching minimum data set.

Objective

To achieve standardisation of minimum content during clinical handover in order to achieve the aim of transferring information, responsibility and accountability.

Content

There are five sections to the over-arching minimum data designed to achieve the aim of transferring information, responsibility and accountability.

1. Environmental awareness
2. Patient identification and demographic details
3. History, evaluation and management
4. Responsibility, risk management and action plan
5. Accountability to ensure patient safety

Environmental awareness

It is essential that the incoming team/individual is aware of the situation and circumstances of the working environment. The first section, situational awareness, is to alert incoming teams/individual’s to these issues. It is further divided into three categories to emphasise patient safety:
• Alert and safety
  o Objective: To emphasis patient or occupational safety during the commencement of the shift.
  o Description: Information regarding individual patients or the working environment that may impact on safety of patients, healthcare professionals or others.
  o Examples: (Staffing issues, patients who might be violent, infectious diseases issues and equipment/device failures/availability).

• Advanced notice
  o Objective: To highlight potential patient movements so that incoming teams can devise plans to manage their workloads.
  o Description: Information regarding potential patient flow given in a summarised manner.
  o Examples: (Name of patients expected to leave the ward/care and name of patients expected to receive care from the ward/ team)

• Attention
  o Objective: To identify and divert resources to patients who are deteriorating or might deteriorate.
  o Description: Information regarding patients who will require significant levels of care.
  o Examples: (Names of patients who had a Medical Emergency Team (MET) call, patients who are deteriorating or who might deteriorate).

Patient identification and demographics

The second step in clinical handover is the identification of individual patients. In order to confirm and safeguard the patient identification process, at least two identifications are required, one textual and one numerical.

• Textual identification
  o Objective: To notify incoming team about patients.
  o Description: Full name of the patient
  o Example: Mr. XXX

• Numerical identification
  o Objective: To provide confirmation of patient identification and allow rapid access to electronic information.
  o Description: Either the unique hospital identifier or the patient or date of birth.
  o Example: The URN is XXXXXX, or the date of birth is XX of month, 19XX

• Other demographics or identification
  o Objective: To provide overview of patient demographics.
  o Description: age of the patient or checking arm-band in bed-side clinical handover.
  o Example: Checking of arm-band should be carried out in bed-side clinical handover, otherwise, the age of the patient should be provided.
**History, evaluation and management**

The third step in clinical handover is the provision of an accurate and holistic view of current issues and progress in the investigation and management of the patient during the previous shift. It should include history, evaluation and management plan to date.

- **History**
  - **Objective:** To provide an understanding of clinical issues that might affect the care of the patient.
  - **Description:** The history should include a statement regarding the presenting complaint/operation date, relevant past medical problems, but most importantly, current issues which require addressing.
  - **Example:** Presenting complaint is XXX (or operation date), relevant past medical histories include and the current issues are XXX.

- **Evaluation**
  - **Objective:** To provide an understanding of the current diagnostic/care rationale.
  - **Description:** This should provide the diagnostic and care understanding by analysing the physical examination or investigation results.
  - **Example:** Physical examination findings of XXX supports the diagnosis of XXX. The following investigations have been performed and the current diagnosis/differential diagnoses are XXX.

- **Management plan to date**
  - **Objective:** To provide an understanding of management plan to date in order to allow continuation of management plan.
  - **Description:** This should include management or care plans which have already been carried out, which may be of relevance to the incoming team.
  - **Example:** The patient has received XXX and has undergone XXX therapy and XXX treatment relieved the symptoms.

**Responsibility, risk management and action plan**

The fourth step in clinical handover is the transfer of all responsibility regarding the care of the patient to the next team. This step is not well carried out during the current clinical handover process. It is essential that all responsibility for patient care is transferred from one team to the other. This section is especially designed to minimise discontinuity of patient care, with special emphasis on patient safety. This whole section needs to emphasise the transfer of information and care from one team to the other.

This can only be adequately achieved through face-to-face handover in order for the receiving team to understand the tasks at hand. Furthermore, the transfer of responsibility requires the transfer of tacit knowledge about patient care.

It consists of three important aspects: Tasks to be completed, abnormal and outstanding results and observations as well as risk management strategies. It is recommended that all transfer of responsibility should include actions and recommendations.
• Tasks to be completed
  o Objective: To provide a clear list of tasks required for the care of the patient.
  o Description: This section should include all tasks required to be completed, such as dietary requirements, medication requirements, dressing requirements and follow up of results.
  o Example: Check haemoglobin results and organise transfusion if haemoglobin is less than 70.

• Outstanding and abnormal results or observations
  o Objective: To ensure continuity of care and to prevent deterioration.
  o Description: This section should include all abnormal results and observation for follow up.
  o Example: Oxygen saturation has dropped to 90% and oxygen therapy has been initiated. Medical officer contacted 20 minutes ago, awaiting review.

• Risk management issues
  o Objective: To ensure the continuity of risk minimisation for patient safety.
  o Description: This section should include hospital wide risk management strategies, such as fall risks, mobility and sedation risks.
  o Example: This patient is unsteady on his/her feet, he/she needs assistance for personal hygiene.

**Accountability**

The last step in clinical handover minimum data set is the transfer of accountability. The transfer of accountability during clinical handover ideally requires clear documentation and acceptance of the care of the patient. It should include the following aspects.

• Patient
  o Objective: To ensure the accountability for the care of each individual patient is delivered to the incoming responsible individual/team
  o Description: Patient’s preference of care must be delivered and the accountability for that preference of care must be transferred. Therefore, the code status, Medical emergency team (MET) call status and other preferences must be communicated clearly.
  o Example: This patient has expressed wishes not to receive resuscitation, he/she is however for MET call.

• Profession and colleagues
  o Objective: To ensure that the incoming team understand the tasks ahead as well as the consultant in-charge of the overall care of the patient.
  o Description: This section should allow for double-checking and clarification as well as transfer of accountability to the consultant in-charge regarding any issues.
  o Example: If the patient deteriorates, Dr. XXX wants you to call him. Are there any questions that you want clarify?
- Organisation
  - Objective: To ensure the most efficient patient flow through the organisation.
  - Description: All issues related to discharge planning should be transferred from one team to the other.
  - Example: This patient will require community nursing care at home when discharged tomorrow, please organise it during your day shift.
Over-arching minimum data set

Step 1: Environmental awareness

- Alerts and safety
- Advanced notice (especially high risk patient movement)
- Attention (to sick/deteriorating patients)

Step 2: Patient identification

- Textual identification (at least surname)
- Numerical identification (hospital unique identifier or date of birth)
- Wrist band check or other demographic data

Step 3: History, evaluation and management

- History (presenting problem, relevant past history and current issues)
- Evaluation (physical examination findings, investigation findings and current diagnosis)
- Management to date.

Step 4: Responsibility, risk management and action plan

- Tasks to be completed (include the tasks as well as recommendations)
- Outstanding or abnormal results and observations (include a list, as well as actions and recommendations)
- Risk management

Step 5: Accountability

- Patient (code status, MET status, other relevant information)
- Profession and colleagues (treating and responsible doctors, charts and clarifications)
- Organisation (discharge planning)
5. Challenges

This section of the report briefly outlines some of the key challenges faced by the project team during the development of minimum data sets. A number of these issues were already reported in the second progress report. Below highlights key challenges experienced during data collection, analysis, validation and in consideration of the challenges of transferability and implementation.

5.1 Data collection

The main challenge experienced during data collection was simply the availability of staff and interruptions posed by normal workloads of providing clinical services. Many staff were very willing to participate in the data collection process, and some staff volunteered their personal time to do so, but it was still often difficult to find convenient/appropriate times. Critically data collection involving clinical staff involves the need to cater for clinical service delivery. Some staff had to be interviewed late at night or early in the morning in order to fit into their working schedules. Furthermore, interviews which are pre-organised often are cancelled at short notice due to clinical commitments. The project team therefore had to be philosophical about these delays and also display persistence to ensure appropriate data collection occurred.

Even during the data collection process, especially during interviews, interruptions resulting from clinical communications via mobile phones and pagers were common. Interviewees were often distracted once there were clinical care deliveries requiring their attention and therefore the data collection process was affected significantly. As a result, it was often necessary to reschedule and start again.

5.2 Data analysis

The most important challenge that the project team faced with data analysis was the variation in the understanding of the clinical handover process and the tendency of individuals to describe clinical handover content very much from their personal experience of current practice. More importantly, many clinicians (both doctors and nurses) view clinical handover as a process of transfer of information only. Interestingly the transfer of responsibility and accountability is most frequently recognised as important mainly by senior clinicians.

In deriving the minimum data sets, the project team’s analysis took into account the need to consider local socio-technical contexts as well broader national and international perspectives as well as the specific objectives of this ACSQHC project to improve the clinical handover process. As a result, the team used data collection and analysis to also stimulate reflection by participants on the nature and importance of clinical handover. The project team also work hard to generate the over-arching minimum data set to contribute to the development of an approach to provide a standardised solution. It is anticipated that this work will be further developed with the
generation of standardised operating protocols (SOPs - deliverable 3) and training materials for SOPs implementation (deliverable 4).

5.3 Validation

The current minimum data sets have undergone thorough and intensive validation in the six clinical settings of the Royal Hobart Hospital.

As described in section 3.5 above - initial versions of the minimum data sets from all six clinical areas were developed through analysis of observations, interviews and handover messages. These initial versions were then put into an iterative process of refinement and validation by trialling them in each clinical area. This trialling involved doctors and nurses using the minimum data sets and interacting with the project team researchers to provide comment and further feedback on improving the minimum data sets. This real-life clinical testing provided strong validation of the minimum data sets presented for each clinical area. This process of validation is now continuing through into the development of standardised operating protocols.

The project team expended considerable effort in engaging with staff in each clinical area to continually revise each individual minimum data set on the basis of their feedback from the real-life clinical testing and the analysis of the data collected. This process had the advantage of commencing the process of embedding this minimum data set into staff practice within each clinical area and it is anticipated that this will be further embedded as the standardised operating protocols are developed. It should be noted that the process of trialling some of these minimum data sets was affected by some systemic factors, such as the format of the computer generated handover sheets in some areas. Nonetheless, all these minimum data sets went through multiple iterative feedback loops and validation by end-users in real-life clinical scenarios.

The project team note, the current versions of the minimum data sets for all six clinical areas have been extensively validated prior to the development and implementation of standardised operating protocols or the delivery of the education and training programs that will form the deliverables for the second half of the overall project. The project team anticipate that there will be on-going revision of these minimum data sets although it is not anticipated that these revisions will be major.

5.4 Generalisability and transferability

The development of six minimum data sets in six clinical areas provided the project team with evidence that generalisability of the over-arching minimum data set was achievable. This perspective is supported by the fact the over-arching minimum data set can accommodate a range of different methods for clinical handover, including verbal handover, written handover and bed-side clinical handover. Critically however, the project team are aware that there is a need to allow significant flexibility in the development process of minimum data sets within this framework as each individual ward has differing handover requirements as evidenced by the six examples provided.
The project team believes that the over-arching minimum data set is transferable to other institutions and other wards given the diversity of clinical handover requirement of these six clinical areas. The generalisability and transferability of the over-arching minimum data set, however, requires significant work and customisation, in order to take into account differing socio-technical contexts. Importantly, the project team are keen to further validate the generalisability and transferability of the over-arching minimum data set by trialling it in another hospital in the future following the completion of this project.

In this regard, the project team is keen to emphasise the importance of the initial data collection process as it serves not only as an essential tool to derive minimum data sets for local use but also to engage local clinicians in the clinical handover improvement process.

5.5 Implementation issues

The project team understands the challenges that will be faced during the implementation phase. Therefore, the project team has resisted the request by some clinicians to change the computerised pro-forma, without a clear protocol and implementation plan. The project team believes that the successful implementation of minimum data sets requires a clear change management and implementation plan.

This will have significant implications regarding clinical leadership, corporate strategy alignment, resource allocation, education and training, evaluation and monitoring as well as risk management.

The project team has every confidence that it will be able to develop and trial the standardised operating protocols according to the project time-line. The project team is also highly aware of external factors, such as shift-overlap, resource issues which may impact on the project implementation plan. The project team plans to further explore the issue of implementation and potential solutions in the next deliverable.
6. Conclusion

This report constitutes the second project deliverable of the ACSQHC funded project “Clinical Handover Initiative: Nursing and Medical Handover in General Surgery, Emergency Medicine and General Medicine at the Royal Hobart Hospital”.

The project forms part of the ACSQHC National Clinical Handover Initiative’s.

This report has presented the minimum data sets for clinical handover developed at the Royal Hobart Hospital for the:

- Department of General Medicine - (Medical and Nursing)
- Department of General Surgery - (Medical and Nursing)
- Department of Emergency Medicine - (Medical and Nursing)

This report has also presented the methodology the project team utilised including a summary of key literature reviewed and details of the process of data collection, analysis and iterative trialling and refinement of the minimum data sets produced. The report also provides information on the challenges experienced by the project team in deploying the methodology and the approaches utilised to overcome them.

Most significantly, this report presented an over-arching minimum data set that was generated through the methodological approach. This over-arching minimum data set emerged from a detailed analysis of similarities and differences across the six minimum data sets produced. This over-arching minimum data set provides a coherent frame of reference for supporting transferability of clinical handover improvement initiatives in different clinical settings.

The ability of this over-arching minimum data set to support 'flexible standardisation' is validated by its ability to accommodate all six minimum data sets presented in this report. It is anticipated that further validation of the capacity of the over-arching minimum data set to support flexible standardisation and transferability will be generated during the production of the standardised operating protocols in the six clinical areas (project deliverable 3).
### Interview questions

**Section 1 – Perceptions of Clinical Handover**

1. What is your definition of clinical handover?
2. What are the functions of clinical handover?
3. According to the AMA guidelines, handover is "the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis." What do you think the transferring of responsibility and accountability during handover means?

**Section 2 – Handover processes in respective departments**

1. Can you please discuss how handover is currently conducted in your department?
2. What do you think are the positive aspects of your current handover process?
3. What do you think are the negative aspects of your current handover process?
4. How do you think your current handover process can be improved?
5. What information do you require for continuity of patient care during your shift?

**Section 3 – Handover Education and Training**

1. Have you been formally taught how to do handover?
2. How did you learn how to do handover?
3. Do you think handover should be taught?
4. If yes, how do you think handover should be taught?

**Section 4 – Handover and Information Technology**

1. What do you think about using information technology to support clinical handover?

**To conclude**

1. Are there any other comments or issues that you would like to add to this interview?
4.2.4 Publication 4


Publication 4 delivers a step-by-step guide to improving clinical handover through a whole system, multi-faceted, multi-steps approach. Publication 4 is based on extensive field research and the development of individual standardised operating protocols for each of the 6 clinical areas. Further analysis of the data and each individual standardised operating protocol for the 6 clinical areas derive an overarching standardised operating protocol, as described in Publication 4.

Publication 4 describes the project, methodological approach as well as theoretical frameworks behind the standardised operating protocol. Publication 4 then describes a step-by-step guide to improving clinical handover. There are five steps: preparation phase, design phase, implementation phase, evaluation phase and maintenance phase. There are four findings derived from this publication. The first finding of Publication 4 is the variability of clinical handover practice and the need to understand that prior to designing interventions to improve clinical handover. The second finding of the publication is the need to consider education and training as part of the clinical handover improvement intervention. Education and training needs to be provided to staff prior to any new procedures or protocols are implemented. On the other hand, a standardised clinical handover process must be determined for the particular clinical area and incorporated into the education and training program to improve the effectiveness of the education and training program. Thirdly, Publication 4 emphasises the need for practical evaluation and maintenance of improvement. Publication 4 discusses the need for continual improvement and continual engagement of clinicians in the process. Finally and most importantly, Publication 4 describes the concept of flexible standardisation to take into consideration local clinical practice context and socio-cultural context.

Publication 4 contributes to Key finding 1, 2, 4 and 5. Firstly, Publication 4 provides a practical discussion of how variability in clinical handover practice should be analysed in order to plan for interventions. This builds on Publication 1 and Publication 3 to derive Key finding 1. Secondly, Publication 4 describes the standardisation of clinical handover processes and contents and provides a conceptual discussion regarding standardisation with flexibility (Key finding 2). Publication 4 further defines the role of education and training in clinical handover improvement. While education and training program is essential, it needs to be part of the clinical handover improvement program with defined procedures and protocols (Key finding 4). Finally, Publication 4 continues to emphasise the need to engage clinicians to minimise deviation from practice and to continue the improvement process by promoting the safety value of clinical handover interventions (Key finding 5).
ROYAL HOBART HOSPITAL

National Clinical Handover Initiative:

Nursing and Medical Handover in General Surgery, Emergency Medicine and General Medicine at the Royal Hobart Hospital

Over-arching Standardised Operating Protocol (SOP)

Submitted to Australian Commission on Safety and Quality in Health Care (ACSQHC)

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1. **Introduction**

1.1 **Project background**

This report constitutes the third project deliverable of the ACSQHC funded project “Clinical Handover Initiative: Nursing and Medical Handover in General Surgery, Emergency Medicine and General Medicine at the Royal Hobart Hospital”. The project forms part of the ACSQHC’s National Clinical Handover Initiative.

The Australian Commission on Safety and Quality in Health Care (the Commission) has identified clinical handover as one of its top priorities for work in 2007-2008. This priority is in the context of Australia taking a lead role in producing a standard operating protocol for clinical handover as part of its participation in the World Health Organisation’s ‘High Fives’ initiative (ACSQHC, 2007).

The Commission’s focus in this priority program seeks to achieve:

1. Significant, sustained and measurable reduction in communication gaps in the continuity of care delivery;
2. Reliable measures of impact on patients outcomes focusing on the information systems and communication processes that support handover;
3. National learning on handover by enabling sharing of transferable and sustainable handover solutions;
4. Standardised operating solutions for handover communication that will contribute to Australia’s participation in the ‘High Fives’ initiative.

This document presents an over-arching standardised operating protocol (SOP) that has been developed as part of this national initiative to improve clinical handover. This SOP has been generated from data collected from six areas: medical and nursing shift to shift clinical handover for General Medicine, General Surgery and Emergency Medicine. This over-arching SOP will be further validated in these six areas to provide an evidence based guide for standardisation. This SOP is applicable to both medical and nursing shift to shift handover and although this protocol may be applicable to other scenarios, the evidence for its utilisation is limited to medical and nursing shift to shift handover. It is the intention of this SOP to provide an inclusive framework which allows for future expansion. This over-arching SOP is also intended to encompass both medical and nursing professions in order to contribute to moves towards multi-disciplinary handover. Whilst this SOP currently does not cater for multi-disciplinary handovers, it is anticipated that its inclusive framework builds the platform necessary for future development and implementation of a multi-disciplinary handover.

The context of this work recognises that the system for the delivery of healthcare services is a very complex one involving multiple parties with a common aim to deliver the highest quality of care. Safety and quality in patient care depends largely on effective communication between various healthcare providers. Transfer of information between healthcare providers should ideally contain all relevant information in an accurate, unambiguous and timely manner. This will ensure that appropriate actions can be taken to facilitate the best quality care. Breakdown in communication has been identified as one of the most important contributing factors in serious adverse events.

Many factors have been identified as impacting on communication. One of these factors is the growing trend to reduce working hours for healthcare professionals, (especially junior medical
officers), in recognition of the fact that fatigue may contribute to poor work performance (Junior Doctors Committee, 2004). In Europe, the European Work Directive will progressively reduce the maximum working hours of healthcare professionals to 48 hours per week (Junior Doctors Committee, 2004). In Australia, the Australian Medical Association has produced guidelines for safe working hours (Australian Medical Association, 2006a). In the United States, the trend towards reduction in working hours is also evident (Kohn et al., 1999). The reduction in working hours has led to an increase in the number of shifts and an increase in the number of teams of healthcare professionals who look after the same patient. Effective and efficient handover processes to transfer information, responsibility and accountability become pertinent.

Shift to shift clinical handovers amongst medical staff are not well defined and not well understood (Australian Medical Association, 2006a). Many hospitals do not have a clear policy for effective handover. More importantly, the transfer of responsibility and accountability is not well practiced (Australian Medical Association, 2006a).

The nursing profession on the other hand has had a long tradition of practising shift to shift handover. The effectiveness and efficiency of nursing handover has been scrutinised intensely in recent times. There is still room for improvement in nursing handover in order to optimise the accurate transfer of information, responsibility and accountability. More importantly, the medical profession and the nursing profession need to work together more closely to achieve a uniform understanding of clinical handover.

Although there has been a proliferation of literature in the area in recent years, there remains little evidence base for best practice in handover processes (Wong et al., 2008a). There is a lack of frameworks to assist in understanding handover, developing tools to improve handover and also developing methodologies to evaluate handover practices. This lack is a significant barrier for clinicians and managers to establish practices to transform clinical handover into a more consistent and reliable part of the delivery of safe patient care. Whilst a strong argument exists for face to face handover, the lack of structure in terms of content and process and information tools leads to handover being a highly variable and 'individual' dependent process.

1.2 Project aims

This SOP is designed to directly contribute to the achievement of the four priority objectives identified above and set out in the priority program for clinical handover in 2007-2008 by the Commission.

This SOP has been developed in the context of a recognised need for solutions that are transferable at a national and potentially international level. Importantly, however, this SOP has also been developed with recognition of the fact that any standardised solution will also require the capacity to be adapted to local circumstances in order to ensure integration to achieve safer clinical care. This SOP aims to achieve the following objectives:

1. A standardised solution which allows seamless integration into the local clinical context to improve clinical handover.

2. A standardised solution which will provide tools to clinicians and managers interested in the area of clinical handover to implement clinical handover improvement initiatives within their local clinical services.

3. A standardised solution which will reduce communication gaps for patient care.
4. A standardised framework which allows for national learning from local adaptation and implementation of the standardised operating protocol.

5. A standardised framework which will enable evaluation of information tools and communication processes for patient safety.

In order to achieve the above objectives, this **SOP consists of five phases**. Each phase has a number of individual steps described in terms of background issues, objectives, framework, local considerations and tools and guidance. The objective of this SOP is to enable clinicians and managers with little knowledge of clinical handover to have a clear understanding of the issues involved and be able to design and implement clinical handover improvement initiatives.

More importantly, another objective of this SOP is to provide a platform for future integration and collaboration with other clinical handover projects funded by the Commission nationally. The SOP also aims to provide a platform for further collaboration with the Commission's other eight priority programs.

**1.3 Frameworks**

It is important that the framework for this SOP be well defined in order to improve the transferability and generalisability of this standardised solution. This SOP draws on, and adapts insights from a number of different frameworks for different phases of the SOP. These frameworks take into consideration the potential to incorporate and collaborate with other clinical handover projects funded by the Commission nationally as well as the Commission's eight other priority programs approved by the Australian Health Ministers' Conference in 2007.

For the purpose of this SOP on shift to shift medical and nursing handover, the definition of clinical handover from the United Kingdom National Patient Safety Agency (Junior Doctors Committee, 2004) and the Australian Medical Association in their 'Safe Handover: Safe Patients' guideline (Australian Medical Association, 2006a) is adopted:

"the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis"

It is important to emphasise that clinical handover requires a transfer of information, responsibility and accountability for patient care. This SOP has been developed to emphasise all of these elements of clinical handover.

**1.3.1 User-centred frameworks**

The SOP emphasises the principles of user centred approaches and user engagement in the quality improvement process (Wong et al., 2007). It is imperative that clinicians and managers who wish to adopt this standardised solution adopt a user-centred approach to engagement with health professional colleagues. Although this framework is important in all five phases, it is especially important in the preparation phase and design phase.

The SOP emphasises the need to obtain views and perspectives of end users. This preparation phase allows engagement of end users as well as creating momentum for change. User participation and user-centred design principles were widely used in the development of this SOP. It is important to emphasise that the design process should involve as many users as possible in order to create a collaborative atmosphere among staff.
User engagement and user participation in the implementation and evaluation phases are very important to ensure that the process empowers users rather than limits users from improving the quality of care delivered. Users should be informed of the evaluation approach and engaged in conversations about how to further improve the process.

1.3.2 Adult educational theory

Adult educational theory is the theoretical framework for education and training design used in this SOP. Malcolm Knowles' adult educational theory emphasises that adults learn very differently and learning is best achieved through self-directed learning (Kaufman, 2003). A few assumptions underpinning this concept are:

1. Self-concept: Adult learners are self-directed and no longer dependent on others to learn.
2. Experience: Adults have more experience to draw upon as a learning resource and they prefer to draw on previous experience.
3. Readiness to learn: Adults are prepared to learn skills and knowledge pertaining to their social role.
4. Orientation of learning: Adult learning is directed to problem centred learning which will be immediately applicable to their role.
5. Motivation to learn: Internal rather than external.

This framework is especially important for the design phase, implementation phase and evaluation phase of this SOP.

1.3.3. Iterative feedback frameworks

This SOP emphasises the need to take socio-cultural factors into consideration. This builds on clinical handover work undertaken by the Royal Hobart Hospital and University of Tasmania deploying a holistic socio-technical approach to understanding and improving clinical handover (Wong et al., 2008b). This approach integrates clinical and information systems expertise with qualitative field techniques and user-centred education and training in an iterative feedback loop to support continuous improvement. This approach relies on the benefits and synergies of interactions across the streams to optimise transferability and sustainability (see Publication 4 Figure 1).

Identification of new problems and potential solutions

Clinical process mapping
Holistic analysis

Revision

Prototyping

User Feedback

Monitoring and Evaluation

Reflection and clinical process re-engineering

Publication 4 Figure 1: Iterative feedback process
The iterative feedback framework is especially important in the design and implementation phases. The iterative feedback process not only ensures continual and increasing engagement of end users but also allows the system to adapt to the dynamic nature of healthcare delivery over time.

1.4 Local considerations

The above frameworks for clinical handover improvement highlight a tension between the need for standardisation to support national improvement and the need for flexibility to respond to local socio-cultural circumstances. While this SOP emphasises the need to engage users and to develop a solution for local socio-cultural clinical practice, it recognises the need to deliver standardised solutions for better patient outcomes both nationally and internationally.

This SOP attempts to provide a solution that addresses this tension. It introduces the concept of flexible standardisation and critical standardisation. This concept is shown in the diagram below. A national standardised framework developed for clinical handover may not integrate well with current local clinical context and practices. For this to be useful at a national level, there needs to be some area of overlap between the national standardised framework and local clinical context and practices. This is the process of critical standardisation (see Publication 4 Figure 2) both at a conceptual level and at a practical level. The goal of continual improvement is to expand the surface area of overlap as much as possible, without affecting the local socio-cultural context.

![Diagram showing Desirable Standardisation, Flexible Standardisation, National Clinical Handover Context, Local Clinical Context, and Critical Standardisation](image)

Publication 4 Figure 2: Critical Standardisation

This SOP addresses the need for critical standardisation in each of the phases. Each phase includes a section on local considerations that identifies important issues from the perspective of the local socio-cultural setting and local clinical practices.
1.5 Tools and guidance

This over-arching SOP contains five phases. It is recommended that all five phases be considered by individuals or groups who are interested in improving the clinical handover processes. These five phases are as follows:

1. Preparation phase
   a. Identify local practice and define objectives and rationales
   b. User centred approach
   c. Ensuring readiness for change

2. Design phase
   a. Identify and design content and processes for improvement
   b. User centred and iterative feedback approach
   c. Ensuring flexible adaptation of standardised solutions

3. Implementation phase
   a. Define an implementation plan tailored to local socio-cultural context
   b. User centred and iterative feedback approach
   c. Ensuring co-ordinated implementation phase to maximise impact and minimise risks

4. Evaluation phase
   a. Identify evaluation strategies that fulfil local, national and international needs.
   b. Iterative feedback approach
   c. Ensuring evaluation processes meet local needs and beyond

5. Maintenance phase
   a. Identify critical success factors and ensure continual improvement
   b. Iterative feedback approach
   c. Ensuring continual improvement for better and safer patient care

Publication 4 Figure 3: below provides a flowchart illustrating this process. The SOP will guide users through these five phases.
Figure 3: SOP flowchart

Step 1: Preparation
Do you understand the current handover process from the users' perspectives?
- Yes
- No

Step 2: Design
Have you considered all the necessary tools and standards in your clinical handover?
- Yes
- No

Step 3: Implementation
Have you considered resources and techniques required for change management and user acceptance?
- Yes
- No

Step 4: Evaluation
Have you adopted a framework that addresses local/national/international needs?
- Yes
- No

Step 5: Maintenance
Have you addressed changing user needs using an iterative feedback loop?
- Yes
- No
1.6 Time-resource considerations

A suggested time-resource chart (Publication 4 Figure 4) has been included below for consideration. Time and resource requirements will need serious consideration prior to the commencement of processes for clinical handover improvement. In this time-resource chart, the length of the bars represents the estimated time required and the height of the bars represents the estimated resources required. The chart illustrates that the resource requirement is significantly more intense at the beginning of the project. The time requirement, however, is significantly more important during the implementation phase. Please note: the time resource displayed in the chart is greater than 100% due to the periods of overlap across the five phases.

1. Preparation phase
   This phase is resource intensive. The project team will need to obtain the views of as many users as possible. The project team will also have to promote the handover improvement initiative to as many users as possible. Due to regular movement of staff, it is very important to build the momentum within a short time frame.

2. Design phase
   This is the most resource intensive phase as in order to achieve user-centred design principles, the success of this phase is dependent on the number of end users who have input into the design. More importantly, the differences in opinion from users and the tension between standardised solution and local innovation need to be balanced in order to achieve the appropriate outcomes.

3. Implementation phase
   This phase is time-consuming. For staff to incorporate new practices into their routine work requires time and constant reminders/support. It is very important that evaluation does not happen early in the implementation phase as it will not reflect the real impact of the program.

4. Evaluation phase
   The evaluation phase requires resources and time. Evaluation of local needs may require less effort but will require the same length of time.

5. Maintenance phase
   It is important to emphasise that for the purpose of this SOP, this phase is the design and planning of future maintenance for improvement. The continual improvement plan will ensure future iteration fulfil the function of adapting to changing clinical contexts and practices.
Publication 4 Figure 4: Time-resource chart

Step 1: Preparation
- 20% of resources
- 15% of time

Step 2: Design
- 30% of resources
- 20% of time

Step 3: Implementation
- 30% of resources
- 50% of time

Step 4: Evaluation
- 10% of resources
- 10% of time

Step 5: Maintenance Plan
- 10% of resources
- 15% of time
1.7 Establishment of a team

This SOP is designed for use by a team of individuals working together to achieve the goal of clinical handover improvement. While individual enthusiasm and efforts to improve clinical handover are welcome, it is unlikely that individual efforts will be able to adopt a standardised process, or sustain a long term change for a unit or an organisation.

While the exact number of members and the skill mix within any team is variable, it is suggested that at the beginning of the project, the following skill mix and membership be considered. This SOP acknowledges that different skill mixes will be required at different times. It also acknowledges and recognises some skill mixes may not be available at every unit or institution.

The team should (preferably) include expertise in the following areas:

- **Project leader**
  The project leader should be a clinician who has strong interest in the area of quality improvement and clinical handover.

- **Senior support**
  There needs to be a senior support person who can guide the team through policy frameworks and the establishment of organisational support.

- **Quality and safety expertise**
  The quality and safety expertise is important in ensuring that the project follows the local quality and safety frameworks as well as identifies areas for collaboration with other local projects.

- **Clinician champions**
  Clinician champions should include senior clinicians and end users. This will assist the engagement and empowerment process.

- **Education expertise**
  The SOP will require significant effort in education and training of end users. Therefore educational expertise will assist the process.

- **Systems expertise/ Change management expertise**
  Systems expertise and change management expertise can be brought in during the duration of the implementation and adaptation phase. It is, however, desirable that they are involved from the beginning of the process. This is especially important if the adaptation process involves electronic systems.
2. Preparation phase

This is the first phase of the SOP and should commence once a team has been established and team members understand the rationale for the need to adapt standardised solutions to improve clinical handover. This SOP provides guidance to the team through various stages of the clinical handover improvement process starting with the preparation phase.

2.1 Objectives

It is imperative that this phase is undertaken with a clear understanding of the current clinical handover process within the specific area in order to understand the concept of flexible standardisation. This will allow for assessment of the potential impact of the standardisation process and the adaptation of a standardised solution. Importantly, the preparation phase will also create momentum for change.

The preparation phase of the project aims to achieve the following objectives:

- **Understand the local context from user’s perspective**
  It is very important that the current handover context is clearly defined from the users’ perspectives (Wong et al., 2008b). This should include the context, content and process of current handover practices. Some individuals may have very good insights and ideas for improvement. These should all be taken into consideration in the design and implementation process.

- **Understand the rationale for change**
  For a clinical handover improvement initiative to be successful, users need to understand the rationale for change (Yee et al., 2006). This involves gathering preliminary information in a local context to construct that rationale for change. Whilst many studies support improvement in clinical handover, this information needs to be integrated at a local level. More importantly, the preparation phase should identify events or data which will engage and empower end users for change.

- **Understand the motivators and barriers for change, through risk assessment**
  This process should include the identification of barriers and resistance to change. These may include environmental factors, technological factors and human factors (Turner et al., 2006). More importantly, motivators for change should be identified in order to assist in the process. This process should be carried out through risk assessment.

- **Identify stakeholders and change champions**
  The process of preparation and understanding should include the identification of all stakeholders involved. Stakeholders should include individuals from these different areas: clinical, administrative, quality and safety, education and training, change management, and information technology. More importantly, the preparation phase should identify local change champions. These change champions should be individuals interested in improving clinical handover who command respect from their peers.
• Identify socio-technical issues for handover improvement
The introduction of new processes to improve clinical handover will be affected by the current socio-cultural context within the area (Yee et al, 2006). More importantly, the socio-cultural context will determine the process of standardisation and adaptation of the SOP. It is very important that the preparation phase identifies and seeks to understand these socio-cultural issues and how they may impact on future changes.

• Prioritise the clinical handover improvement initiative
The preparation phase provides an opportunity to prioritise the clinical handover improvement within the unit. It is important that the priority is assigned from the perspectives of the end users, administration and senior support. It is also very important to identify other quality and safety projects and potential future changes to clinical practice to avoid “change fatigue” among staff.

• Identify resource requirements
Resource requirements for the implementation of the standardised solution need to be determined in the preparation phase so as to enable the identification of potential funding sources to support the clinical handover improvement initiative.

2.2 Issues for consideration

During the preparation phase, a holistic understanding of the current clinical handover practice should be established (Yee et al., 2006). It is very important to understand that the current clinical handover process may serve numerous important functions (Turner et al., 2006). It is important to retain these functions, (through other means if necessary) if the implementation of a standardised solution leads to some of these functions not being fulfilled during handover. More importantly, it is important to consider the factors which may affect the handover process. Attempts should be made to design the handover process in order to minimise the impact of dynamic interactions of the factors which may affect clinical handover (Turner et al., 2006). A shift diagram should be drawn to identify handover time (see Publication 4 Figure 5 below).

More specifically, understanding of current clinical handover practice should at least cover three important inter-related aspects: the context of clinical handover, the process of clinical handover and the content of handover. These aspects are described in greater detail below.

2.2.1 Context of handover

The context of handover deals with various factors present in the clinical and environmental context which may impact directly or indirectly on the actual clinical handover process and the clinical handover content. The preparation phase should sensitise the project team to these factors and consider these factors prior to adapting and implementing standardised solutions.

• Continuity of patient care during handover
As the clinical handover process often takes clinical staff away from patient care, it is very important to ensure that this process does not interfere with the continuity of patient care. It is therefore important to identify patient care needs that must be provided for during the handover process, including for example the following:
  o Emergency resuscitation situations;
  o Expected arrival or physical transfer of patients, especially unstable patients;
Specific treatment and management which must be provided at a specific time;

- Unexpected emergencies during handover periods;

- Provision of patient care, such as toileting during handover periods.

The current handover processes may have mechanisms in place to deal with these scenarios, but they may not be explicitly stated, it is important to identify these mechanisms and make them explicit.

- **Multi-disciplinary involvement**

  Most patient care involves more than one professional discipline. Sometimes, continuity of patient care is best delivered by a multi-disciplinary handover process. This is especially important in complex clinical cases or in cases in which multiple different teams of healthcare professionals interact with each other at all times in order to provide patient care. In these cases, the risk of incomplete and unsafe handover is high. Effective multidisciplinary care, however, is difficult to achieve. A good handover culture within the same profession is the foundation for multidisciplinary handover. Therefore, it is recommended that organisations attempt to improve handover for individual profession first prior to implement multidisciplinary handover.

  While multi-disciplinary handover may be desirable in some circumstances, it is often a time and resource intensive activity. The process can be effective and efficient if multidisciplinary care has already been well established to provide patient care, such as in ICU setting. In circumstances where there is minimal inter-professional dependency in clinical care delivery, such as in general medicine, then, multidisciplinary handover needs to be balanced with the need to efficiently transfer information, responsibility and accountability. More importantly, in a multi-disciplinary handover setting, the responsibility and accountability of patient care needs to be clearly delineated.

- **Documentation and relationship with patient notes**

  The current status of medical record documentation and the type of handover utilised will determine the relationship with patient notes. Handover information may be ephemeral in nature (eg. shift to shift handover) or may be regularly referred to as a permanent and important part of patient care (eg. discharge summaries from theatre or intensive care unit). Handover information may be taped, typed or just scribbled on a piece of paper to serve as an information artefact and memory trigger. It is imperative that a standardised handover process consider the documentation and archiving process of the standardised information as part of patient notes. The current state of the medical record, i.e. paper based, electronic or scanned records, will determine the documentation and archiving process of handover documentation.

- **Decision making and decision support in handover**

  This will vary considerably, depending on the type of handover and other processes available to assist with these functions. It is, however, very important for the standardised handover process to consider the role of handover in the detection and management of deteriorating patients.

  This is especially important in after-hours medical and nursing handovers. Handovers should be developed into a safety mechanism to trigger a MET call (Medical Emergency Team) in order to provide a clear plan for the management of a deteriorating patient. It is important to emphasise that handover should not be the only mechanism to detect deteriorating patient. The standardised practice must emphasise the transfer of up to date observation of
patients from one team to the other as a mechanism to identify deteriorating patient. More importantly, the process of handovers should provide junior staff with an opportunity to seek advice for decision support and decision making.

- **Patients and their families involvement**
  Patients and their families should play a central role in managing their health. Their role in the quality and safety of healthcare should be emphasised in patient centred care models. The effectiveness of handover communication, in some situations, may be enhanced by the participation of patients, carers and family members. This involvement should be considered in the design of these standardised handover processes. It is, however, important to note that the role of patient within the handover context has not been clearly defined in the literature. Also, legal frameworks and legal implications should be taken into consideration in involving patients and their families in handover.

- **Educational role of handover**
  The theoretical framework of handover and the real-life practice of handover do not normally include formal teaching as a role embedded within that practice. It is very important to note that handovers, especially shift to shift handovers, carry a very important informal teaching role for junior staff. Students and junior staff often study the medical and nursing practices and cultures through observations and informal interactions with staff members. It is therefore very important that a standardised handover solution provide the opportunity for students and junior staff to continue learning during the process.

- **Shift overlap**
  The effectiveness and efficiency of handovers, as well as the transfer of responsibility and accountability are highly affected by the shift structure. It is very important that a clear understanding of the shift structure be developed during the preparation phase. In staggered shifts, a clear understanding of the current practice of transfer of responsibility needs to be developed.

- **Priority of clinical handover improvements**
  The success of the clinical handover improvement initiative is highly dependent on its priority within the institution, from the perspectives of senior management, the quality and safety unit as well as local clinical unit. The preparation phase should determine the priority of the clinical handover improvement initiative within these areas.

### 2.2.2 Process of handover

The current handover process should be clearly defined from the end user's perspective utilising a combination of techniques. It is imperative that the process is therefore determined from the perspectives of policy (and therefore senior management’s perspective), end-users (and their perceptions of the current process) and practice culture (i.e. do they do what they say they do). Publication 4 Table 1 is designed to assist in the understanding of the current clinical handover process through these perspectives. The risk assessment of the current clinical handover process is important and must focus on improving our understanding of handover through detailed observations and recordings of what it is clinicians need during handover and what it is they often lack. Leveraging from what clinicians already do will be key to advancing handover in specific contexts.
Factors that may affect the process of clinical handover

Many factors have the potential to affect the efficiency and effectiveness of clinical handover (Turner et al., 2006). These factors include interruptions, environmental factors, cultural factors, human performance factors. The impact of these factors on the process of clinical handover should be clearly identified in the preparation phase. It is also important to note whether any preparation work is needed prior to the handover process.

Tools to assist the process of handover and preparation for handover

Various tools can be used to assist in the clinical handover process. It is important that these tools are well defined. These tools may include using a white board, electronic data projectors or clear clinical handover guidelines. More importantly, the preparation phase must clearly identify version control of these tools in order to minimise errors. The preparation time required for these tools to assist the handover process should be clearly noted.

Venue and time

It is very important that clinical handovers are conducted at a fixed time and fixed place and this information is clearly distributed to all parties involved in the handover process. The preparation phase should determine these issues within the current scope of practice. This aspect should be investigated from the perspective of available policies and whether these policies are adequately distributed to all parties. More importantly, from a practical aspect, the quality of the venue for handover and the culture of handover practice should be noted.

Attendance and leadership

Clinical handovers should be attended by key healthcare professionals and they should be punctual. More importantly, there needs to be clear leadership to assist in the efficiency and effectiveness of clinical handover process. The preparation phase should clearly identify the availability of policies, the knowledge of end users and more importantly, the current cultural practices of this aspect of the clinical handover process. Characteristics of the leader for effective handover should be identified.

Fixed agenda and well known checklist

Clinical handovers should have a fixed agenda and a checklist to ensure all aspects are covered. The preparation phase should clearly identify the availability of policies, the knowledge of end users and more importantly, the current cultural practices of this aspect of clinical handover process. It is also important to note the variability of the agenda and factors which affect the variability of the agenda.

Type of handover

The preparation phase should clearly identify the current practice of handover, i.e. office based discussions, bedside, tape recorded, or electronic. It must be emphasised that face to face handover is preferable in most settings. It is also important to emphasise that electronic handover systems or electronic handover tools should refer to electronic systems or tools that have been designed solely for handover and allow for simultaneous access in terms of viewing and entering handover data. These tools must also allow for the transfer of responsibility and information on patient care. Use of spreadsheets and/or word processing tools should only be considered as tools used for information support.
2.2.3 Content of handover

During the handover process, there should be a clearly identifiable transfer of information, responsibility and accountability through standardised content delivery. Minimum data sets may be used by end users during handover and it is important to understand the minimum data sets in order to design a standardised approach. Publication 4 Table 2 is designed to assist in the understanding of the content delivery of current handover practice.

• Verbal/written or verbal versus written
  In handover, the sender transmits the content either verbally or in a written format or utilises both mediums. The receiver of the handover message then either documents the message in a written form or relies solely on their memory to recall the information. These forms of communication should be clearly identified and documented.

• Standardised format
  The efficiency and effectiveness of the handover can be improved with a standardised format for the delivery of most information. There may already be some formal or informal standardisation of this within the current handover process. It is important to identify these formats and what their role is in handover from the perspectives of policy, end-users perceptions and current practice.

• Information tools for consistent content delivery
  Information tools are important to assist in a consistent delivery of content. These may include the use of a checklist, computer print outs, white boards or other information tools. It is important that the content in these information tools is analysed to generate a clear understanding of the current practice.
Figure 5: Shift diagram

- **Morning handover:** 0800hrs to 0830hrs
- **Evening handover:** 1630hrs to 1700hrs
- **Night handover:** 2130hrs to 2200hrs
<table>
<thead>
<tr>
<th>Domain and issues</th>
<th>Policy</th>
<th>Perception from end users</th>
<th>Real-life practice</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Factors which may influence handover:</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Environmental such as:</td>
<td>Is there a clear policy to minimise the impact of various factors on the effectiveness and efficiency of handover?</td>
<td>What do end users think about these factors?</td>
<td>What are the impacts of these factors on handover?</td>
</tr>
<tr>
<td>interruption, shift overlap</td>
<td></td>
<td>Do end users understand the policies around them?</td>
<td>Has any policy in place been followed?</td>
</tr>
<tr>
<td>• Information</td>
<td></td>
<td>What do end users think they do to minimise these factors</td>
<td>Do end users develop certain practices (work-arounds) to avoid the impacts of these factors?</td>
</tr>
<tr>
<td>• Human performance etc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tools to assist handover process:</strong></td>
<td>Is there a clear policy for utilisation of tools to assist the handover process?</td>
<td>What do end users think about tools to assist the handover process?</td>
<td>What tools are utilised in real-life to assist the handover process?</td>
</tr>
<tr>
<td>• Flow charts</td>
<td>Is there a clear policy for auditing handover process?</td>
<td>What do end users need/utilise from their perspective?</td>
<td>Are handover tools available?</td>
</tr>
<tr>
<td>• Posters</td>
<td></td>
<td></td>
<td>Is there any feedback to end users regarding the process?</td>
</tr>
<tr>
<td>• Documentation of each shifts</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Environment for handover</strong></td>
<td>Is there is clear policy on the venue, time and duration for handover?</td>
<td>What do end users think about the location, time and duration?</td>
<td>Are the time, duration and venue of handover clearly understood?</td>
</tr>
<tr>
<td>• Is there a fixed venue?</td>
<td>Is there a clear policy for attendance at handover?</td>
<td>What do end users think about attendance?</td>
<td>Is there a consistency in attendance?</td>
</tr>
<tr>
<td>• Is there a fixed time?</td>
<td>Is there a clear policy for leadership during handover</td>
<td>Is there a clear leader during handover?</td>
<td>Does the leader provide good leadership?</td>
</tr>
<tr>
<td>• Who attends handover and who leads handover?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Handover characteristics</strong></td>
<td>Is there a clear policy for the type of handover required during each shift?</td>
<td>What do end users think about the type of handover which is currently being used?</td>
<td>Is the type of handover conducted consistently?</td>
</tr>
<tr>
<td>• Type of handover</td>
<td>Is there a clear policy on the agenda items/checklists for handover?</td>
<td>What do end users think about agenda for handovers?</td>
<td>Is there any consistency in the agenda of handover process?</td>
</tr>
<tr>
<td>• Agenda</td>
<td></td>
<td></td>
<td>Is there any opportunity for clarification?</td>
</tr>
<tr>
<td>• Opportunity for clarification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Domain and issues</td>
<td>Policy</td>
<td>Perception from end users</td>
<td>Real-life practice</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>------------------------------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Verbal/written/other</td>
<td>Is there a clear policy to guide handover?</td>
<td>What do end users think about the handover process?</td>
<td>What do end users do to transfer information?</td>
</tr>
<tr>
<td>• How do end users transfer the content?</td>
<td>Is there any clear policy to guide written aspects of handover?</td>
<td></td>
<td>Is there any consistency in their approach?</td>
</tr>
<tr>
<td>Standardisation and minimum data sets</td>
<td>Is there a clear policy on a minimum data set for handover?</td>
<td>What information do end users need for continuity of patient care?</td>
<td>What information is transferred during handover?</td>
</tr>
<tr>
<td>• Is there a minimum data set?</td>
<td>Is there a clear policy on transfer of information, responsibility and accountability during handover?</td>
<td></td>
<td>Is there a consistent pattern and information being transferred?</td>
</tr>
<tr>
<td>• Are there any informal rules/standardised content to be transferred?</td>
<td></td>
<td></td>
<td>Is there a clear transfer of information, responsibility and accountability?</td>
</tr>
<tr>
<td>• Does the content transfer cover information, responsibility and accountability?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Information tools to assist handovers:</td>
<td>Is there a clear policy for utilisation of information tools during handover?</td>
<td>What do end users think about information tools to assist handover?</td>
<td>What information tools are utilised in real-life to assist handover?</td>
</tr>
<tr>
<td>• Paper based</td>
<td>Is there a clear policy for achieving handover documentation?</td>
<td>What do end users use/need from their perspective?</td>
<td>What do end users do to the information/ memory aids?</td>
</tr>
<tr>
<td>• Electronic</td>
<td></td>
<td></td>
<td>Are handover tools available all the time?</td>
</tr>
<tr>
<td>• Memory aids</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2.3 Frameworks and techniques

The framework for the preparation phase should be well defined as it determines the techniques that are applicable for preparing any unit/organisation for a clinical handover improvement initiative. The framework adopted by this SOP is a user-centred design framework involving users within all the different processes. Based on the user-centred design framework, techniques used to prepare the unit/organisation include observations, interviews and content analysis. This SOP does not encourage the utilisation of surveys as a primary tool to assist in the process of understanding, as there are limitations in terms of the richness of information which surveys generate. This SOP does acknowledge that there are tools published in the literature which promote the use of using surveys as a data collection technique.

2.3.1 User-centred process

This SOP emphasises the need to obtain a holistic view, but most importantly it emphasises the need to obtain a view from the perspectives of end users (Wong et al., 2008b). It is very important the atmosphere/approach of the preparation phase is one of collaborative problem solving. Therefore, the preparation phase should actively involve and engage end-users. End users must be given reassurance that this process is non-judgemental and the results are not being used for personal performance evaluation or any other purposes. Extensive education and promotion of the user-centred design process needs to take place in the preparation phase. Failure to engage users at this stage will have a significant impact on future development. Importantly, this preparation process should clearly document the differences, (if any) in perception between senior management and end users. More importantly, there are often differences between the perceptions of end users and the real-life practice of handover. It is critical to identify and understand this gap before proceeding to the next phase which is the design phase.

2.3.2 Observations

It has been documented in the literature that the perceptions of end users and senior management are often quite different compared to real-life clinical practice. This difference is often a lot bigger than the Hawthorn effect, i.e. the effect of being observed (Wong et al., 2007). The preparation phase should include some observation sessions to ensure that conceptual understanding of the current handover process matches the real life clinical practice. The project team will need to consider the following issues, using observation techniques.

- **Participant observer vs non-participant observer**
  Participant observers, usually one of the change champions or one of the end users, provide the benefit of understanding the current system and language within the healthcare system. Their view, however, may be biased. Non-participant observers, on the other hand, carry the risk of not being accepted by the unit and/or individuals within it, as well as facing difficulties of not understanding the culture and terminology utilised.

- **Structure vs Unstructured observations: Novice vs Experienced observers**
  Structured observations are easier to carry out for novice observers. The drawback of structured observations is that they may not provide a holistic picture of the phenomenon...
being observed. Unstructured observations can be overwhelming in terms of the volume of data and/or difficulty of understanding, especially for novice observers, but the results may reveal much more detail/insight. Experienced researchers, however, may be difficult to find and their views may also be biased and/or too academically focused without a strong awareness of practical implications.

- **Number of observations required**
  The number of sessions required is highly variable; however, as a guide at least 10 sessions are generally required to reach a clear and deep understanding of the range of existing practices.

- **Observation framework: risk assessment framework**
  The following risk framework is intended to capture drivers, constraints and trade offs and how they are created in the clinical setting. A situation that is highly variable on a daily basis.
  a. For each of the handover scenarios, describe what clinicians do, based on the information gathered through observation sessions;
  b. Identify for each handover scenario, specific ways that the process could break down or fail due to gaps in handover;
  c. Identify and analyse how such gaps are identified (or not);
  d. State the effect of the breakdown on information, responsibility and accountability transfer;
  e. Identify what clinicians do to recover from discontinuities in handover.

### 2.3.3 Interviews

Interviews serve two purposes. Firstly, interviews serve to understand the perception of the handover process and content from the perspective of the end users. Secondly, the interviews serve to engage end users to participate in the change process. It is therefore important to ensure that interviewees are given opportunities to describe the current process and to make suggestions for future improvements.

- **Structured, unstructured or semi-structured interviews**
  There are various methods to conduct interviews: structured interviews, unstructured interviews and semi-structured interviews. The structured interview is a time efficient process but may not provide a holistic perspective. Unstructured interviews, while often revealing useful insights may not provide all relevant information. This SOP recommends semi-structured interviews as the preferred methodology. It, however, acknowledges this particular technique requires the interviewer to have some experience in the conduct of interviews.

- **Novice or experienced interviewers**
  This SOP suggests that experienced interviewers may be a lot more productive in generating a holistic perspective of the current clinical handover process. It is acknowledged that experienced interviewers may not be available and in the event that novice interviewers are used, the project team will need to consider strategies for professional development and skill development to master the technique.

- **Number of interviews required**
The number of interviews required is highly variable; however, it is recommended that in any unit/organisation sufficient interviews should be conducted to acquire insights/engagement with all levels of seniority and all specialities in order to ensure the generation of a deep and thorough understanding of the range of perspectives on the current situation.

2.3.4 Content analysis

The current handover process may incorporate local content that is not part of the standardised content. In this instance, prior to the adoption of a standardised solution, the project team will need to ensure that the process of standardisation does not eliminate the important delivery of local content during handover.

Current handover notes and verbal handover conversations should be collected and analysed to ensure that the current content transfer is well understood by the team. At least 50 handover messages from randomly selected patients should be analysed. This will ensure that an approach that is incorporates ‘flexible standardisation’ can be achieved.

2.3.5 Professional development and skill development

This SOP deploys qualitative field techniques together with information systems and clinical expertise. These techniques have proved important in ensuring the adaptation and implementation of this SOP. It is recommended that any project team therefore ensure that they have adequate resources and a range of experienced staff to guide the process.

This SOP provides numerous tools and guides to assist a team to gain knowledge about the techniques used and to simplify the process to make the approach easier to adapt and implement. It is however very important to acknowledge that the objective transfer of some of these skills and knowledge is a far more challenging process. The tacit aspect of many knowledge and skills is well recognised and this SOP recognises that along with the tools and techniques provided tacit understanding will need to be acquired as an important aspect of the process.

Professional development and skill development of the project team, especially the individuals who are leading the project needs to be achieved in order to facilitate successful adaptation and implementation this SOP. These can be achieved by invited training sessions and expert advice from consultants to provide the necessary up-skilling and professional development.

2.4 Local considerations

There are some issues that the project team will need to consider in any local context. The list below is a guide of issues that the project team should consider in the preparation phase.

2.4.1 Preparation techniques

The SOP suggests specific techniques for understanding the current handover process that require particular skills and knowledge. Locally there may be experts who have alternate skills and knowledge that can be deployed to derive a similar understanding of handover. In these circumstances it is recommended the project team consider these as a potential alternative approach to acquiring understanding.
2.4.3 Time frame

The time frame for this project is dependent on a range of different factors, especially the resources available, the preparedness of the unit/organisation and/or individuals availability to commit to the project, the size of the unit/organisation, the number of steps required to implement the protocol and other factors. It is recommended that the time frame be at least 12 months for the whole project.

2.4.4 Resources requirements

It is important to commit resources in the preparation phase. In the preparation phase, resource requirements should also be identified for the remaining phases of the clinical handover improvement initiative. It is important that resources such as staff, communication requirements, tool requirements, training requirements and other requirements be taken into account.

2.4.5 Skill mix and training

A skills mix is required to implement this SOP in a manner that will ensure its successful adaptation to any unit/organisation. But it is important to note that many of the skills and principles utilised are also applicable to other quality and safety improvement initiatives. Therefore, the up-skilling process and professional development process may benefit the organisation as a whole.

2.4.6 Academic rigor versus practicality

This SOP applies many techniques that are used in academia. This SOP, however, aims to deliver a practical guide to staff requiring practical solutions. As a result this SOP avoids the academic arguments surrounding ontological & epistemological discussions, validity & reliability discussions and/or theoretical conceptualisations. These issues have been addressed in academic publications by the authors of this report. However, any local project team will need to consider the relative importance of academic rigor (ie. the desire to publish) versus practicality of implementation of a standardised solution to improve practice.
2.5 Tools and guidance

This SOP includes guidelines and tools to assist in the preparation phase. These guidelines and tools are as follows:

- **Handover process guide (see Publication 4 Table 1 above)**
  This is a summary table displaying the process of handover from the perspective of policies available, end user's perceptions and practice.

- **Handover content guide (see Publication 4 Table 2 above)**
  This is a summary table displaying the content of handover transfer from the perspective of policy available, end user's perception and practice.

- **Observation guide (Publication 4 Table 3)**
  This is a list of things that it is suggested should be collected during the observation phase, for every observation and every handover scenario.

- **Risk assessment guide (Publication 4 Table 4)**
  This is risk assessment table to determine current problems of handover and its potential risks to patient safety.

- **Handover interview questions (Publication 4 Table 5)**
  This is list of suggested interview questions which will assist in the engagement and empowerment of end users.

- **Clinical handover SOP design checklist (Publication 4 Table 6)**
  This is a checklist to highlight clinical handover design, which contains 25 questions.
Common data that need to be recorded in each work domain where clinical handover is observed.

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>a.</td>
<td>The standard time(s) for handover</td>
</tr>
<tr>
<td>b.</td>
<td>The location(s) in the work area where handover is conducted</td>
</tr>
<tr>
<td>c.</td>
<td>The participants in handover communication (outgoing and incoming)</td>
</tr>
<tr>
<td>d.</td>
<td>The length of time taken for handover (a range in minutes)</td>
</tr>
<tr>
<td>e.</td>
<td>Whether a common structure or set of rules are employed (eg, read-back)</td>
</tr>
<tr>
<td>f.</td>
<td>The minimum information transferred (clarity, brevity, and level of filtering required)</td>
</tr>
<tr>
<td>g.</td>
<td>What is excluded from handover (and the existence of other means for addressing what is not included)</td>
</tr>
<tr>
<td>h.</td>
<td>The level of interaction between staff members (ie, the form of handover eg. do new caregivers ask questions and receive responses?)</td>
</tr>
<tr>
<td>i.</td>
<td>The functionality of tools used (electronic media, checklists, handover sheets), and</td>
</tr>
<tr>
<td>j.</td>
<td>What type of durable record is used and how is it accessed by the health care team</td>
</tr>
<tr>
<td>Process steps</td>
<td>Potential Failure Mode</td>
</tr>
<tr>
<td>-----------------------------------</td>
<td>----------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Provide for care of patient during handover</td>
<td>Insufficient staff to do handover and attend to patient</td>
</tr>
<tr>
<td></td>
<td>Lack of clear understanding of emergency resuscitation process during handover</td>
</tr>
<tr>
<td>Convene participants</td>
<td>Participants not available</td>
</tr>
<tr>
<td>Information transfer</td>
<td>Participants distracted</td>
</tr>
<tr>
<td>Required documents not available</td>
<td>Incomplete information</td>
</tr>
<tr>
<td>Responsibility transfer and clarification</td>
<td>Responsibility not clearly transferred</td>
</tr>
<tr>
<td></td>
<td>No opportunity for clarification</td>
</tr>
<tr>
<td>Accountability transfer</td>
<td>The incoming team does not understand/accept accountability for care.</td>
</tr>
<tr>
<td>Conclusion of handover</td>
<td>Unanswered question or ambiguity</td>
</tr>
</tbody>
</table>

* Recommend simple 3-point (high, medium, low) or 5-point scale  ** Risk priority number = Frequency x Discoverability x Severity
Publication 4 Table 5: Interview questions

**Section 1 – Perceptions of Clinical Handover**

1. What is your definition of clinical handover?
2. What are the functions of clinical handover?
3. According to the AMA guidelines, handover is "the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis." What do you think the transferring of responsibility and accountability during handover means?

**Section 2 – Handover processes in respective departments**

6. Can you please discuss how handover is currently conducted in your department?
7. What do you think are the positive aspects of your current handover process?
8. What do you think are the negative aspects of your current handover process?
9. How do you think your current handover process can be improved?
10. What information do you require for continuity of patient care during your shift?

**Section 3 – Handover Education and Training**

5. Have you been formally taught how to do handover?
6. How did you learn how to do handover?
7. Do you think handover should be taught?
8. If yes, how do you think handover should be taught?

**Section 4 – Handover and Information Technology**

1. What do you think about using information technology to support clinical handover?
Publication 4 Table 1: Clinical handover checklist (adapted from ACSQHC, 2008)

<table>
<thead>
<tr>
<th>Organisation support for handover</th>
<th>1. Is there adequate organisation support to improve handover?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2. Is there a system commitment to clinical handover at the senior executive and senior clinician level to ensure lines of accountability are clear and that appropriate resources (particularly staff time) are allocated for the handover?</td>
</tr>
<tr>
<td></td>
<td>3. Are there enough shift overlaps to conduct effective and efficient handover?</td>
</tr>
<tr>
<td>Continuity of patient care during handover</td>
<td>4. Is there a clear cut plan for continuity of patient care during handover? The following patient care needs must be continued during handover:</td>
</tr>
<tr>
<td></td>
<td>• Emergency resuscitation situations</td>
</tr>
<tr>
<td></td>
<td>• Expected arrival or physical transfer of patients, especially unstable patients</td>
</tr>
<tr>
<td></td>
<td>• Specific treatment and management which must be provided at a specific time</td>
</tr>
<tr>
<td></td>
<td>• Unexpected emergency during handover time</td>
</tr>
<tr>
<td></td>
<td>• Provision of patient care, such as toileting during handover time</td>
</tr>
<tr>
<td>Patient</td>
<td>5. Has the involvement of patients and carers in the handover been considered?</td>
</tr>
<tr>
<td></td>
<td>• Their participation is particularly important when there are transitions in care, changes in routine, movement of patients or if the handover forms a focus for making new management decisions. Patients and/or carers must also be kept informed of changes in clinical understanding and management plans (eg medications and procedures), and this communication should be recorded in the medical record.</td>
</tr>
<tr>
<td></td>
<td>6. Does the handover include the patient’s concerns and relevant psycho-social issues?</td>
</tr>
<tr>
<td>Clinical Teams</td>
<td>7. Is it possible or appropriate to use the interaction during handover to provide an opportunity for active participation and decision making by relevant members of the health care team?</td>
</tr>
<tr>
<td></td>
<td>8. Is a multi-professional handover appropriate?</td>
</tr>
<tr>
<td></td>
<td>• Some handover should include all members of the health care team. This is particularly important where a patient is being cared for by multiple clinical teams of differing clinical specialities?</td>
</tr>
<tr>
<td>Clinical handover process</td>
<td>9. Is there a fixed location and time for handovers to take place?</td>
</tr>
<tr>
<td>--------------------------</td>
<td>------------------------------------------------------------------</td>
</tr>
<tr>
<td></td>
<td>10. Does the handover process have a clear agenda?</td>
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<tr>
<td></td>
<td>11. Is there a leader for the handover process?</td>
</tr>
<tr>
<td></td>
<td>12. Are factors that affect the effectiveness and efficiency of handover minimised? These may include interruption, unavailability of staff, formal teaching programs etc.</td>
</tr>
<tr>
<td>Have the minimum requirements for handover been met?</td>
<td>13. Is information shared about patients, both historical and most importantly about likely future events?</td>
</tr>
<tr>
<td></td>
<td>14. Is there the opportunity to ensure that the staff taking over, understand the information?</td>
</tr>
<tr>
<td></td>
<td>15. Is the transfer of accountability and/or responsibility for a patient or group of patients clear?</td>
</tr>
<tr>
<td></td>
<td>- Face to face handover is safer, and should be used whenever possible (electronic or paper tools should be support tools)</td>
</tr>
<tr>
<td>Task and Technology</td>
<td>16. Does the handover information contain an explicit, practical, minimum data set that is agreed and understood by all participants (see SBAR and the NZ JUMP).</td>
</tr>
<tr>
<td></td>
<td>a. This data set must include correct and accurate identification of the patient, together with a brief history.</td>
</tr>
<tr>
<td></td>
<td>b. The data set should emphasise recent changes in the patient's care.</td>
</tr>
<tr>
<td></td>
<td>17. Can the handover information be made accessible to staff to refer to when needed?</td>
</tr>
<tr>
<td>Individual Clinical staff</td>
<td>18. Are clear lines of accountability and responsibility for care established and understood?</td>
</tr>
<tr>
<td></td>
<td>19. Is the senior clinician responsible for the patients care clearly identified at all times?</td>
</tr>
<tr>
<td>Work Environment</td>
<td>20. Is workplace training in clinical handover (including teamwork and communication) available?</td>
</tr>
<tr>
<td>Evaluation and maintenance</td>
<td>21. Is it possible to develop methods for on-going observation, monitoring and evaluation of handover as part of normal work?</td>
</tr>
<tr>
<td></td>
<td>- These should form part of continual improvement of the process</td>
</tr>
<tr>
<td></td>
<td>- There should be a maintenance plan</td>
</tr>
<tr>
<td></td>
<td>- There should be a mechanism for continual iteration and improvement.</td>
</tr>
<tr>
<td>Institutional Context</td>
<td>22. Do staff share an understanding about the ethical and relevant legislative requirements to ensure appropriate confidentiality of patient information during the handover?</td>
</tr>
<tr>
<td></td>
<td>- The safety of handover can be reduced by concerns arising from misconceptions about these requirements unnecessarily restricting the transfer of information.</td>
</tr>
<tr>
<td></td>
<td>23. Should the handover information be stored permanently, as part of the medical record, or in other ways?</td>
</tr>
</tbody>
</table>
3. Design phase

The design phase follows the preparation phase in this SOP. After obtaining sufficient data to gain an understanding of the handover process, the project team is ready to start the design phase. There will be a slight overlap between the design phase and the preparation phase as illustrated in the timeline diagram above. By the end of the design phase, the project team will have set a date for implementation and have all the tools ready for the implementation of the standardised solution. The standardised solution should include standardised content and a standardised process. This SOP allows significant flexibility in the design phase to incorporate other techniques to improve clinical handover. Many of these other techniques are currently in development through the Australian Commission on Safety and Quality in Health Care national clinical handover initiative.

3.1 Objectives of this phase

This SOP has emphasised the importance of local context and flexible adaptation of standardised solutions. This phase of the project is especially designed to achieve flexible adaptation. The process guide, content guide, information tools, education and training tools designed and developed through this process should contain standardised features incorporating a strong local context.

The design phase of the project aims to achieve the following objectives:

- **Engage end-users in the design of a standardised handover process, which retains flexibility in adapting standardised practice guides**
  This phase aims to design a standardised handover process, which has adapted standardised practice, but retains local flexibility that best serves the purpose of the process within the local socio-cultural setting.

- **Engage end-users in the design of a standardised content transfer, which retains flexibility in adapting available minimum data sets**
  This phase also aims to design a standardised content transfer during handover, based on a standardised minimum data set with local variations.

- **Engage end-users in the design of process tools to assist in the implementation of standardised content transfer**
  Various tools may help the implementation phase of the standardised process and these tools have to fit into the socio-cultural settings of the unit/organisation. End users engagement in the design of these tools is very important.

- **Engage end-users in the design of information tools to assist in the implementation of standardised content transfer**
  This phase should include the design of information tools to assist in the implementation and familiarisation of the standardised content transfer format. Information tools may consist of electronic documents, printed documents, as well as memory aids located near handover areas in order to engage and encourage end users to adapt to the new standardised content transfer with ease.
Engage end-users in the design of an education and training program to implement the standardised process and content of handovers. The introduction of a new process and new standardised content transfer will require education and training of all the end users involved. The education and training should involve all current staff and potential future staff, especially where staff are on a rotational roster. While the education and training program will vary from unit to unit, it is recommended that some staff be trained through the "master trainer" scheme and therefore are available to train other staff on a regular basis.

3.2 Issues for consideration

There are various issues that the project team should consider during the design phase. The main issue involves designing the standardisation of the handover process as adapted to the localised context and process identified through during this phase.

3.2.1 Process flowchart

The first step to design the standardised clinical handover process is to develop a flow chart of the current handover process. The current flow chart should then be compared with the standardised flow chart to assist with the adaptation of this standardised protocol. Through this flow chart, the team can work through the necessary steps and develop a new process for implementation. A flow chart and the explanation of each step and design features are provided and explained below (see Publication 4 Figure 6).

The process should include five steps:

- **Preparation for handover**
  This step should include preparing for the continuity of patient care while handing over and preparing the handover list and/or patient information list

- **Handover structure**
  The handover process should have a clear starting time, place and maximum duration of time allowed. Attendance of key staff should be determined and clear leadership during handover should be defined.

- **Environmental awareness**
  All handovers, regardless of type, should provide the incoming team with a clear idea of the environment and situation that they are working in. This step should include clear guidelines on the detection of deteriorating patients.

- **Individual patient handover, incorporating minimum data sets**
  This step may involve a range of different formats. However, this SOP emphasises that face to face handover is the preferred option. It also emphasises the need to allow interaction and clarification during handover.

- **Meeting closure**
  This may include any important announcements that may affect the incoming team.
3.2.2 Process tools

Once a new process has been designed and agreed upon, the team should inform all members of this new process. There should be process tools available to assist the implementation of the new process. These process tools should be designed during the design phase. These may include posters, guidelines and step by step guides that can be displayed in appropriate places to optimise dissemination of information. A sample step by step guide is provided below.

3.2.3 Content: through minimum data set adaptation

The handover of individual patient information, responsibility and accountability must be achieved through a standardised content delivery. This standardised content delivery for each unit needs to be designed in order to take into account local variations. A minimum data set is provided here which may be adapted into the local context.

It is important to emphasise that this SOP aims to complement the minimum data sets to ensure the transfer of information, responsibility and accountability. The standardised content delivery should include the following elements.

- **Environmental awareness**
  A standardised method and content in order to inform the incoming team of the working environment should be developed. This should at least provide the incoming team with an overview of deteriorating patients and patients requiring immediate attention.

- **Patient identification**
  All handover standardised content delivery should consist of a clear patient identification process. All patients should be identified by, at least, two identifiers.

- **Information transfer**
  The standardised content delivery should include essential information transfer, i.e. background issues, current issues and impending issues.

- **Transfer of responsibility, risk management and action plan**
  The tasks required to be completed by the next team of healthcare professionals, as well as pending investigations and management need to be included in the standardised content delivery.

- **Transfer of accountability**
  The standardised content should include transfer of accountability, and when and where appropriate, the incoming team should document and accept the responsibility and accountability, and this should be archived with patient notes.
3.2.4 Information tools

Once the team has adapted the minimum data set and developed a standardised content delivery for local needs, information tools should be developed in order to assist end users to adapt to the new standardised content delivery format. These information tools range from simple printed forms to complicated computer generated documents. The design of these information tools has to fit into the local practice to achieve the best outcomes. There should be tools to assist end users to tick off standardised content, such as laminated information sheets. These information tools should be easily available and should be used at every handover session.

3.2.5 Education and training program

The design phase will need to include the development of education and training programs to assist in the implementation process. The program should provide enough information to allow the adaptation of the process and the standard content delivery. The design of these educational programs should be simple and competency based. The following sections should be included in the education and training program during the design process.

- **Patient safety requires both systems resilience and a safety culture**
  It is very important that the education and training program emphasises the conceptual understanding of patient safety, system factors in patient safety and socio-cultural factors in patient safety. This provides the necessary introduction and rationale in order to adapt to new changes introduced as part of handover improvement. In order to achieve safer healthcare delivery, both systemic interventions (in order to build system resilience) and socio-cultural interventions (to promote safety culture) are required to work in a complementary manner. The handover SOP aims to achieve this through standardised process and content, as well as the promotion of a culture of safe handover.

- **Handover is a high risk area for patient safety**
  The education and training program should emphasise the importance of clinical handover in ensuring safe patient care. Local case studies may be appropriate for illustration purposes. It is important to emphasise that handover should be conducted using the standard process and content for every patient during every shift.

- **Handover is a priority for patient safety improvement, nationally and internationally**
  The program should emphasise that the clinical handover improvement program is a high priority patient safety area both nationally and internationally. The initiatives and the leading role of the Australian Commission on Safety and Quality in Health Care should be acknowledged. The program should also emphasise the fact that clinical handover is one of the top five priority areas within the World Health Organisation framework. The importance of national and international initiatives cannot be over-emphasised, as these examples often generate momentum among staff.
• The local standardised process for handover
  The education program must go through the standardised process of handover in a step by step manner until all participants understand the process.

• The local standardised content for handover
  The education program must go through the standardised content of handover in a step by step manner until all participants understand the content and all participants have the ability to use the standardised content for handover.

• Techniques to improve communication/team work during handover
  The project team should decide whether team work training and communication techniques training are appropriate in their local clinical context. The inclusion of these training modules may be beneficial to the final outcomes of clinical handover improvement.

• Local implementation plan, including considerations for e-learning
  The education and training program should include a local implementation plan and provide contact details for feedback. More importantly, the project team should consider whether an e-learning platform is appropriate for local use in order to complement and support the implementation plan.

3.3 Frameworks

This design phase requires three different frameworks. The design of process and tools, especially the process and content of handover are based on the user-centred design framework. Due to the difficulties in predicting the effects of an intervention within the healthcare system, this SOP strongly suggests the need to adopt an iterative feedback framework with rapid prototyping and revision. The importance of this process cannot be over-emphasised. The education and training program should be designed based on adult educational framework. These frameworks are described briefly below in order to guide the project team.

3.3.1 User-centred framework

This SOP emphasises the need for a user-centred focus and user engagement as part of the quality improvement process. During the design phase, this framework is most important to engage and involve as many users as possible in order to create a collaborative atmosphere among staff (Wong et al., 2007). The methods to engage users and staff may include collaborative design workshops, participatory design workshops, consultations and voluntary trialling of processes and standardised content formats. It is very important to emphasise that during the design phase, all comments and recommendations should be taken onboard. The project team will then need to balance conflicting views and the availability of resources to achieve the optimal outcomes.

3.3.2 Iterative feedback framework

Due to the complexity of the healthcare system, it is very important to recognise that any intervention, especially systemic interventions, such as the implementation of information tools or process improvement initiatives may deliver unintended consequences (Wong et al., 2008b). This SOP emphasises the need to take socio-cultural factors into consideration. The iterative feedback process is especially important in the design phase. The iterative feedback process not
only ensures continual and increasing engagement of end users but also allows the system to adapt to the dynamic nature of healthcare delivery and respond to changing circumstances and/or consequences.

The iterative feedback process is shown in the Publication 4 Figure 1 above. The project team will need to provide a prototype for end users to provide feedback on. The recommendations and feedback will then be incorporated into the next iteration. The project team may find this process time-consuming and at times frustrating. It is, however, very important that the iterative feedback process be conducted in order to engage users, maintain their commitment and optimise the possibility for best outcomes.

3.3.3 Adult educational theory

Adult educational theory is the theoretical framework for education and training design used in this SOP. Malcolm Knowles’ adult educational theory emphasises that adults learn very differently and learning is best achieved through self-directed learning (Kaufman, 2003). There are a number of assumptions underpinning this concept.

1. Self-concept: Adult learners are self-directed and no longer dependent on others to learn;
2. Experience: Adults have more experience to draw upon as a learning resource and they prefer to draw on previous experience;
3. Readiness to learn: Adults are prepared to learn skills and knowledge pertaining to their social role;
4. Orientation of learning: Adult learning is directed to problem centred learning which will be immediately applicable to their role;
5. Motivation to learn: is internal rather than external.

It is important that the education and training program provides practical direction and skills transfer to learners so that they can immediately put their skills to practice. It is also important that the education and training program maximises the potential to draw on the existing experience of learners in order to obtain the best outcomes.

3.4 Local considerations

There are a few issues that the project team needs to consider during the design phase. These issues will impact on the handover improvement process but are likely to be highly dependent on local clinical settings.

3.4.1 Design technique and end users involvement

The SOP advocates user-centred design techniques, using participatory workshops. This design method requires a certain understanding of the user-centred approach. The local team can understand the technique relatively quickly in order to carry out the workshops. Alternatively, there may be local experts with other related skills and techniques through which the team could derive similar design outcomes.
3.4.2 Time frame and iterative cycles

The time frame for this phase is highly dependent on user feedback. It is suggested some high-value end users, who are very keen to provide feedback, be given time off during work to provide insights and feedback regarding the process and content during the design phase. The number of iterative feedback cycles required is dependent on the initial understanding of the socio-cultural context. If the project team has an in-depth understanding and are able to integrate that with standardised solutions, the iterative cycles may be reduced.

3.4.3 Resources requirements

While this phase will not produce a large number of outputs, it is important to realise that this phase is resource intensive. The project team will need to be able to communicate with end users continuously and be able to establish rapport with end users in order to obtain useful feedback for the design of tools and systems.

3.4.4 Skill mix and training

Different skills will be required in this phase, these will include communication skills, design skills, skills for conceptualisation and interpersonal skills. These skills will be useful in many other projects, especially quality and safety projects. Knowledge and skills to design education and training programs may be available through local nurse educators and tertiary educational institutions.

3.4.5 Theoretical Design arguments versus practicality

This SOP applies design techniques that are underpinned by a sound theoretical framework to support their use. This SOP acknowledges that there are many other design frameworks that investigate systems and the system-human interaction. This SOP avoids argument over the relative validity of different design frameworks. This SOP aims to provide a practical guide to design processes and content that support flexible standardisation. The project team may consider these theoretical aspects if there is a desire to pursue an academic discussion on the relative merits of different design methods.
3.5 Tools and guidance

- **Process flowchart (Publication 4 Figure 6)**
  This process flow chart summarises essential steps for the clinical handover process in a diagrammatic form. This is followed by a detailed explanation of all the steps presented.

- **Minimum data set flowchart (Publication 4 Figure 7)**
  This diagram illustrates the process of utilising the minimum data set. An explanation of the various steps is illustrated in Publication 4 Table.

- **Suggested minimum content for an education and training program (Publication 4 Table 8)**
  This is the suggested minimum content for clinical handover education and training program especially focussed on Australian Healthcare context.
Preparing for handover

Ensure continuity of care is provided. Ensure necessary documents are available for handover.

Time and Place

Convene participants at a fixed time and fixed venue.

Attendance & leadership

Ensure all individuals are in attendance. Ensure leadership is provided during handover.

Environmental Awareness

Identify deteriorating patients. Identify environmental factors which are important.

Individual patient handover

See: minimum data set
<table>
<thead>
<tr>
<th>Process steps</th>
<th>Details</th>
<th>Issues to consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Prepare for handover</td>
<td>Obtain and update necessary documents to support the hand-over. This may include name lists, handover sheets, electronic handovers or other necessary preparations. Ensure continuity of patient care during the hand-over</td>
<td>Do staff have time to complete handover preparation? Are staff assigned for emergency and continual patient care?</td>
</tr>
<tr>
<td>2. Time and place</td>
<td>Convene participants in the hand-over process (may include specifying time to meet, anticipated duration, and location)</td>
<td>It is important to decide whether handover should happen at bedside or office</td>
</tr>
<tr>
<td>3. Attendance and leadership</td>
<td>The handover process should be attended by individuals who will assist in the care of the patient. It is very important that the handover meeting has a leader.</td>
<td>It is important to decide whether multi-disciplinary involvement is an effective process. The handover must have a leader who ensures all relevant agenda items are covered in a timely fashion.</td>
</tr>
<tr>
<td>4. Environmental awareness</td>
<td>Identify patients who are deteriorating and patients who have the potential to deteriorate Identify any environmental or other issues which may affect the shift Identify any patient movements which are likely to happen in the next shift.</td>
<td>MET call criteria should be emphasised and handover may serve as a reminder for MET call. Patient movements especially from ICU should be clearly handed over.</td>
</tr>
<tr>
<td>5. Patient identification</td>
<td>Identify patient's using at least two identifiers, one should be the name, and the other should be numerical.</td>
<td>This will ensure the culture of correct patient identification.</td>
</tr>
<tr>
<td>6. Information</td>
<td>Includes background, current issues and anticipated changes.</td>
<td>The background and current issues are very important for clear handover.</td>
</tr>
<tr>
<td>7. Responsibility, risk management and action plan</td>
<td>For actions, on-going care requirements and monitoring.</td>
<td>Includes all pending investigation results and abnormal results.</td>
</tr>
<tr>
<td>8. Accountability</td>
<td>Transfer of accountability and responsibility must be explicit and documented in institutional procedures. A policy about communication to the senior in charge needs to be understood.</td>
<td>The duties and responsibilities of after hours or cover teams need to be made clear. Adequate staff must be provided to ensure staff can fulfil these duties.</td>
</tr>
<tr>
<td>9. Clarification</td>
<td>There must always be an opportunity for this, and not necessarily just at the end but as appropriate during process steps 5, 6, 7 and 8.</td>
<td>This is one reason that this handover should be done face to face (as staff are leaving the institution) Electronic tools may help ensure details are not forgotten.</td>
</tr>
</tbody>
</table>
Patient identification should include a minimum of two identifiers.

This should include history, evaluation and management to date. Important to include relevant background and current issues.

Handover of tasks, outstanding results and risk management issues.

Accountability to the patients, organisation and profession.

Are there any problems or questions with the above? (This step is important and therefore face-to-face handover is desirable).

If not, any other problems and handover closure.

Next patient
### Step 1: Environmental awareness
- Alert and safety
- Advanced notice (especially high risk patient movements)
- Attention (to sick/deteriorating patients)

### Step 2: Patient identification
- Textual identification (at least surname)
- Numerical identification (hospital unique identifier or date of birth)
- Wrist band check or other demographic data

### Step 3: History, evaluation and management
- History (presenting problem, relevant past history and current issues)
- Evaluation (physical examination findings, investigation findings and current diagnosis)
- Management to date

### Step 4: Responsibility, risk management and action plan
- Tasks to be completed (include the tasks as well as recommendations)
- Outstanding or abnormal results and observations (include a list, as well as actions and recommendations)
- Risk management

### Step 5: Accountability
- Patient (code status, MET status, other relevant information)
- Organisation (discharge planning)
- Profession and colleagues (treating and responsible doctors, charts and clarifications)
<table>
<thead>
<tr>
<th>Patient safety and medical errors</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Medical errors are common.</td>
</tr>
<tr>
<td>• Communication problem is one of the major causes of medical errors.</td>
</tr>
<tr>
<td>• Error reduction and patient safety require systems interventions and a safety culture.</td>
</tr>
<tr>
<td>• In a handover situation, standardisation is the systemic intervention.</td>
</tr>
<tr>
<td>• The success of the process, however, requires everyone to learn it, embrace it and encourage other people to follow it.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Handover is high risk area for patient safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Local case study should be included here.</td>
</tr>
<tr>
<td>• Some data and statistics from the literature, but should tailor to the local clinical context (nursing versus medical, specific wards).</td>
</tr>
<tr>
<td>• One of the reasons that it is high risk is because of lack of standardisation.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Handover is a priority for patient safety improvement, nationally and internationally</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Handover is a high priority area for patient safety improvement internationally</td>
</tr>
<tr>
<td>• Handover is a high priority area for patient safety improvement in Australia; the program should acknowledge the leading role of the Australian Commission on Safety and Quality in Health Care and the current initiatives in this area.</td>
</tr>
<tr>
<td>• Handover is a priority area for improvement within the local setting.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The local standardised process for handover</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Current handover process and problems associated with it.</td>
</tr>
<tr>
<td>• The rationale for the new process.</td>
</tr>
<tr>
<td>• The new standardised process of handover must be introduced in a step by step manner until all participants understand the process.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The local standardised content for handover</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Current content of handovers and problems associated with it.</td>
</tr>
<tr>
<td>• The rationale for minimum data set.</td>
</tr>
<tr>
<td>• Minimum data set introduction.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Techniques to improve communication/team work during handover</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Any techniques which may be introduced, such as team work or communication techniques.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Local implementation plan, including consideration for e-learning</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Overview of implementation plan.</td>
</tr>
<tr>
<td>• Date that it will start.</td>
</tr>
<tr>
<td>• Feedback and other problem: contact number for the team.</td>
</tr>
</tbody>
</table>
4. Implementation phase

Each handover scenario will have an associated handover process. While there is general agreement that the quality and safety of health care depends on the availability of accurate patient information, the information transfer only forms part of the handover process. More importantly, while healthcare professionals often suggest that handovers should be standardised both in terms of process and content, the standardisation process may be resisted if it is not planned and executed in a systematic manner with:
- appropriate guidance,
- allocation of resources,
- provision of education and training,
- provision of support tools,
- engagement of participants,
- empowerment of participants and,
- importantly, positive feedback and celebration of successes.

4.1 Objectives of this phase

This SOP emphasises the need to engage end users and to promote a user-centred approach through flexible adaptation of standardised solutions. This phase of the project is crucial in order to engage users for sustainable change. The implementation process should ensure that end users feel empowered and engaged to make changes. Support in the form of education, memory triggers and information tools should be provided and these support tools should fit into the clinical organisational context. More importantly, end users should understand the rationale for change. The implementation process should ensure end users embrace the change and be able to receive positive feedback and celebrate successes with the project team.

The Implementation phase of the project aims to achieve the following objectives:

- **Establish a project implementation team which consists of all necessary members**
  The project implementation phase should have a project implementation team with clearly delineated responsibilities and expertise. This project implementation team will assist the implementation of the standardised solution.

- **Establish a project implementation work plan so that the implementation process is coordinated**
  This step should include a master work plan to identify the major tasks and milestones relevant to all of the handover scenarios/units. A more detailed work plan is required for each unit participating in the process. All professional disciplines and relevant experts should be represented in developing the master work plan.

- **Establish a risk management strategy for the project to ensure smooth implementation**
  The implementation plan should have a risk registry to ensure all risks to the project have been considered and appropriate steps have been taken in order to minimise the impact of these risks on the progress of the project. While many unexpected barriers and problems may occur during the implementation phase, there are some risks which can be predetermined and these risks should be considered prior to the implementation phase.

- **Pilot the standardised handover process and contents**
This SOP advocates the implementation team focus on one specific handover type as a pilot site for the implementation of the standardised solution. The complexity of medical practice and the large number of healthcare professionals involved in this process make the outcome of implementation less predictable. It is therefore, important to start with a simple site and spread rapidly once the standardised solution is thought to be well accepted and suitable for the local clinical context.

- **Establish a spread methodology once the standardised process and contents have been revised based on initial feedback**
  There should be a clearly defined spread methodology for the implementation of standardised solutions. The spread methodology should be clearly co-ordinated with adequate resources allocated for the purpose.

- **Establish a communication and engagement strategic plan**
  The project implementation team will need to establish a plan for dissemination of information regarding the implementation of these standardised solutions to all end users. The communication method must be relevant and must be able to engage with users. More importantly, regular updates and feedback are necessary to ensure empowerment and continual engagement of staff.

- **Establish an inter-disciplinary, inter-departmental continual learning strategy**
  The project implementation team will need to establish a plan for an inter-disciplinary and inter-departmental continual learning strategy. Initially this process should involve engaging champions and staff at pilot sites to demonstrate their achievements and provide guidance and support to other sites. As the standardisation process spreads to other units/scenarios, it is important that there are opportunities for experience sharing and collaborative learning. This strategy is important to ensure continual improvement.

### 4.2 Issues for consideration

There are many issues that should be considered by the project team during the implementation phase. This phase is time-consuming for the project team. The project team, however, needs to spread the workload to other clinical champions during this phase in order to maintain enthusiasm for the project. Therefore, while the project is time consuming, the resource requirements from the perspectives of the project team should be less intense.

#### 4.2.1 Project implementation team

At this phase of the project, a separate project implementation team to oversee the implementation phase is required. For each of the wards or units involved, there needs to be separate project implementation team for that unit. This is to ensure that the implementation process, while standardised across different units and scenarios, maintains local engagement and will be accepted within the local socio-cultural context. The project team should meet on a regular basis in order to ensure smooth implementation of the project. A graphical representation of the implementation team is shown in Publication 4 Figure 8.

This SOP advocates that the overall project implementation team consist of at least five members. The following steps guide the assembly of a project implementation team.
1. Governance Group
   The first step is the identification of the Governance Group for the implementation of the project. This group should be the governing body which provides senior leadership. The Governance Group should consist of at least one clinician.

2. Senior administrative leader
   A senior administrative leader should be assigned to provide direct guidance to the implementation activities, assignment of staff, allocation of time for staff to do the work, and allocation of other resources. The senior administrative leader should have the ability and authority to source equipment and other resources necessary to implement the standardised process and content.

3. Project leader
   The project implementation team needs to have a project leader. This person may come from the initial project team. The project leader should be very familiar with the standardised process and content. The project leader should have a good understanding of change management principles. The project leader will provide guidance to project champions.

4. Project champions
   The project team needs to identify units most appropriate for adapting these standardised solutions. For each of the handover scenarios or units, there needs to be one or more representatives of the professional disciplines involved in that type of handover to guide the design, testing, and roll-out of the standardised process and to serve as role models and "champions" of the new process for their respective disciplines or unit.

5. Project officer
   The project implementation phase will need an assigned facilitator—a person with knowledge of communication methods and project management skills—to develop and manage the project work plan

4.2.2 Project implementation work plan

A master work plan should be developed in this phase. This master work plan aims to guide the implementation process for each individual unit or clinical handover scenario. A more detailed work plan should be developed for each of the clinical units or clinical handover scenarios that are adapting the standardised approach. All professional disciplines should be represented on the team that develops the master work plan. These work plans should include relevant milestones and targets.

1. Master work plan
   The master work plan is the main document that the project implementation team should refer back to. It should consist of a good overview of the whole project, especially dealing with the approach adapted for the implementation of standardised solutions for multiple scenarios across different clinical areas. The master work plan should include a well developed task list for the approval of the process design, the approval of the content design, information tools, testing of information tools, training program, implementation, support, measurement, feedback and revision. The master work plan should identify
dependencies and time frame for each unit/scenario, and identify deliverables and due dates for these. More importantly, resources should be assigned to each of the units/scenarios. A sample master work plan has been developed in the next section to assist the implementation team.

2. Individual work plan
An individual work plan will need to be developed for each of the handover scenarios and each of the clinical units. The individual work plan should include approval of the process, approval of the contents, availability and approval of information tools, testing requirement, education and training, implementation date, implementation support, measurement, feedback, revision and reporting. Details will vary from one area to another. The individual work plan should identify dependencies and time frames for each task, and identify deliverables and due dates for each task. More importantly, resources should be assigned to each of the tasks. A sample work plan has been developed and presented in the next section to assist the implementation team.

3. Relevant milestones
Both the master work plan and individual work plan should identify important milestones for implementation. The milestones should include the following (ACSQHC, 2008):

i. Approval of the master project work plan, which should include all clinical areas and handover scenarios adapting the standardised solution.

ii. Approval of the project work plans for each of the handover scenarios and each clinical unit. These individual work plans may run concurrently or sequentially, as appropriate to the complexity and resource availability of the organization.

iii. Approval of the process and content design for standardisation.

iv. Approval of the information tools available to support the implementation.

v. Approval of the education and training program.

vi. Approval of the pilot test strategies.

vii. Set “Go-live” dates for the pilot tests.

viii. Ensuring information tools are available for implementation.

ix. Ensuring education and training programs are provided to the majority of staff.

x. Ensuring staff engagement is adequate and clear communication is established.

xi. “Go-live”.

xii. Presentation of pilot test results to the oversight group.

xiii. Presentation, feedback and revision.

xiv. “Go-live” date for full implementation.

4.2.3 Risk registry and risk management strategies
The implementation team should keep a risk registry for the implementation phase. There are multiple risks which may affect the successful implementation of the standardised solution. It is important that the implementation team understands these risks and assigns a risk score to each of the risks. More importantly, the implementation team should identify risk minimisation strategies to enhance the probability of timely completion of all the tasks.
More specifically, the following risks and risk management strategies should be considered by the implementation team.

1. **Availability of staff**
   Many clinical staff, especially junior staff may be on constant rotation. The skills and knowledge of certain staff, therefore, may not be available at all times. The lack of appropriate and adequate human resources is a very important consideration. Risk management strategies should include the involvement of more than one clinical champion per unit or handover scenario to ensure corporate knowledge is maintained.

2. **Competing demands and interests**
   Many clinical staff who are interested in quality and safety initiatives will often be asked to be involved in multiple projects simultaneously. The conflict of multiple competing demands and interests may negatively impact on the project outcomes. It is important that project team members be given specific time commitments by the organisation to implement the project.

3. **Inadequate resources**
   The implementation team should be aware that resources required during the implementation vary significantly from unit to unit. The scale of implementation and the number of staff involved in the process will determine resource requirements. The implementation team should be aware that the resource implications of staff time, stationary costs, printing costs, engagement activities and any other activities should all be clearly considered.

4. **Delay delivery of information tools and support tools**
   The organisation and the project implementation team should consider the pros and cons of involving external parties in the production of information tools and support tools. Regardless of the decision, it is important that there is flexibility for potential delays in the delivery of information tools and support tools.

5. **Education and training of staff**
   The implementation team must consider the scale of education and training activities required. More importantly, the working patterns of staff need to be considered. It may be more difficult to provide training to staff working part-time or on a casual roster. The “train the trainer” strategy and e-learning strategy should be considered in order to reduce the reliance on certain individuals being available for training.
4.3.4 Pilot testing

It is very important that the implementation team consider pilot testing the standardisation process. Despite all efforts to understand the local context and to carry out a socio-technical integrated design, unintended consequences may result in real life clinical practice. It is, therefore, very important for the implementation team to pilot test the standardisation process and to revise the plan according to feedback from the pilot test.

The following issues should be considered during pilot testing.

1. Clinical areas and handover scenario
   It is recommended that the implementation team consider no more than 5 areas for pilot testing. More importantly, the selection of pilot areas is crucial for the success of the whole implementation process. These areas should be areas which have a high likelihood of successful implementation, especially in areas with enthusiastic leaders and staff.

2. Engagement of pilot clinical areas
   Full engagement of the pilot areas is essential. Staff should be actively encouraged at the first opportunity. A full engagement of these areas will ensure that they become the ambassador for full implementation and its spread to other areas of the organisation in the future.

3. Every shift versus specific shift
   The implementation team needs to consider whether the standardisation process should immediately be applicable to all shifts/handovers or only to specific shifts/handovers. An example may be that the shift to shift standardisation process will start with the morning shift, as that is the shift with the most number of senior staff available to assist in the event of unpredicted problems.

4. Meaningful evaluation
   The implementation process in these areas should be measured and documented clearly, in regard to the timeliness and consistency of implementation, the impact on other activities and the impact on patient care.

5. Iteration and revision
   The feedback and evaluation from staff should be clearly considered by the implementation team and iteration and revision of the initial process, contents or tools should be developed.

6. Further pilot
   The implementation team should consider the need for further pilots, especially if the revision makes significant changes to the initial process, contents or tools.

7. Positive continual engagement of pilot site
Staff from the pilot sites should be rewarded and their positive comments should be documented and used as part of any spread strategy.

4.2.5 Spread methodology

Once the pilot projects have been completed and feedback has been incorporated into a revised process, contents and information tools, the implementation team should then consider the spread methodology.

The following issues should be considered.

1. **Sequential versus concurrent implementation**
   While concurrent implementation may have a bigger impact on patient safety, it may also cause significant problems as each ward is slightly different from the other. This SOP therefore, advocates sequential rather than concurrent implementation. Sequential implementation not only allows adequate preparation and design of the process, contents and tools, but also allows adequate oversight and coaching during the early implementation phase and monitoring of any potential problems.

2. **Sequence and timing**
   Firstly, all handovers/ all shifts of the pilot areas should utilise the standardised process every time a handover takes place. Secondly, the implementation team will need to decide the selection, sequence and timing of other wards and clinical units for the specific handover scenario. The team will also need to consider the implementation of other handover scenarios within the same ward. The timing and sequence is important to ensure successful spread. This protocol suggests that wards with enthusiastic leaders be included in the initial phase as these leaders can then assist in future spread.

3. **Utilisation of a successful site as the ambassador**
   Pilot clinical areas which have successfully implemented the SOP should be engaged to be ambassadors for the process. More importantly, the collective knowledge and skills of the pilot areas should be engaged to assist the spread of the standardisation process.

4. **Scope creep**
   Communications issues identified during the handover project are likely to be broader in scope than the intended objectives of the SOP. The implementation team and the project team will need to be aware of scope creep and be able to maintain focused on specific areas of handovers to be addressed.

5. **Heterogeneity in socio-cultural and technical factors**
   The implementation team should be aware of the heterogeneity in socio-cultural practice of handover as well as technical capacity of different wards. Major adjustments to time frames, protocols, contents and information tools may need to happen which will have significant impacts on the time-frame and resource requirements of the project.
4.2.6 Communication and engagement plan

Miscommunication is a real risk to the implementation phase of the project as it has the potential to create misunderstandings of the process and therefore negatively impact on the implementation plan. Multiple communication strategies should be considered by the implementation team. End user engagement is essential in the implementation of standardised solutions. Disengagement of end users is a formula for failure. Disengagement of certain staff, not only creates apathy but also may affect the perception of other staff. Multiple engagement strategies should be considered by the implementation team.

1. Communication platform
The communication platform should ideally be up-to-date, continuous and cost-effective. Electronic media will fulfil most of these criteria. It is important that the implementation team consider computer literacy of staff involved and therefore ensuring that communication strategies reach most, if not all, staff concerned. Practical solutions may include website, emails, newsletters, pamphlets, workshops and other communication strategies.

2. Content coverage
The implementation team should consider the following contents (ACSQHC, 2008):
   i. Announcement of organisation’s decision and commitment to implement standardised handover communication
   ii. Rationale for participation in the initiative:
      a. Description of the problem to be addressed (inconsistent handover communication)
      b. The proposed solution (standardised handover communication)
      c. The costs and benefits of participation
      d. Incentives to clinical staff to participate (efficiencies and lower risk exposure for staff)
      e. Anticipated outcomes (patient safety)
   iii. Support and resources allocation from the organisation for the standardisation process.

3. Update and feedback
It is important that staff receive regular updates from the implementation team regarding the progress of the project work plan. Regular feedback should be provided to staff on the data collected and analysed through the project implementation phase.

4. Recognition and continual engagement
The project team should ensure that due recognition of the contributions and successes of all staff participating in the project are made public. This will provide incentives to staff to continually improve and champion the process.

5. Innovative engagement
The communication and engagement process should include innovative methods. These may include stationery which could be used for handover and patient care, activities to raise
awareness of the project, activities to generate the sense of social belonging within the project and team building engagement strategies.

4.2.7 Inter-disciplinary, inter-departmental continual learning strategy

Despite the complexity of the healthcare system and the heterogeneity of socio-cultural and technical issues for each ward, there are some underlying similarities when process improvement projects are being put in place. It is important that the experience of each ward and unit is shared with other wards and units implementing the same standardisation process. The continual learning strategy not only serves as a platform to develop solutions through collective understanding, but also serves as a strategy to continue the engagement and empowerment of staff.

1. Pilot site show case
   It is important that successful pilot areas be identified and a show-case session be organised with other units/clinical areas encouraged to visit and understand the improvement achieved. This will allow inter-disciplinary, inter-departmental learning and an exchange of ideas. It will also ensure continual engagement of pilot clinical areas.

2. Regular seminars by clinical champions
   The implementation team should consider organising regular seminars for all clinical champions in order to continually provide up-skilling and engagement. Professional isolation can be reduced and problem solving strategies can be shared. The seminars should include the following contents:
   i. Feedback and continual evaluation from wards and units.
   ii. Expansion and spread, and anticipated expansion and spread.
   iii. Success stories and experiences
   iv. Problems faced and challenges
   v. Suggestions for future improvement.

3. Annual handover awareness campaign
   This standardisation operating protocol (SOP) advocates that the implementation team consider annual handover awareness campaigns for the whole organisation. There should be activities organised to show-case successful standardisation and improvement but also activities organised to acknowledge the work of all staff involved. It is important the awareness campaign triggers a new sense of enthusiasm and continual improvement so that handover does not become simply a symbolic ritual within the scope of clinical practice.
4.3 Framework

4.3.1 Iterative feedback framework

Due to the complexity of the healthcare system, it is very important to recognise that systemic interventions may deliver unintended consequences. This SOP emphasises the need to take socio-cultural factors into consideration (Wong et al., 2008b). The clinical handover work of Royal Hobart Hospital and University of Tasmania deploys a holistic socio-technical approach to understanding and improving clinical handover. This approach relies on the benefits and synergies of interactions across the streams to optimise transferability and sustainability (see Publication 4 Figure 1).

The iterative feedback process is very important in the implementation phase. The iterative feedback process should be extensively adapted through the pilot implementation and the spread methodology. The iterative feedback process not only ensures continual and increasing engagement of end users but also allows the systems to adapt to the dynamic nature of healthcare delivery.

4.4 Local considerations

There are some issues that the project team will need to consider for local needs. This list is a guide to some of the issues that the project team should consider in the implementation phase.

4.4.1 Alignment with the organisational strategic plan

The implementation team has to consider the alignment of the SOP for handover with the organisation's vision and strategic plan. The handover improvement process should not be an isolated effort. It should however, be a priority program for patient safety improvement within the organisation.

4.4.2 Time frame

The time frame for the implementation phase is dependent on multiple factors, especially resources available, availability of individuals who are committed to this project, the size of the organisation, the number of wards or units participating in the process and the number of handover scenarios involved. The implementation team may consider a staggered approach to reduce the time frame requirements.

4.4.3 Resources requirement and allocation

It is important that the organisation commits resources, especially human resources to the implementation phase. Staff who are actively participating in this phase should be allocated time for the work. The project success should not be dependent on the goodwill of staff involved. More importantly, resources such as communication requirements, tools requirements, training requirements and other requirements must be taken into account.
4.4.4 Skill mix and training

Many skills are required for successful implementation of this program. These include change management skills, communication skills, interpersonal skills, time management skills, project management skills. It is important to note that many of these skills and principles are applicable to many other quality and safety improvement initiatives. The implementation team should ensure that staff with the relevant mix of skills are available.

4.4.5 Evidence based debate versus practicality

It is important for the implementation team to note that research providing a strong evidence based for practice within the scope of handover are limited. Furthermore, the traditional biomedical model of double-blinded controlled trial might not apply in process improvement strategies due to the complexity of the healthcare system. Therefore, evidence based practice should be practically focused. The academic debate of evidence based practice may impede the process of implementation.
4.5 Tools and guidance

- **Project implementation team diagram (Publication 4 Figure 8)**
  This is a diagrammatic representation of the suggested project implementation team to assist the process of clinical handover improvement.

- **Master work plan (Publication 4 Table 9)**
  This is a suggested master work plan for organisations interested in clinical handover improvement programs.

- **Individual work plan (Publication 4 Table 10)**
  This is a detail individual work plan for each site/clinical area which is interested in implementation of the standardised process.

- **Risk management plan (Publication 4 Table 11)**
  This is the risk management registry with some generic suggestions for risk management strategies.
Publication 4 Figure 8: Project implementation team

- Governance Group
- Senior Administrative Leader
- Project Officer
- Reference Groups
- Project Leader
- Project Champion 1
- Project Champion 2
- Project Champion 3
- Handover Facilitators
- Educators
- Unit Managers
Table 9: Master work plan (adapted from ACSQHC, 2008)

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** Assign low/medium/high risk to “Impact” and “Likelihood/Seriousness” column**

Grade A: High/High
Grade B: High/Medium or Medium/Medium
Grade C: All others
5. Evaluation phase

After the implementation phase, the project team should consider the evaluation phase, not only to inform local improvement, but also to inform national and international learning. This SOP provides a simple evaluation framework for the project team to consider. It is acknowledged that there are a lot of evaluation frameworks and strategies. It is also acknowledged that evaluation framework in some instances should include the evaluation of theoretical conceptualisations. These aspects of evaluation, however, are outside the scope of this SOP. This SOP acknowledges that there are other evaluation techniques and methodologies which are currently in development as part of the national clinical handover initiatives of the Australian Commission on Safety and Quality in Healthcare. The outcomes of these other initiatives will strengthen the evaluation phase of this protocol. The national learning and experience sharing of all projects will provide further evidence to support an evidence based protocol in the future.

5.1 Objectives of this phase

This SOP has emphasised the importance of local context and flexible adaptation of standardised solutions. This emphasis continues to be the main focus of this SOP in the evaluation phase.

The evaluation phase of the project aims to achieve the following objectives:

- **Development of an evaluation framework and evaluation plan for the implementation of standardised solutions**
  The evaluation phase aims to develop an approach through the adaptation of the framework used for other standardised solutions. This framework will help derive the evaluation plan for local clinical handover initiatives, that best serves the purpose of the process within any local socio-cultural setting.

- **Development tools to assist the evaluation of the implementation of standardised solutions**
  This evaluation phase also aims to design tools to assist in the evaluation of the implementation of standardisation in clinical handover and to allow for comparison across different disciplines and clinical units while at the same time retaining sensitivity to the local socio-cultural setting.

- **Strategies to disseminate evaluation data locally, nationally and beyond**
  The evaluation phase should include the development of strategies to disseminate evaluation data. The dissemination of evaluation data should provide guidance for future improvement within the local setting but also should inform national learning and beyond.

5.2 Issues for consideration

There are many issues that should be considered by the project team during the evaluation phase. While the evaluation phase consumes less time and resources, it requires significant intellectual effort in order to ensure the evaluation can assist future improvement. It is important to emphasise that the current evaluation framework is practically focused. The Australian Commission on Safety and Quality in Health Care has funded evaluation projects that will further inform this phase.
5.2.1 Evaluation framework

The project team should decide on the purpose of the evaluation and adapt an evaluation framework that will help guide the process. The issues which should be considered include:

- Local needs versus national learning
- Practicality versus conceptualisation
- Technical process and content measures
- Outcome measures
- Socio-cultural parameters

5.2.2 Pre-implementation and post-implementation consideration

The project team should consider comparison of pre-implementation and post-implementation measures. During the preparation and design phase, the methodology utilised to collect essential information can be used as pre-implementation data collection or post-implementation data collection for comparison.

5.2.3 On-going analysis during the implementation phase

The iterative feedback process dictates that periodic and continual analysis of the data is required in order to revise the implementation process. The project team, however, may wish to set specific intervals for data collection in order to provide interval comparisons as part of the evaluation framework.

5.2.4 Evaluation content

This SOP advocates that the project team consider the following essential measures:

- **Structural measures**
  In order to conduct comparative evaluation of the standardised handover processes across different participating units, it will be necessary to collect certain demographic and structural data about the respective units and handover processes.

- **Process measures**
  There should be a clear process measure developed and it should include:
  - Consistency in the performance of critical steps in the new process
  - Level of participation of staff as specified in the process design
  - Completeness of key steps
  - Time for completion of the new handover process
  - Effectiveness (follow-up calls for additional information or clarification)

- **Content measures**
  There should be a clear content measure developed and it should include
  - Consistency of delivery of all minimum required content
  - Consistency of transfer of information, responsibility and accountability
  - Completeness of delivery of standardised content
  - Efficiency of the content transfer
  - Effectiveness
• **Outcome measures**

There may be some benefit in looking at the frequency of specified patient care adverse events involving handover as a factor. It is important, however, to note that the complexity of patient care will make it difficult to correlate error rates with the degree of harm to patients as gaps in the continuity of patient care resulting from breakdowns at handover. More importantly, in a robust and resilient system, there should be other barriers to avoid breakdown in handover that may result in patient harm. In terms of outcome measures, it may be as useful to examine breakdowns in information flow at handover and how staff respond to and anticipate events.

• **Socio-cultural measures**

It is important to note that handover serves many other functions, beyond ensuring the continuity of patient care. It is also important to note that happy and satisfied employees are likely to be more productive employees. Therefore, in assessing the impact of standardisation on handover processes socio-cultural aspects of clinical practice need to be considered during the evaluation phase.

### 5.2.5 Evaluation techniques

Different data collection processes and techniques can be used in this phase. The project should consider the pros- and cons- of various techniques. It is important to note often a combination of techniques can be beneficial in order to evaluate various aspects of the project. Techniques which can be used include:

- Direct observations
- Interviews with participating staff
- Retrospective audit of documentation
- Prospective audit of documentation
- Incident reporting
- Mortality and risk estimation techniques
- Reflective methods, such as video-reflective ethnographic methods

### 5.2.6 Evaluation plan

The project team should develop detailed measure specifications and data collection protocols. The project team should also consider training staff to evaluate the program as well as in the development of tools to assist the evaluation phase.

### 5.2.7 Dissemination of evaluation data

The project team should consider dissemination of evaluation data in various ways. The evaluation phase should enable the provision of regular reports of aggregated and analysed data to the governance group and to all staff for future improvement. The project team should also consider dissemination for national learning and/or improvement in conceptual understanding through academic publications or conference presentations.
5.3 Framework

5.3.1 Iterative feedback framework

The framework underlying the evaluation plan is one of an iterative feedback framework. It is very important to emphasise that this SOP is designed for local quality and safety improvement (Wong et al., 2008b). The changes implemented will therefore continue to evolve through the implementation and evaluation phase due to iterative feedback cycles. It is very important to note that the continuous and regular feedback will ensure the successful adaptation of the standardised solutions into local practice. The process is demonstrated in Publication 4 Figure 1 at the start of the document.

It is acknowledged that these constant iterations and changes to the intervention make evaluation difficult. This is especially the case if the conceptual approach is one of a quantitative-positivist view. This SOP emphasises that the dynamic nature of clinical practice makes the double blinded controlled trial evaluation methodology very difficult to utilise effectively and meaningfully.

5.4 Local considerations

There are some issues that the project team will need to consider in relation to local needs. This list is a guide of issues that the project team should consider in the evaluation phase.

5.4.1 Alignment with local needs

The project team has to consider the alignment of the evaluation plan with local needs. The acuity of patient care, the volume of patients within the clinical setting as well as the number of staff involved in the process should all be considered in the design of evaluation tools.

5.4.2 Time frame

The time frame for evaluation is variable. It is however, recommended that evaluation be conducted at least 8 weeks after the initial implementation in order to avoid capturing data during the initial teething issues post implementation. The project team should consider short term and longer term evaluation in order to understand the impact of cultural change over time.

5.4.3 Resource requirements and allocation

The actual human resources and other resources required during the evaluation phase vary according the techniques utilised. It is, however, important to consider the data entry requirements as well as intellectual contributions and requirements in order to fully understand the implications of the evaluation phase on resources.
5.4.4 Skill mix and training

Many skills are required for successful evaluation of the program and these are dependent on the techniques to be used. These may include survey design, interview techniques, observation techniques, risk analysis techniques and reflective techniques. The project team should ensure adequate staff, with the relevant mix of skills are available to conduct the evaluation.

5.4.5 Traditional evidence based concept vs iterative outcome concept

It is important for the project team to note that the traditional interventional trial concept may not be applicable in these circumstances. This is especially important in large academic centres in which the rigours of evaluation may be challenged. It is important to note that there are increasing amounts of data that support the view that traditional interventional trial concept is not ideal to assess these aspects of human interactions.

5.5 Tools and guidance

- Evaluation plan (Publication 4 Table 12)
  This is a suggested evaluation plan for clinical handover improvement programs.
Publication 4 Table 12: Evaluation plan (adapted from ACSQHC, 2008)

NB. Parameters - must be determined by the institution and based on their observational work prior to implementing a SOP

<table>
<thead>
<tr>
<th>Measures</th>
<th>Parameters</th>
<th>Collection method</th>
<th>Evaluation interval (sample answers)</th>
<th>Reporting (sample)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural measures:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type of organization (urban/rural; public/private; community/academic; etc.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size of organization (beds; visits)</td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>Specific types of handovers where an SOP has been implemented and number of locations (eg number of wards)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process measures:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of staff that understand the SOP (practice and theory)</td>
<td>Survey of staff</td>
<td>After training, then at 3,6,12 months Repeated after alterations to SOP</td>
<td>All staff</td>
<td></td>
</tr>
<tr>
<td>% of handovers completed according to protocol</td>
<td>Observation</td>
<td>Weekly for first month and then monthly</td>
<td>Random handovers</td>
<td></td>
</tr>
<tr>
<td>% of handovers interrupted</td>
<td>Observation</td>
<td>Weekly for first month and then monthly</td>
<td>Random handovers</td>
<td></td>
</tr>
<tr>
<td>% of handovers w/o needed documentation</td>
<td>Observation</td>
<td>Weekly for first month and then monthly</td>
<td>Random handovers</td>
<td></td>
</tr>
<tr>
<td>Average time for handover (and cost of this time)</td>
<td>Observation</td>
<td>Weekly for first month and then monthly</td>
<td>Random handovers</td>
<td></td>
</tr>
<tr>
<td>Participant and patient satisfaction.</td>
<td>Survey and interview</td>
<td>Monthly</td>
<td>Monthly</td>
<td></td>
</tr>
<tr>
<td>Outcome measures:</td>
<td>Method</td>
<td>Description</td>
<td>Frequency</td>
<td></td>
</tr>
<tr>
<td>--------------------------------------------------------------------------------</td>
<td>---------------------------------</td>
<td>----------------------------------------------------------------------------</td>
<td>------------</td>
<td></td>
</tr>
<tr>
<td>Have clinical errors occurred due to insufficient information? (Does analysis point to a specific problem with a handover scenario where an SOP has been implemented?)</td>
<td>Observational Incident monitoring</td>
<td>Observational work in high risk areas (eg ED, ICU) weekly for first month and then monthly. Incident monitoring</td>
<td>Random shifts, Continuous</td>
<td></td>
</tr>
<tr>
<td>Are clinical responsibilities clearly handed over?</td>
<td>Observational Incident monitoring</td>
<td>Observational work in high risk areas (eg ED, ICU) weekly for first month and then monthly. Incident monitoring</td>
<td>Random shifts, Continuous</td>
<td></td>
</tr>
<tr>
<td>Is information handed over acted on?</td>
<td>Observational Incident monitoring</td>
<td>Observational work in high risk areas (eg ED, ICU) weekly for first month and then monthly. Incident monitoring</td>
<td>Random shifts, Continuous</td>
<td></td>
</tr>
<tr>
<td>Has clinical accountability been clearly handed over?</td>
<td>Observational Incident monitoring</td>
<td>Observational work in high risk areas (eg ED, ICU) weekly for first month and then monthly. Incident monitoring</td>
<td>Random shifts, Continuous</td>
<td></td>
</tr>
<tr>
<td>If handover SOPs are instituted very widely and effectively, length of stay (and possibly mortality) will be reduced and could be monitored (together with the costs).</td>
<td>Survey</td>
<td>Continuous</td>
<td>Continuous</td>
<td></td>
</tr>
<tr>
<td>Staff awareness of the patient safety aspects of clinical handover (assessed by survey and interview).</td>
<td>Survey</td>
<td>After training, then at 3,6,12 months</td>
<td>All staff</td>
<td></td>
</tr>
<tr>
<td>Staff satisfaction survey about the handover process</td>
<td>Survey</td>
<td>Continuous, 6 monthly interval</td>
<td>All staff</td>
<td></td>
</tr>
</tbody>
</table>
6. Maintenance phase

The maintenance phase of the standardisation of handover processes and contents is beyond the scope of this SOP. However, there are a few very important issues that should be considered by the project team as part of any strategic plan for the maintenance of handover initiatives.

- **Maintenance phase is time and resource intensive**
  The maintenance phase typically utilises significant resources and staff time and can be as much or even more than the combination of the five phases discussed above. Adequate human resources and other resources will need to be allocated for the maintenance phase, including continual supply of support tools and continual engagement of staff. It is suggested that once the SOP for handovers has been implemented throughout the organisation, regular monitoring of key parameters should continue for at least three years.

- **Identification of "drifting" and "deviations" early**
  The maintenance phase should include mechanisms to identify evidence of "drifting" and "deviations" from the intended procedures early. These events should be analysed to identify the reasons and to determine an appropriate response.

- **Identification of potential unintended consequences**
  The project team should consider regular monitoring to ensure that potential unintended consequences are detected early. These unintended consequences may include a prescriptive protocol that inhibits communication by limiting information capture; increased data entry work for staff; distraction from other tasks due to additional time spent on handover; and gaps in the patient record due to the creation of handover forms that are not integrated.

- **Continual education and training of staff**
  Within the clinical environment, there is often a regular turnover of staff. Typically, there will be new interns and junior staff, including medical, nursing and other allied health professionals, joining or leaving the unit/organisation. The maintenance phase should include mechanisms to ensure all staff are provided with the opportunity to acquire the knowledge and skills prior to commencement of employment. Furthermore, continuing staff will need regular refresher courses in order to continue delivering best practice and best performance.

- **Continual iterations to achieve current best practice**
  The clinical care delivery is a dynamic, time-dependent process. Clinical practices are evolving continuously, due to advancements in medicine and technology and improved understanding of clinical practices. The maintenance phase must consist of mechanisms to ensure the process allows and integrates with current clinical practice. More importantly, as evidence continues to emerge on best handover practices, the maintenance phase must provide opportunities to incorporate new improved practices and to act upon these opportunities where they are determined to be appropriate for local socio-cultural and technical settings.
4.2.5 Publication 5


Publication 5 is the main training manual developed for clinical handover training for doctors as part of the clinical handover improvement program. This training manual was developed after extensive analysis of the interviews, observations and clinical handover notes. Three nursing training manuals were subsequently developed based on this medical training manual. These nursing training manuals were developed in collaboration with nurse researchers for each of the wards. The training manual (Publication 5) provides training regarding clinical handover, covering four domains. Firstly, Publication 5 emphasises safety as the rationale for clinical handover improvement. Secondly, Publication 5 utilises relevant case studies for discussion and reflection. Thirdly, Publication 5 emphasise the organisational commitment to clinical handover improvement and the significance of clinical handover improvement locally, nationally and internationally. Finally, Publication 5 provides training regarding the defined standardised operating protocol and the defined minimum data set. Literature and further readings are provided to support the training program. The process of developing the training manual and the analysis of the research work to support the training program provides significant insights and findings into clinical handover improvement. Firstly, despite the availability of a standardised minimum data set and information platform, the use of these information management tools and systems require education and training for effective clinical handover. This finding is further supported by publication 6. Secondly, education and training program needs to incorporate a standardised procedure and a standardised tool for maximum effectiveness. Finally, education and training is a continual and dynamics process that requires continual involvement by clinicians.

Publication 5 contributes to Key finding 4 and 5. Key finding 4 emphasises the importance of education and training and the incorporation of a standardised operating protocol and Information transfer into the education and training program. Publication 5 provides a practical demonstration of how Key finding 4 could be achieved. Furthermore, Publication 5 suggests the need to continuously update the training manual given the time-sensitivity of the materials. As such, through continual education and training, engagement of clinicians in the process can be achieved (Key finding 5).
The Department of Health and Human Services (DHHS) and the University of Tasmania (UTAS) would like to acknowledge the support and funding provided by the Australian Commission for Safety and Quality in Health Care (ACSQHC) in the preparation of this training manual.

Clinical Handover is one of ACSQHC’s priority programs with the aim to identify, develop and improve clinical handover communication through developing and implementing more consistent and reliable approaches to clinical handover.

The ACSQHC Clinical Handover Project Team would also like to thank all staff who have participated in the Clinical Handover Project.
All content found in this training manual is for use at the Royal Hobart Hospital only. Modifications will be required for dissemination of this training manual to other organisations and other settings.

All content found in this training manual is current as of June 2008.

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Please direct all requests concerning reproduction of this material to members of the Clinical Handover Team.
The Australian Medical Association defines clinical handover as

"the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis".

Clinical handover has become increasingly important due to changes in healthcare services and increasing complexity of patient care. These changes have significant implications for the current model of delivery of care. Some of these factors include:

- Increasing acknowledgement that safety and quality of healthcare services is of paramount importance.

- Increasing recognition of the impact of fatigue among healthcare professionals. This has led to shorter working hours and an increase in the number of shifts over a 24 hour period.

- Increasing recognition that discontinuity of patient care leads to adverse patient outcomes.

- Increasing understanding of the handover process and potential improvement strategies.

- Increasing understanding of the importance of education and training in fostering a safe healthcare culture.

- Increasing complexity of patient care, necessitating increasing number of healthcare professionals to assist in the care of patients.

- Increasing acuity of patients being looked after on general wards.

This Education and Training Manual is designed to deliver education and training regarding clinical handovers among healthcare professionals. Local protocols and minimum data sets have been included in this training manual. This forms part of the bigger project funded by the ACSQHC which aims to develop standardised operating protocols to improve clinical handover.
Objectives

This Education and Training Manual aims to achieve the following objectives:

• Provide an understanding of patient safety with a focus on clinical handover.

• Provide an understanding of the importance of systems and human performance in patient safety with a focus on clinical handover.

• Provide an understanding of clinical handover problems through case study examples.

• Provide a dynamic discussion of strategies for clinical handover improvement.

• Provide an understanding of international and national clinical handover initiatives and the role of local improvement programs in informing national and international initiatives.

• Provide an understanding of the rationale and the current clinical handover standardised operating protocol, both at the conceptual and local level.

• Provide an understanding of the rationale and the current clinical handover minimum data set, both at the conceptual level and local level.

• Provide an overview of local implementation and local support for clinical handover improvement.

• Provide up to date literature to support current practice

This Education and Training Manual should be used together with systemic interventions in order to improve clinical handover practices. These training activities should be carried out on a regular basis to ensure all staff members are familiar and understand the importance of clinical handover. This training manual should be updated on a regular basis to ensure best practice according to current literature.
HANDOVER AND PATIENT SAFETY
Handover and Patient Safety

Introduction to Patient Safety

- Medical errors and adverse events are common
- How safe do you think healthcare systems are?
- What would you estimate the adverse event rates to be?

US Statistics

- Avoidable deaths in hospitals from medical errors are estimated to be between 44,000 and 98,000 per year and to cost around $29 billion
- This is equivalent to 2 full Boeing-747 planes crashing every two weeks
- Fifth leading cause of death in the USA
  
[Kohn et al (1999)]
UK Statistics

- Estimated that 10% of admissions are associated with adverse events  
  [Department of Health (2001)]

Australia Statistics

- The Quality in Australian Healthcare study indicated that 16.6% of hospital admissions were related to adverse events and medical errors
- 50,000 led to permanent disabilities and 18,000 resulted in deaths
- About half of these cases were thought to be preventable  

Error causation

- Communication is the main problem (> 50% of adverse events)
- Other causations include:
  - Technology
  - Work environment and institution
  - Staff individuals
- Handover is considered an important and common communication problem  
  [Wilson et al (1999)]
Error causation cont’d

- Prevention strategies identified in the Quality in Australian Health Care Study include:
  - New, or better implementation policies or protocols (23.7%)
  - More or better formal quality monitoring or assurance processes (21.2%)
  - Better education and training (19.2%)

[Wilson et al (1999)]

Approach to patient safety

- The personal perfectionism approach
  - Assumption
    - Bad things only happen to bad people
    - “Blame, shame and train”
    - Errors are deliberate and should be condemned
  - Comments
    - Still common and well and truly alive
    - Satisfaction of “problem solved”
  - Errors recur frequently, often with different operators

[Reason (2000), Yee et al (2006)]

The system error theory

- The systems view originates from aviation and the nuclear power plant
  - Assumption
    - Humans are fallible and errors will always happen when humans are involved.
    - Errors are consequences, rather than causes, which includes recurrent error traps and organizational processes
    - Systems need to be robust
  - Solutions should aim to build a more robust system
  - Systems need to be able to prevent errors from causing adverse events

[Reason (2000)]
Swiss Cheese Model

- Active errors (unsafe act due to slips, lapses etc)
- Latent conditions (error provoking conditions such as staffing, time pressure etc, and weakness in defences, such as alarms/alerts which do not work)
- We cannot change the human condition, but we can change the conditions under which humans work

[Reason (2000)]

A different view: Resilience

- Systems are intrinsically unsafe
- Safety and efficiency trade-offs
- Safety involves all levels of the organisation

[Dekker (2006)]

Resilient systems

- A safe and resilient system will require a combination of both factors
- System intervention is required, especially for routine work, i.e. doing the routine right everyday, every time.
- Socio-cultural intervention is required to create safety within an unknown environment (i.e, I want to do it right.)

[Dekker (2006), Wong et al (2006)]
Handover safety

- Handover can be safer, by combining systemic and socio-cultural interventions
- Systemic intervention(s) might include standardisation, information tools etc
- Socio-cultural intervention(s) depends on you and me, i.e. everyone within an organisation

[Yee et al (2006)]

Systemic intervention(s) in handover

- Systemic intervention(s) requires standardisation so that everyone knows what to expect
- Standardisation provides guidance and reduces slips/misses
- Standardisation, needs to consider individual localised factors and therefore needs to incorporate flexibility (i.e. take into account local considerations)

[Wong et al (2007)]

Socio-cultural intervention

- The culture is dependent on us!
- It is us that create a safe culture and us that create a safe healthcare system!
- We need to believe in it, learn how to do it, promote it and practise it.
- We need to make safety a routine practice.
- It depends on us to make it sustainable and to teach and engage future practitioners!

Support / Tools

- Both systemic and socio-cultural interventions require tools to assist in its utilisation
- Both require support for sustainability
- Policies/guidelines are important but the practice of it depends on us!

References

PROBLEMS WITH HANDOVER:
CASE STUDIES
Introduction

This section will present a few short summaries of case studies which demonstrate the problem. These cases were de-identified as much as possible and only certain aspects of the care of the patient are presented here to demonstrate problems with handover. Active discussion among participants is important.

CASE 1

Background

Mr. CM is a 80 year old gentleman, who presented to the hospital with increasing confusion on a background history of mild dementia.

His past medical history included ischaemic heart disease, cerebrovascular disease, hypertension, hypercholesterolaema, atrial fibrillation and osteoporosis.

Due to the presence of nitrate during a urinary dipstick examination, he was diagnosed with urinary tract infection, and that was thought to be the cause of his confusion. A suggestion for a CT scan of the head was made, however, it was not clear whether the admitting medical staff had ordered and organised the scan.

After the ward round, it was found that the CT scan had not been organised with the radiology department. Unfortunately, the radiology department was busy and stated that the scan would be performed whenever it was possible.

At 5:00pm

As it was a busy day, the day team did not get home until 5:30pm, no handover was provided to the registrar. The evening medical intern was told to check the CT results.

He continued to suffer increasing confusion on the ward.

At 7:30pm

The radiology registrar called the medical registrar to say that Mr. CM had a massive subdural haematoma, causing mid-line shift.

Reading through the notes, the medical registrar decided to contact the neuro-surgical registrar and to reverse the warfarin.

Mr. CM continued to deteriorate, and by the time the family was contacted, Mr. CM unfortunately had passed away.
Discussion

What are the problems?

How could the problems be solved/prevented?

Is this a problem with handover?

Conclusion

When the family was contacted, it became clear that Mr. CM had expressed advanced directives previously when he was cared for in a nursing home, that he did not want any resuscitation or invasive procedures.

He would like to be kept comfortable in the event of problems like this.

Therefore, there were no serious adverse outcomes in this case, but the outcomes could potentially be catastrophic.
CASE 2

Background

Mrs. MM is a 58 year old lady, admitted with abdominal pain. A CT abdomen which was performed was normal and she was admitted to the ward. Some blood tests were organised and results were pending.

At 5:00pm

The day team handed over to the evening team, stated the task of handover as “check bloods”.

Blood tests results were checked at 7:00pm and most of her blood tests were normal.

The next morning

The day team returned the next morning. They checked the blood tests and found that her troponin level from last night was 10 (elevated). There was no documentation of acknowledgement of the results or any actions carried out by the evening/night team.

Discussion

What are the problems?

How could the problems be solved/ prevented?

Is this a problem with handover?

Conclusion

She was transferred to the medical unit and provided with medical management. She recovered well from her hospital admission.
CASE 3

Background
Mr. HN is a 63 year old gentleman. He presented to the Department of Emergency Medicine with dizziness. After a history and physical examination, an ECG and a CXR was ordered by the medical officer.

At 4:00pm
The medical officer showed the ECG to the consultant, provided a short history and stated that he thought the ECG showed ST depression on chest leads. The consultant agreed and suggested that cardiology team be consulted and should probably be admitted under the care of the cardiology team.

The cardiology team was informed of the patient and the medical officer left the building at 4:30pm the end of his shift.

At 9:30pm
As the evening team was going through all the patients in the Department of Emergency Medicine, they found that Mr. HN was still in the department with no further activities or actions planned for the patient. They could not find who had accepted the handover of the patient. Upon reading through the notes, they found that the cardiology team had seen the patient and recommended for a general medicine admission as they thought that ST changes were consistent with left ventricular hypertrophy rather than ischaemia and his symptoms were more suggestive of cerebral pathology.

They could not find the medical officer and therefore informed the nurse who looked after the patient. No one in the Department of Emergency Medicine actually knew that the medical officer had left.

Discussion
What are the problems?
How could the problems be solved/ prevented?
Is this a problem with handover?

Conclusion
He was admitted under the general medicine unit and found to have a stroke. He recovered well from his stroke.
Problems with handover

Definition of handover

"the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis"

[AMA (2006)]

Handover and the shift

- A prospective study was conducted to investigate the handover process in the US
- In about 1/3 of the shifts, residents found that something happened while on call that they were not adequately prepared for
- In most cases, the incoming team did not receive information during handover which would have been useful
- The only variable which affected the perception of preparedness for night shifts was the quality of handover

[Borowitz et al (2008)]
Handover and malpractice claims

- Ten years of US malpractice claims was investigated to examine types and causes of medical errors involving trainee clinicians.
- From 240 cases 70% involved errors from team-work breakdowns.
- Lack of supervision and handoff problems were the most prevalent types of teamwork problems.

[Singh et al (2007)]

Why is handover high risk?

- A multi-method approach was utilised to investigate medical shift-to-shift handover at an Australian metropolitan hospital.
- Handover is a high risk activity due to significant variability in its practice.
- There is a lack of structure, lack of standard or formal procedure for documentation and the handover communication is prone to error.

[Bomba and Prakash (2005)]

Specific risks for handovers

- Provision of verbal handover only.
  - After 5 cycles, only 2.5% of patient information was retained compared to 85.5% with note taking.

[Bhabra et al (2007)]

- Use of abbreviations.
  - Not many abbreviations are recognised by colleagues.

[Sheppard et al (2008)]
Specific risks for handovers

- Patients with complex problems, mental health problems or indistinct medical diagnoses complicated by deterioration were perceived as worse than other patients
  [Bruce and Suserud (2005)]
Handover as a priority area
Handover as a priority area

World Health Organisation High-5s Initiative

- Collaboration of various organisations: Commonwealth Fund, the WHO World Alliance for Patient Safety and the WHO Collaborating Centre for Patient Safety.
- The WHO High-5 initiative aims to implement innovative, standardised operating protocols for five patient safety solutions over 5 years.
- It aims to prevent avoidable adverse events in hospitals.

World Health Organisation High-5s Initiative (cont’d)

- High-five initiatives:
  - Prevention of patient care hand-over errors
  - Prevention of wrong site / wrong procedure / wrong person surgical errors
  - Prevention of continuity of medication errors
  - Prevention of high concentration drug errors
  - Promotion of effective hand hygiene practices
- Share experience to provide solutions internationally.
Australia’s initiative

- Australian Commission on Quality and Safety in Health Care is the leading technical agency for WHO handover initiative
- The Commission has a working plan and has funded 7 Phase 1 projects

Australia’s initiative

- Commission aims to improve handover through:
  - Standardised operating protocol (SOP)
  - Electronic tools
  - Education and training
  - Monitoring and evaluation

Current funding (the 7 projects)

- Bedside handover and whiteboard communication ➔ QLD
- Clinical handover for critically ill patients requiring air transportation ➔ WA
- Hospital to nursing home envelope ➔ VIC GP Division.
- SOP for nursing and medical shift to shift handover ➔ TAS
Handover as a priority area

Current funding (the 7 projects)
- Developing of E-learning strategies ➔ QLD
- TeamSTEPPS communication training ➔ SA
- Reflective video observation tools ➔ NSW

Further tenders
- Private sector handover
- Literature review
- National learning from coroner’s cases

Clinical Handover Initiative
- This is the first phase, i.e. the beginning of projects to address the issue of clinical handover (2007-2008)
- Expected further projects in these areas in 2008-2009 and beyond
- Likely to be in future accreditation of hospital etc.
Local support

- Strong steering committee, consists of Chief Executive Officer, academics, DHHS representatives, Director of Medical Services and Executive Director of Nursing
- Strong local departmental and ward support
- Need strong support from staff members

For more information......

STANDARDISED OPERATING PROTOCOL
Standardised Operating Protocol

Overarching SOP

• Preparation phase
  - Understand the local context from user’s perspective
  - Understand the rationale for change
  - Understand the motivators and barriers for change, through risk assessment
  - Identify stakeholders and change champions
  - Identify socio-technical issues for handover improvement
  - Identify resource requirements
  - Prioritise the clinical handover improvement initiative

Overarching SOP

• Design phase
  - Engage end-users in the design of a standardised handover process, which retains flexibility in adapting standardised practice guides
  - Engage end-users in the design of a standardised content transfer, which retains flexibility in adapting available minimum data sets
  - Engage end-users in the design of process tools to assist in the implementation of standardised content transfer
Overarching SOP

• **Design phase cont’d**
  - Engage end-users in the design of information tools to assist in the implementation of standardised content transfer.
  - Engage end-users in the design of an education and training program to implement the standardised process and content of handovers.

• **Implementation phase**
  - Establish a project implementation team which consists of all necessary members
  - Establish a project implementation work plan so that the implementation process is coordinated
  - Establish a risk management strategy for the project to ensure smooth implementation
  - Pilot the standardised handover process and contents

• **Implementation phase cont’d**
  - Establish an inter-disciplinary, inter-departmental continual learning strategy
  - Establish a communication and engagement strategic plan
  - Establish a spread methodology once the standardised process and contents have been revised based on initial feedback
Overarching SOP

- **Evaluation phase**
  - Strategies to disseminate evaluation data locally, nationally and beyond
  - Development of tools to assist the evaluation of the implementation of standardised solutions
  - Development of an evaluation framework and evaluation plan for the implementation of standardised solutions

- **Maintenance phase**
  - Maintenance phase is time and resource intensive
  - Identification of "drifting" and "deviations" early
  - Identification of potential unintended consequences
  - Continual education and training of staff
  - Continual iterations to achieve current best practice

Individual SOPs

For individual SOPs relating to Department of General Internal Medicine, Department of General Surgery and Department of Emergency Medicine, please refer to "RHH Clinical Handover Guide - Junior Medical Officers' Shift-to-Shift Handover"
Standardised Operating Protocol

Preparing for handover
- Ensuring continuity of care is provided
- Ensuring necessary documents are available for handover

Time and Place
- Convene participants at a fixed time and fixed venue

Attendance and Leadership
- Ensuring all individuals are in attendance
- Ensuring leadership is provided during handover

Situational Awareness
- Identify deteriorating patient
- Identify environmental factors which are important

Individual patient handover
- See minimum data set
Minimum Data Sets

Overarching Minimum Data Set

Step 1: Situational awareness
- Alerts and safety
- Advanced notice (especially high risk patient movement)
- Attention (to sick/deteriorating patients)

Overarching Minimum Data Set

Step 2: Patient identification
- Textual identification (at least surname)
- Numerical identification (hospital unique identifier or date of birth)
- Wrist band check or other demographic data
Overarching Minimum Data Set

Step 3: History, evaluation and management
- History (presenting problem, relevant past history and current issues)
- Evaluation (physical examination findings, investigation findings and current diagnosis)
- Management to date

Step 4: Responsibility, actions and recommendations
- Tasks to be completed (include the tasks as well as recommendations)
- Outstanding or abnormal results and observations (include a list, as well as actions and recommendations)
- Risk management

Step 5: Accountability
- Patient (code status, MET status, other relevant information)
- Organisation (discharge planning)
- Profession and colleagues (treating and responsible doctors, charts and clarifications)
Individual Minimum Data Set

For individual Minimum Data Sets relating to Department of General Internal Medicine, Department of General Surgery and Department of Emergency Medicine, please refer to “RHH Clinical Handover Guide – Junior Medical Officers’ Shift-to-Shift Handover”
Minimum Data Set

Patient identification

Handover of information

Handover of responsibility

Handover of accountability

Questions or clarification

Next patient

Handover of tasks, outstanding results and risk management issues

This should include history, evaluation and management to date. Important to include relevant background and current issues

Handover of tasks, outstanding results and risk management issues

Responsibility to the patients, organisation and profession

Are there any problems or questions with the above (This step is important and therefore face-to-face handover is desirable)

If not, any other problems and handover closure

Yes

No
SUPPORTING LITERATURE

**Objectives**
- To examine the causes of adverse events (AEs) resulting from healthcare to assist in developing strategies to minimise preventable patient injury.

**Design**
- Review of the 2353 AEs reported by the Quality in Australian Health Care Study (QAHCS).
- A qualitative approach was used to develop categories for human error and for prevention strategies to minimise these errors.
- These categories were then used to classify the AEs identified in the QAHCS.

**Main results**
- 34.6% of the causes of AEs were categorised as "a complication of, or the failure in, the technical performance of an indicated procedure or operation", 15.8% as "the failure to synthesise, decide and/or act on available information", 11.8% as "the failure to request or arrange an investigation, procedure or consultation", and 10.9% as "a lack of care and attention or failure to attend the patient".
- AEs in which the cause was cognitive failure were associated with higher preventability scores.
- The main prevention strategies identified were "new, better, or better implemented policies or protocols" (23.7% of strategies), "more or better formal quality monitoring or assurance processes" (21.2%), "better education and training" (19.2%), and "more consultation with other specialists or peers" (10.2%).

**Main Message**
- Adverse events due to cognitive failure are more preventable and strategies include:
  - Protocols/policies
  - Quality monitoring
  - Education and training
  - Working with peers/other specialists

**Conclusion**
- The causes of AEs or errors leading to AEs can be characterised, and human error is a prominent cause. This study emphasises the need for designing safer systems for care which protect the patient from the inevitability of human error. These systems should provide new policies and protocols and technological support to aid the cognitive activities of clinicians.

Objectives

- To review human errors within healthcare system and propose some strategies to assist in designing a safer system.

Design

- Model and opinion for debate.

Main Messages

- "Blame, shame and train" does not solve the problem of patient safety.
- Adverse events reflect systemic problems.
- Active errors and latent conditions are both important if the healthcare system is going to be safer.
- The Swiss Cheese Model demonstrates the role of active errors and latent conditions in adverse event causation.
- "We cannot change the human condition, but we can change the conditions under which humans work".
- Other high reliability industries have many strategies to minimise adverse events.
- The healthcare industry can learn from other industries in order to derive strategies which might minimise adverse events.

**Objectives**
- To characterise the effectiveness of the handover process between resident physicians on an acute care ward.

**Design**
- Resident physicians rotating on an acute care ward participated in a prospective study.
- Immediately after an on-call night, they completed a confidential survey characterising their night on call.

**Main results**
- On 49/158 surveys (31%), residents indicated something happened while on call they were not adequately prepared for.
- In 40/49 instances residents did not receive information during handover that would have been helpful, and in 33/40 the situation could have been anticipated and discussed during handover.
- The quality of handovers on the nights when something happened that the resident was not adequately prepared for was significantly lower than the nights they felt adequately prepared.
- There were no significant differences in: how busy the nights were; numbers of patients on service at the beginning of the on-call shift; numbers of admissions during a call shift and numbers of transfers to an intensive care unit.
- There were also no significant differences in whether residents were from other wards or were members of the general ward team; and whether the resident had cared for the patient previously.

**Main Messages**
- The adequacy of handover highly affects the preparedness of residents for the incoming night shift.
- This is independent of whether the resident had cared for the patient previously and whether the residents were from other wards.
- There are significant number of inadequate handover which should be addressed through education and training program.

**Conclusion**
- Although handover between resident physicians is a frequent activity, there are many times when important information is not transmitted.

Objectives  
- To describe the characteristics of and factors contributing to trainee errors.

Design  
- Specialist physicians reviewed random samples of malpractice claim files at 5 liability insurers from 2002 to 2004.
- They determined whether injuries had occurred and whether they were due to error.
- Clinical circumstances and contributing factors associated with errors were described.

Main results  
- Among 240 cases, errors in judgment (173 of 240 [72%]), teamwork breakdowns (167 of 240 [70%]), and lack of technical competence (139 of 240 [58%]) were the most prevalent contributing factors.
- Lack of supervision and handoff problems were most prevalent types of teamwork problems, and both were disproportionately more common among errors that involved trainees than those that did not.
- The most common task during which failures of technical competence occurred were diagnostic decision making and monitoring of the patient or situation.

Main Messages  
- Handover is a major factor in malpractice claim involving trainees.
- These cases tend to be complex in nature and there are multiple contributing factors
- Good understanding and training of these areas are important.

Conclusion  
- In addition to problems with handovers, house staff are particularly vulnerable to medical errors owing to teamwork failures, especially lack of supervision. Education program should address all these areas.

<table>
<thead>
<tr>
<th>Objective</th>
<th>Description</th>
</tr>
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<tbody>
<tr>
<td>To provide an analysis of the communication processes during handover.</td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Design</th>
<th>Mixed methodology of documentation, interviews and survey.</th>
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<table>
<thead>
<tr>
<th>Main results</th>
<th>Handover process was unstructured, informal and error prone.</th>
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</thead>
<tbody>
<tr>
<td>Majority of doctor noting that there was no standard or formal procedure.</td>
<td></td>
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<tr>
<td>The majority of hospital doctors recognised the potential benefits of formalising and computerising this process.</td>
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</table>

<table>
<thead>
<tr>
<th>Main Messages</th>
<th>There needs to be a formalised, standardised process for handover within the hospital setting.</th>
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</thead>
<tbody>
<tr>
<td>The standardised process should have standardised content</td>
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<tr>
<td>The benefits of the standardisation process are evident to end-users.</td>
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<table>
<thead>
<tr>
<th>Conclusion</th>
<th>There is a need for process change in medical shift to shift handover.</th>
</tr>
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</table>

**Objectives**
- To compare the reliability of three different handover methods: verbal only, verbal with handover notes and typed handover notes.

**Design**
- Observation of 12 simulated patients over five consecutive handover cycles between doctors on a one-to-one basis.
- Three handover styles were used and a numerical scoring system assessed clinical information lost per handover cycle.

**Main results**
- After five handover cycles, only 2.5% of patient information was retained using the verbal-only handover method.
- 85.5% was retained when using the verbal with note taking method.
- 99% was retained when a printed handover containing all patient information was used.

**Main Messages**
- Verbal only handover does not ensure continuity of information flow (and therefore patient care), and should be avoided.
- Verbal handover with note taking method retained most information and is preferred.
- While printed handover sheet retained almost all information, the accuracy of information is dependent on regular update of the information sheet.

**Conclusion**
- Verbal only handover should be avoided whenever possible.

Objectives

- To explore the experiences of nurses receiving patients who were brought into hospital as emergencies by ambulance crews through an analysis of the handover and triage process.

Design

- A qualitative descriptive interview study inspired by the phenomenological method was used with six emergency nurses.

Main results

- There are three elements to a handover: a verbal report, handing over documented accounts and the final “physical” handover.
- The study identified that the verbal communication between ambulance and emergency nurses was often very structured.
- The ideal handovers often involved patients with very distinct medical problems.
- The difficult handover was characterised by a significantly more complicated care situation, with vague symptoms.

Main Messages

- Patient characteristics affect the quality of handover.
- Patients with well-defined illness or symptoms were thought to be handed over well.
- Patients with vague symptoms or deteriorating were not handed over as well, however, they represent the most vulnerable group of patients requiring seamless care.

Conclusion

- Verbal only handover should be avoided whenever possible.

Objectives  
- To assess the frequency, nature and understanding of abbreviations in medical records.

Design  
- Audit of abbreviation use and meaning in handover sheets and medical notes compared to standards.
- A selection of abbreviations was shown to healthcare professionals to examine interpretation of abbreviations.

Main results  
- On 25 handover sheets a total of 2286 abbreviations were used, with 221 different abbreviations.
- The standards recognised 14%-20% of these abbreviations.
- Some words were shortened in different forms, for example, normal (N, NI, NAD).
- Some abbreviations had multiple interpretations that differed from those intended.
- When presented with a selection of abbreviations, paediatric doctors recognized 56-94% and other healthcare professionals recognised 31-63%.

Main Messages  
- Abbreviation usage in handover is common.
- Abbreviations are not well recognised by standard terminology and many are not recognised by healthcare professionals.
- Non-standard use of abbreviation should be avoided.

Conclusion  
- Abbreviation use was widespread and there was no systematic approach to this and difficulties in interpretation were demonstrated.

Objectives
- To describe the effect of using a standardised communication process, SBAR process for handover communication.

Design
- Change process of nursing shift to shift handover using SBAR technique.
- Phone recording.

Main results
- Paper reports on the use of the SBAR technique in combination with phone recordings of nursing handover at a US hospital medical centre.
- The paper reports improvements in patient safety and quality of care since the implementation of the system.
- Other benefits reported include a streamlined handoff process, reduced patient falls during shift change, increased response times to patient call lights and reduced reporting time by 70%.
- There was a significant reduction in interruption and the average length of handover has reduced from 6 minutes to less than 2 minutes per report.

Main Messages
- Standardised communication techniques such as SBAR can improve patient safety and quality of care.
- The benefits include reduction in time spent for handover and improved patient outcomes.
- Standardised communication techniques improve handover and are cost-effective.

Conclusion
- Standardised communication techniques work well to improve clinical handover.

**Objectives**
- To improve the quality and safety of handover of patients from surgery to intensive care.

**Design**
- A prospective intervention study measured the change in performance before and after the implementation of a new handover protocol that was developed through detailed discussions with a Formula 1 racing team and aviation training captains.

**Main results**
- The mean number of technical errors was reduced, the mean number of information handover omissions was reduced, and duration of handover was reduced from 10.8 min to 9.4 min.
- Nine out of twenty-three (39%) precondition patients had more than one error in both technical and information handover prior to the new protocol, compared with three out of twenty-seven (11.5%) with the new handover.
- Regression analysis showed that the number of technical errors were significantly reduced with the new handover and an interaction suggested that teamwork had a different effect with the new handover protocol.

**Main Messages**
- The new handover protocol includes pre-handover preparation, equipment and technology, information, discussion and plan.
- The protocol consists of 11 safety themes.
- A well designed and implemented handover protocol which works within the local context can have significant benefits for quality and safety of patient care.

**Conclusion**
- The introduction of the new handover protocol leads to improvements in all aspects of the handover.

**Objectives**
- To develop a method for clinical handover improvement through the development and implementation of standardised operating protocol.

**Design**
- An interactive 90-minute workshop (hand-off clinic) was developed in 2005 to:
  - develop a standardized process for the handoff
  - create a checklist of critical patient content,
  - plan for dissemination and training.

**Main results**
- 7 out of 10 resident programs have participated.
- Handover protocols are variable and discipline-specific.
- Verbal handover sometimes did not happen.
- Transfer of responsibility might be separated in time and space from the transfer of information.

**Main Messages**
- Standardisation of handover process is challenging.
- Every discipline/ward will have different requirements, different protocols and different data sets for clinical handover.
- The new protocol will need to emphasise transfer of information and responsibility.

**Conclusion**
- The model of using handover clinic for design and implementation of standardised protocol can be applied to other healthcare settings.

**Objectives**
- To survey house officers and nurses regarding timing, structure and content of clinical handover and compare these results.
- To develop an 'on-call' sheet and the development of guidelines for handovers.

**Design**
- Survey study.

**Main results**
- This study showed that nurses have more handovers than house officers in a 24-hour period.
- Nurses rated their handovers as 'good', with a mean score of 7.8/10, while house officers rated the standard of their handovers as only 'average', with a mean score of 5.1/10.
- This study found that 60.9% of house officers reported that they had encountered a problem at least seven times in their most recent clinical rotation that they could directly attribute to a poor handover.
- Nurses reported a much lower incidence of problems relating to poor handover standards, with 37.5% of this group indicating that they had experienced a clinical problem with a patient related to a nursing handover.

**Main Messages**
- Nurses have a better handover process and better culture in ensuring good clinical handover.
- Handover should have a fixed time and location, a standardised process and content (in this case JUMP) and training for all staff.
- Standardised handover might improve patient outcomes.

**Conclusion**
- In this study, we identified that health professionals perceive that clinical problems can be attributed to poor clinical handover. The majority of respondents in the study felt that an effective handover system should include a set location for handover, a standardised 'on-call' sheet and training related to handovers.
Supporting Literature


Objectives
- To understand clinical handover and patient safety, as well as interventions to address systemic and human performance issues.

Design
- A methodological approach which combines qualitative field techniques with information systems analysis.

Main results
- Clinical handovers were affected by multiple various factors, some were not recognised by clinicians.
- Clinical handovers served multiple different functions.
- New intervention needs to take into account all these factors in order to achieve socio-cultural-technical integration.

Main Messages
- It is important to understand the socio-cultural context prior to designing and implementing clinical handover solutions.
- Clinician's engagement, especially end-users' engagement is most important in designing new systems.
- Clinicians learn through reflective learning and engagement for quality and safety programs.

Conclusion
- Systemic intervention in healthcare needs to take multiple different factors into account, especially the socio-cultural factors.

Objectives
- To understand the importance of socio-cultural factors in handover intervention.

Design
- A methodological approach which combines qualitative field techniques with information systems analysis.

Main results
- Electronic or other tools should be built as a support tool rather than a “total solution”.
- Different users would want different requirements from systemic solutions.
- Minimum data sets and safety features were provided in this article.

Main Messages
- It is important to understand socio-cultural aspects of systemic intervention and to engage clinicians as co-participants in any systemic interventions.
- Minimum data sets and safety features should be investigated and built into any systemic intervention.
- Clinicians have different views about their work processes which need to be balanced carefully in any intervention.

Conclusion
- User-centred design approach is important in healthcare intervention.

**Objectives**
- To understand user-centred design and user engagement in patient safety study.

**Design**
- Description of system development, taking user's view into account in order to build interventions successfully.

**Main results**
- Clinicians have different views regarding system requirements, marginalising these views, however, might be detrimental to the systems built.
- The socio-cultural issues need to be taken into consideration in order to meaningfully engage clinician.
- The paper describes user engagement process.

**Main Messages**
- Clinician's views need to be balanced against the need for standardisation.
- User centred design will need to consider various requirements of users for any intervention within the healthcare systems.
- Continuous end user engagement is essential.

**Conclusion**
- Systemic intervention in healthcare needs to fully engage users. It is important to recognise the heterogeneity of users for healthcare systems and their views will need to be balanced against the need for standardisation.
4.2.6 Publication 6


Publication 6 is the academic summary of all of the work done from 2005 to 2009 regarding clinical handover improvement by the PhD candidate and colleagues. Publication 6 describes the development of a standardised clinical handover procedure and information transfer platform using the research approach described in Chapter 3. Publication 6 describes "HAND ME AN ISOBAR" as a way of engaging clinicians to participate in clinical handover improvement project. It is acknowledged that the ISOBAR mnemonic initially originated from a team of researchers in Western Australia (Porteous et al, 2009). In order to provide consistency and collaboration, re-analysis of the data from Tasmania were flexibly incorporated into the ISOBAR mnemonic.

There are three main findings of this publication. Firstly, Publication 6 is a demonstration of standardisation with the ability to incorporate local practice and socio-cultural context, including the ISOBAR mnemonic. Secondly, Publication 6 provides an example of a standardised protocol and a standardised information platform that could be implemented in other healthcare systems. Thirdly, Publication 6 suggests the need to emphasise safety and safety value assigned by clinicians and the organisation on the clinical handover process. This could be achieved by engaging clinicians and the organisation to prepare for clinical handover sessions, organise clinical handover sessions, as well as the provision of environmental awareness that emphasises safety as the primary goal. The ISOBAR mnemonic acts a surrogate for transfer of responsibility and accountability of patient care to improve safety in patient care.

Publication 6 contributes to Key finding 2 and 5. More importantly, Publication 6 helps to build the conceptual model for clinical handover improvement around safety and safety value. Publication 6 demonstrates the possibility of standardisation that incorporates local socio-cultural contexts across 6 different clinical areas as well as across institutions through collaboration with the team from Western Australia (Key finding 2). Publication 6 emphasises the iterative feedback cycle and the need to emphasise safety as an engagement strategy for clinicians to actively participate in clinical handover improvement (Key finding 5).
HAND ME AN ISOBAR: An evidence based approach to improve shift-to-shift clinical handover – A pilot study

Authors

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Abstract

Objective: To present an evidence based approach to the development of an overarching minimum data set (MDS) and standardised operating protocol (SOP) to improve medical and nursing shift-to-shift clinical handover.

Design, Setting and Participants: This research was conducted in three clinical areas: (General Medicine, General Surgery and Emergency Medicine) at the Royal Hobart Hospital, Tasmania. Data collection and analysis involved a triangulation of qualitative techniques A total of 120 observation sessions; 112 interviews were conducted across the 6 clinical areas and handover information on more than 1000 individual patient handovers were analysed.

Results: An over-arching MDS and SOP structured in a four step approach handover under the acronym 'HAND ME AN ISOBAR' is presented. This standardised solution supports flexible adaption to local circumstances.

Conclusion: A standardized solution can be developed and validated across professional and disciplinary boundaries. It is anticipated ‘HAND ME AN ISOBAR’ will be transferable to other sites and clinical settings.

Key Word: Clinical handover, qualitative research, quality and safety, standardisation, healthcare communication, nursing handover, junior medical officer.

Introduction

Reducing the working hours of healthcare professionals, (especially junior medical officers), is a trend that acknowledges fatigue may contribute to poor work performance (Feyer, 2001, Dawson and Reid, 1997). In Europe, the European Work Directive will progressively reduce the maximum working hours of healthcare professionals to 48 hours per week (Junior Doctors Committee, 2004). In the United States, this trend is also evident, and in Australia, the Australian Medical Association has produced guidelines for safe working hours (Australian Medical Association, 2006b). This trend has also led to an increase in both the number of shifts and number of healthcare teams looking after the same patient. As a result, mechanisms to support effective and efficient handover processes for transferring information, responsibility and accountability have become recognised as increasingly important for the delivery of high quality safe healthcare (Australian Medical Association, 2006a).

Shift-to-shift medical and nursing handovers have been identified as high-risk areas where improved clinical handover solutions are urgently required (World Health Organisation, 2007). Major factors that have been identified as inhibiting handover improvements include both the lack of basic understanding of handover processes and absence of a common structure (World Health Organisation, 2007). In Australia amongst medical staff, shift-to-shift clinical handover remains poorly defined and poorly understood (Yee et al., 2006). Many hospitals do not have clear policies on how to conduct effective handover and the transfer of responsibility and accountability is not well practiced (Bomba and Prakash, 2005). At the same time, the nursing
profession has a long tradition of practising shift-to-shift handover (Sherlock, 1995). Recently, the efficiency and effectiveness of nursing handovers has been scrutinised and the need to improve and optimise the accurate transfer of information, responsibility and accountability identified (Manias and Street, 2000). More importantly, the need to improve clinical handover has been recognised as important for reducing errors, improving patient safety and responding to the increasing use of information technology (Australian Council for Safety and Quality in Health Care, 2005).

Despite a proliferation of research literature on clinical handover over the last 5 years, there remains a lack of evidence on best practice (Wong et al., 2008a). There are few frameworks for enhancing understanding of handover, developing tools to improve it or methodologies to evaluate handover practices (Wong et al., 2008a, Agency for Healthcare Research and Quality and US Department of Defence, 2007). This gap is a significant barrier for clinicians and managers keen to establish practices to transform clinical handover into a more consistent and reliable part of the delivery of safe patient care. Whilst a strong argument exists for face to face handover, the lack of structure in terms of content, process and information tools means that handover can be a highly variable and ‘individual’ dependent process. Studies have suggested the development of standardised operating protocols (SOPs) and minimum data sets (MDSs) are an important step in reducing this individual variability and improving the effectiveness and efficiency of handover (McCann et al., 2007, Wilson, 2007, Arora and Johnson, 2006, Fenton, 2006, Bourne, 2000).

A number of SOPs and MDSs have been developed and implemented including the widely promoted SBAR (Situation-Background-Assessment-Recommendation) technique. However, most of these SOPs and MDSs lack validation in real-world clinical settings and few studies provide details on the experiences and practices of their implementation (Wong et al., 2008a, Agency for Healthcare Research and Quality and US Department of Defence, 2007). Importantly, most SOPs and MDSs remain designed for use in highly specialised areas raising questions about their transferability. There is also little evidence that any of these SOPs and MDSs have been developed through direct engagement with end-users (health professionals). Perhaps most significantly, none of the SOPs and MDSs appear to adequately address both the transfer of responsibility and transfer of accountability during handover.

This paper presents an evidence based, user-centred approach to the development and validation of an overarching minimum data set (MDS) and standardised operating protocol (SOP) to improve shift-to-shift clinical handover across disciplinary, professional and departmental boundaries. This over-arching MDS and SOP for clinical handover, has the acronym ‘HAND ME AN ISOBAR’.
Methodology

The methodology deploys a socio-technical approach to understanding and improving clinical handover (Westbrook et al., 2007). By integrating clinical and information systems expertise within the research team, this applied approach supported the iterative use of qualitative field techniques underpinned by user-centred design principles (Westbrook et al., 2007, Clegg, 2000, Land, 2000). The approach relied on the benefits and synergies of these expert interactions and analytical iterations to optimise transferability and sustainability of the research outputs (Figure below). This study was approved by the Tasmania Social Sciences Human Research Ethics Committee. Informed consent was obtained from all participants.

Figure to show Holistic Socio-Technical Approach

This research was conducted in three clinical areas: (General Medicine, General Surgery and Emergency Medicine) at the Royal Hobart Hospital, Tasmania with a focus on (junior medical officers) and nursing staff. Data collection and analysis involved a triangulation of qualitative techniques (handover notes, field observations, semi-structured interviews and focus groups). The research team involved 4 hospital staff (3 nurses, 1 registrar) with experience of the clinical areas and 2 information systems researchers.

Phase 1 focused on understanding current handover practices, acquiring data on users' experiences and attitudes, and generating insight into key factors (and their inter-relationships) impacting on handover. A total of 120 observation sessions (60 with nurses, 60 with doctors) and 112 interviews (51 with nurses, 61 with doctors) were conducted across the 6 clinical areas. Interviews were audio-recorded and researchers also took comprehensive notes covering not just the content but other factors of potential relevance including body language and level of interruption. Interview transcripts were analysed using a coding process drawing on the principles of grounded theory (Glaser and Strauss, 1967).
Phase 2 (concurrent with phase one), involved analysing handover messages (both written and verbal), for information content and structure as part of the process of developing initial MDSs and SOPs for each of the clinical areas. Some clinical areas already had typed handover sheets in combination with verbal handovers, while other areas had typed/written handover sheets or verbal handovers only. For medical officers, written handover sheets were collected and analysed by the medical doctor in the research team together with the aligned observation sessions to assist in validating the emerging MDS. For nurses, a combination of typed handover sheets and verbal information transfer was analysed, in combination with observation sessions by the whole research team following data collection. Handover sheets from 60 medical handover sessions and 60 nursing handover sessions containing handover information on more than 1000 individual patient handovers were analysed.

Phase 3 involved analysis and interpretation of the data generated in phases 1 & 2. This generated 6 individual MDSs and SOPs for nursing and medical (junior medical officer) handover along with associated training manuals and training workshops. Phase 4 involved iterative processes of refining and validating these SOPs and MDSs by trialling them in each clinical area with doctors and nurses. The clinicians then interacted with the project team both formally (through focus groups) and informally to provide comment and feedback for their improvement. This real-life clinical testing (over a period of 4 months) provided validation of the SOPs and MDSs in each clinical area. Phase 5 involved the research team engaging in a further detailed analysis to explore similarities and differences across these 6 SOPs and MDSs. This led to the development of the over-arching MDS and SOP that is the focus of this paper. The over-arching MDS and SOP collectively known by the acronym ‘HAND ME AN ISOBAR’ provide a coherent framework for supporting transferability of clinical handover improvement initiatives in different clinical settings whilst emphasising the transfer of information, responsibility and accountability.

**Results**

**What is “HAND ME AN ISOBAR”?**

The acronym “HAND ME AN ISOBAR” represents the four step evidence based approach to clinical handover. Table below provides a summary of this SOP and the figure below illustrates the steps of “HAND ME AN ISOBAR” in a flow chart. Each of the four steps and their constituent phases is explained in detail below.
"HAND ME AN ISOBAR"

The SOP "HAND ME AN ISOBAR" represents the following steps (and actions):

Step 1: HAND; Preparing for handover
- H = Hey, it's handover time
- A = Allocate staff for continuity of patient care
- N = Nominate participants, venue and time
- D = Document on written sheets and patient notes

Step 2: ME; Organise handover
- M = Make sure all participants have arrived
- E = Elect a leader

Step 3: AN; Provide environmental awareness
- A = Alerts
- N = Notice

Step 4: ISOBAR; Provide handover for individual patients
- I = Identification of patient
- S = Situation and status
- O = Observation and MET call
- B = Background and history
- A = Action and accountability to seniors
- R = Responsibility and risk management
HAND
(Prepare for handover)
- Handover is a priority
- Ensure continuity of care is provided
- Ensure necessary documents are available for handover
- Convene participants at a fixed time and fixed venue

ME
(Organise handover)
- Ensure all participants are present
- Ensure leadership is provided during handover

AN
(Provide environmental awareness)
- Identify deteriorating patients
- Identify environmental factors which are important
- Identify/Plan for Patient

ISOBAR
(Provide handover for individual patients)
- See: Minimum Data Set
Step 1: HAND (Preparation Step for handover)

Preparation is very important for an effective clinical handover process and is comprised of four phases.

Phase 1: (H) Hey, it is handover time!

Clinicians are busy and are often simultaneously engaged in multiple tasks requiring completion. To achieve an effective handover, clinical handover has to be prioritised as a key task. This step emphasises the importance of culture in ensuring that handover is embraced as a priority.

Phase 2: (A) Allocate staff for continuity of patient care

During the clinical handover process, it is essential that emergency patient care is maintained and delivered by staff. Therefore clear allocation of staff to facilitate continuity of care is essential to ensure patient safety and to minimise disruptions during handover.

Phase 3: (N) Nominate participants, time and venue for handover

Attendance of key staff should be determined and the handover process should have a clear starting time, place and maximum duration. Clinical handover should ideally be conducted at a venue that will minimise disruptions.

Phase 4: (D) Document on written sheets and patient notes

Clinicians tend to retain little information from pure verbal handover. It is therefore important for verbal handover to be complemented by written handover sheets. This SOP emphasises the need to document all information clearly in both the patient progress notes and the handover sheets.

Step 2: ME (Organisation Step for clinical handover)

The organisation step is important to ensure the smooth running of handover. This step is comprised of two phases.

Phase 1: (M) Make sure all participants have arrived

It is critical to ensure all key participants have arrived before the handover of essential information begins. Each organisation should determine key participants for each handover session. It is important that clinicians are provided with paid and protected time to attend handover. Punctuality during handover sessions is important and should be reflected by the professionalism of clinicians and in organisational safety culture.
Phase 2: (E) Elect a leader

The handover of patients during a shift change should be supervised by a designated leader. This is usually the role of the most senior clinician present. The designated leader should ensure that all relevant agenda items are covered in a timely manner.

Step 3: AN (Step for the Provision of environmental awareness)

All handovers, regardless of type, should provide the incoming team with a clear idea of the environment and situation that they will be working in. This step should include clear guidelines on the detection of deteriorating patients. This step is comprised of two phases.

Phase 1: (A) Alerts, attention and safety

It is important to identify patients who require specific/urgent attention and/or occupational safety issues during the commencement of the shift. Information should include environmental factors that may impact on the safety of patients, healthcare professionals or others.

Phase 2: (N) Notice

All potential patient movements should be identified to the incoming teams so that the team can devise plans to manage their workload. Information regarding potential patient flows should be given in a summarised manner.

Step 4: ISOBAR (Step for the Provision of individual patient handover)

This step may involve a range of different formats, including written sheets and/or verbal handovers. However, this SOP emphasises that face to face handover is the preferred option supported by documentation. It also emphasises the need to allow for interaction and clarification during handover. The MDS for individual patient handover, known as the ISOBAR will ensure effective and efficient clinical handover if used in accordance with the SOP outlined. There are six sections to the MDS designed to ensure the transfer of information, responsibility and accountability during handover.

1.  I = identity of patient
2.  S = situation and status
3.  O = observation and MET call
4.  B = background and history
5.  A = actions, agreed plan and accountability to seniors
6.  R = responsibility and risk management

These six elements are presented in a flow chart below.
This should include two identifiers

Patient's current status and patient-centred care, including directives and discharge

Current observation of patients and whether MET call is indicated

This should include history, evaluation and management to date. Important to include relevant background and current issues

Handover of tasks, agreed plan and recommendations as well as who to call

Responsibility transfer through read-back or acceptance and tasks and risk management strategies

If not, any other problems and handover closure
Discussion and Conclusion

The over-arching SOP and MDS have undergone considerable validation within the Royal Hobart Hospital, Tasmania, across six different clinical areas. Their development recognises the need for solutions that are transferable at national and potentially international levels. More specifically, this SOP and MDS illustrate how to flexibly adapt a standardised approach into shift-to-shift handover for medical and nursing staff in General Medicine, General Surgery and Emergency Medicine. The initial experience of implementing this SOP and MDS has been an improvement in clinical handover. Extensive evaluation is now underway to further understand the impact of SOP and MDS on clinical handover and will be reported in future publications.

The socio-technical approach supported the development of the SOP and MDS to accommodate the reality that any standardised solution to handover must be able to be adapted to local circumstances that achieve safer clinical care. Critically this ‘flexible standardisation’ embedded within the over-arching SOP and MDS aims to support their use in other clinical settings. Indeed, the SOP and MDS were designed from the outset to provide an inclusive framework to support transferability. Although multi-disciplinary handover was not the focus of this research, the authors anticipate that the SOP and MDS provide a framework for the future development and implementation of multi-disciplinary handover.

The development of six MDSs in six clinical areas provided the project team with evidence of the generalisability and transferability of this work. This perspective is further supported by the fact that this SOP and MDS can accommodate a range of different methods for clinical handover, including verbal handover, written handover and bed-side handover. Most importantly, flexibility can be maintained in the development process of MDSs within this framework to accommodate local circumstances including differing handover content requirements.

The research team are now very keen to further validate the generalisabilily and transferability of the over-arching SOP and MDS by trialling it in another hospital and in a range of other clinical settings. In this regard, the project team is keen to emphasise the importance of the initial data collection process as it serves not only as an essential tool to derive the SOP and MDS for local use, but also to engage local clinicians in the clinical handover improvement process. Most importantly, the research team believe that the successful implementation of SOP and MDS for clinical handover requires clear end-user involvement and change management and implementation plans that continue to involve all relevant stakeholders.
4.2.7 Publication 7


Publication 7 arises from the analysis and synthesis of collected data from a clinical and communication perspective. This was performed after the PhD candidate completed 5 years of service with the Australian Commission on Safety and Quality in Health Care as well as local healthcare organisations to improve clinical handover. The experience gained through participation in these committees and organisations provided the PhD candidate with a fresh perspectives regarding the standardisation of information transfer and the use of tools to standardise information transfer. While Publication 7 focuses on the use of electronic tools, the finding will be applicable to any form of information standardisation platforms as the emphasis of the publication is not the tool itself but the utilisation of the tool from the clinical and communicative perspective. There are tensions between clinical judgement and communicative practices with the standardisation of information transfer. Standardised information transfer is affected by the sender of the information, the environment and clinical judgement. This interaction in turn affects the outcome of clinical handover.

Publication 7 provides a fresh perspective on the standardisation of clinical handover practice, especially the standardisation of information transfer during clinical handover. Publication 7 forms the basis of Key finding 3. This is an important finding as it further challenges the view that the standardisation of clinical handover practice and information transfer is the primary intervention that could achieve safe clinical outcomes from clinical handover improvement programs.

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4.3 Key findings
This section provides the interpretation of five key findings which emerged from the analysis and review of publications as outlined above.

4.3.1 Key finding 1: Clinical handover is a complex process, with varied understanding and practices among different clinicians and healthcare settings. The unifying underlying purpose of clinical handover is the transfer of responsibility and accountability of patient care.

This thesis suggests through Publication 1 that clinical handover is a complex process without uniform understanding and practices. The variability in clinical handover practice is important in determining interventions required to improve clinical handover within a specific clinical setting. In Publication 3 and Publication 4, this point is further explored to not only understand the variability and its impact on clinical handover but also to identify a systematic way of documenting the variability to facilitate clinical handover improvement.

Despite the fact that clinical handover is conducted by nurses and doctors on a daily basis, there is no uniform understanding and practice within a particular group of healthcare professionals, within a particular clinical setting, between different healthcare professional groups and between different clinical settings. Publication 1 describes this finding within one healthcare professional group (medical practitioners) and within one clinical practice area. Publication 1 shows that clinical handover serves different functions and the clinical handover process is affected by different factors within the same clinical practice environment.

When this work is further expanded to include the nursing profession as well as other wards and clinical areas, it becomes obvious that clinical handover is a complex process, embedded within a specific local clinical and socio-cultural context. Publication 3 provides a description of the observed practice of clinical handover. This description has been provided in Section 1.4 as the research context. This description and results of the interviews, observations and clinical handover notes analysis show that clinicians have a varied understanding of clinical handover, expectations of clinical handover practices and experiences in their participation in clinical handover activities. This is in part due to their varied knowledge of the purpose of clinical handover as well as the lack of best practice to conduct clinical handover. This point has been emphasised in Publication 1, as clinicians, especially junior clinicians emphasise the need for education and training programs to improve their knowledge, skills and confidence to conduct proper clinical handover.

This variability is important when determining interventions required to improve clinical handover. Publication 4 emphasises this point by developing a simplified method to conduct interviews, observation and clinical handover notes analysis in order to understand the current context of clinical handover improvement and to facilitate the design of appropriate interventions to improve
clinical handover. This is presented in the preparatory phase. There are three very important messages embedded within Publication 4. These three messages are highlighted here.

Firstly, the organisation, both at the hospital and health services level and the local ward level, as well as the environment in which clinical handover is conducted have significant impact on the understanding of clinical handover and the outcomes of clinical handover improvement. The priority of clinical handover as a quality and safety initiative within an organisation is an important determinant of clinical handover expectations of clinicians. In clinical areas in which there are multiple quality and safety improvement initiatives, clinicians are unclear of the priority of each initiative. They are therefore unclear of the importance of clinical handover improvement within the overall organisational structure and organisational vision. As such, clinical handover improvement programs might not achieve anticipated outcomes.

Secondly, the physical environment in which clinical handover is conducted affects the clinical handover understanding, expectations and practices of clinical handover by clinicians. A defined space for clinical handover creates the expectation and understanding among clinicians that this is an important part of clinical duty. Without a defined physical space, clinical handover is not seen as an important clinical practice for patient care and as such, the expectation is one of occurrence by chance rather than occurrence by design.

Thirdly, the socio-cultural influence of a clinical area has significant impact on the understanding of clinical handover and clinical handover practice. This is particularly evident in the research by the PhD candidate and research team when nursing and medical professions are considered. In the nursing profession, clinical handover is an expected part of clinical duty and clinical handover marks the beginning of a shift and the end of a shift. In the medical profession, the clinical handover culture is not ingrained. As such, clinical handover does not carry the assumed statutory border of a shift. This is in part due to the fact that nurses often look after different patients for each shift. As such, clinical handover is the time to obtain a plan for patient care. Medical professionals on the other hand, tend to shoulder patient care responsibility outside working hours and even outside hospitals. They continue to care for their patients until discharge. As such, their understanding of clinical handover, expectations and practices of clinical handover are different.

The practical solution of this seems to be the availability of a defined physical space and appropriate shift overlap, both of which are recommended in Publication 4. The complexity of clinical handover among different clinicians however, suggests that the safety value assigned on clinical handover by clinician and the organisation is the underlying framework required to improve clinical handover in a sustainable way.

It is interesting to note that despite the variability of practices, understanding and expectations of clinical handover, there is a unifying underlying purpose of clinical handover described by clinicians. The purpose of that process is the transfer of responsibility and accountability of patient care. This point has been emphasised in Publication 1, 3, 4, 6 and 7. It is important to note that clinicians consider the transfer of information as the objective “surrogate” for the transfer of responsibility.
and accountability for patient care. Information transfer is the medium through which the transfer of responsibility and accountability of patient care occurred. It is important to emphasise that in the research by the PhD candidate and team, both nursing and medical professionals consider the transfer of patient care as the ultimate goal and purpose of the clinical handover process, regardless of the ward that the healthcare professionals work in. As such, Publication 3 emphasises the purpose of transfer of responsibility and accountability of patient care through a specifically designed information transfer platform.

Key finding 1 has significant implications for clinical handover improvement. More importantly, Key finding 1 creates a platform for clinical handover improvement. Firstly, Key finding 1 suggests the need for standardisation within a local context (Key finding 2). Secondly, education and training within a specific structure is important (Key finding 4). Finally, the safety value that clinicians and healthcare organisations assign on clinical handover is very important. This is further explored in Section 5.3, the safety value alignment model for clinical handover improvement.
4.3.2 Key finding 2: Local socio-cultural context and clinical practice need to be taken into consideration in standardising clinical handover processes.

This thesis suggests that the standardisation of the clinical handover process and information transfer is important. This point is particularly emphasised in Publication 1, Publication 3 and Publication 4. Clinical handover practice is however, highly variable as described in Key finding 1. As such, the standardisation process must take into consideration local clinical practice and socio-cultural context. This includes not only the clinical handover process but also the information transfer platform. The process of standardisation while taking into account local clinical practice and variability has been emphasised and described in Publication 4. This concept is further demonstrated in Publication 6 with the development and the use of “HAND ME AN ISOBAR”.

Key finding 1 suggests that clinical handover practice is variable. There is however a unifying underlying purpose, which is the transfer of responsibility and accountability of patient care. In order to improve clinical handover practice, standardisation within local context is described in Publication 4. Publication 4 introduces the concept of flexible standardisation, critical standardisation and desirable standardisation as demonstrated in Figure 7.

![Diagram](image)

**Figure 7**: Demonstration of standardisation with flexibility.

As shown in the above diagram, there are recommendations derived from research and practical guidelines regarding how clinical handover should be conducted for better outcomes. This is desirable standardisation across institution, states and countries. There are however, local clinical
practices as well as socio-cultural contexts that will impact on whether all the recommendations could be adopted for all clinical settings and professional groups. The overlap is the essential part of the standardisation process, termed critical standardisation in Publication 4.

An example would be the recommendation for bedside handover. While this is possible in a clinical setting where there is a confined space and limited number of patients, such as intensive care unit, bedside handover is impossible for junior doctors covering medical calls, sometimes across different physical locations within the same healthcare organisation. The widespread physical location and the number of patients involved make it an impossible task. The concept behind bedside handover however, is a formal process of transfer of responsibility and accountability and the need to include the patient’s voice in handover. For medical staff therefore, this could potentially be possible through a change in information transfer during clinical handover to include a data field that documents patient specific suggestions. Furthermore, a formal sign off of written documents at the end of clinical handover can serve the goal of transfer of responsibility and accountability of care, without having the clinical handover process occurring at patient bedsides.

This thesis emphasises that the process of standardisation of clinical handover needs to consider local practice and socio-cultural context. This thesis further emphasises that flexibility needs to be built into the information transfer process. Publication 3 highlights the information transfer standardisation process through the development of minimum data sets. When these minimum data sets are analysed in detail, including publications from other groups, presented in Publication 2 and Chapter 2, commonalities start to emerge. The main aspect of information that clinicians consider important can be classified into three groups: the identification of patient and staff members involved, objective information regarding patient history and care, and cognitive and care projection from the outgoing team to the incoming team. These three aspects serve the purpose of transfer of responsibility and accountability of patient care.

In Publication 6, this research suggests the process "HAND ME AN ISOBAR" to improve clinical handover. Publication 6 suggests a four steps approach to clinical handover: preparation, organisation, environmental awareness and individual patient handover. The ISOBAR mnemonic is a collaborative work with Western Australia. The team from Western Australia suggests the mnemonic ISOBAR for inter-hospital transfer (Porteous et al., 2009). In order to adopt the mnemonic "ISOBAR", changes have to be made to specific data field. In Western Australia setting, read-back is important. As such, the last letter "R" represents read-back. In Tasmania, as face-to-face handover could exchange written or printed information artefacts, read-back is less important. As such, the concept of transfer of responsibility and risk management is introduced (Yee et al., 2009).

Key finding 2 not only emphasises the need for standardisation of clinical handover practice and information transfer but also the need to consider current clinical practice and local socio-cultural context. This key finding describes how standardisation could take into consideration local contexts. More importantly, this key finding describes the concept of an underlying framework for improvement. This is further discussed in Key finding 3, 4 and 5.
4.3.3 Key finding 3: Clinical judgement and communicative practices among clinicians affect the outcomes of standardisation of clinical handover.

This key finding is derived from Publication 7. The experience of conducting research in clinical handover improvement over the years as well as seeing how this work in clinical practices, has provided the PhD candidate with a new perspective regarding information standardisation and how clinical practice might affect the effectiveness of information standardisation. This has prompted the PhD candidate and colleagues to review previously collected data. While the work contained in Publication 7 deals with the use of an electronic tool, this could be extrapolated to the process associated with information standardisation without the use of an electronic tool. The analysis of data from the second part of the research project without the implementation of an electronic tool has demonstrated a similar finding. This is further explained below.

Despite extensive involvement of clinicians in the process of designing information standardisation tools and processes as well as electronic tools, reviews of actual use in practice, however showed tensions between standardisation and clinical judgement and communicative practices (Yee et al., 2013). These tensions affected how the tool was being used and the effectiveness of the tool on clinical handover improvement.

Clinicians emphasise the need for standardisation of clinical practices, including clinical handover process and information transfer in order to achieve better outcomes. When further explored, the rationale behind the standardisation process is to allow a better understanding and expectations by different individuals participating in the same activity, with the ultimate goal of achieving the transfer of responsibility and accountability of patient care. Standardisation of information transfer has been emphasised by clinicians as described in Publication 1, Publication 2, Publication 3 and Publication 4. It is interesting to note that when the process of standardisation of information fields is put into practice using the electronic tool as described in Publication 7, not all information fields attract the same attention from clinicians. Furthermore, the quality of information transfer and whether clinicians act upon the information provided is dependent on the sender and the receiver of the information rather than the information itself.

Further analysis of our primary data from the six clinical areas in combination with Publication 7 identified interesting findings. The stereotyped stigmata associated with a patient carries significant meanings to the interpretation of clinical handover messages. This is especially important for patients who present to the hospital regularly with stigmatised diseases. Secondly, the identity of the handover message sender seems to be as important if not more important than the message itself for the receiver. Some clinicians tend to ignore objective data presented by certain individuals. It therefore seems counter-productive that clinicians want standardisation and yet they do not consider each message equal. Thirdly, despite the fact that clinical data should be objective, these data are presented with the sender’s interpretation. Finally, the identity of the
sender has the most impact on cognitive and care projection from one team to the other. Some staff members, especially junior staff members do not tend to provide this. Furthermore, some senior staff members are dismissive of this aspect of handover from junior staff. Most importantly, the standardised data field and the request for a standardised information transfer platform are obtained from interviews from clinicians. The above mentioned deviations from standardised information transfer are obtained through observations and handover notes analysis. The possible explanation for this variation between interviews and observations is that clinicians decide the clinical handover information that they want to act upon based on characteristics of patients and the identity of information sender because of subconscious behaviours. Clinicians probably do not realise their own behaviours during clinical handover.

This finding is significant as the standardisation of clinical handover practice and information transfer will not achieve the anticipated outcomes of improving patient care without addressing and understanding the impact of clinical judgement and communicative practices on the utilisation of information. As such, this key finding provides the platform to discuss the importance of education and training in improving clinical handover, as described in Key finding 4. Furthermore, this key finding shows that standardisation without influencing the safety value of clinical handover will not have a sustainable effect in the long term. It therefore provides the platform to discuss key finding 5.
4.3.4 Key finding 4: An effective education and training program, developed based on a standardised procedure and tool, is essential to improve clinical handover.

This thesis suggests that an effective education and training program is very important to produce substantive and sustainable outcomes in clinical handover improvement. More importantly, this thesis suggests that a stand-alone education and training program might not be effective. However, when an educational and training program is combined with a standardised procedure and tool, it has the potential to achieve substantive progress in the improvement of clinical handover practice.

In Publication 1, the importance of education and training was highlighted. Clinicians emphasised the importance and the need for a formal education and training program to support the implementation of clinical handover improvement interventions. The literature review in Publication 2 however, shows that education and training has not been extensively studied. Publication 4 again emphasises the importance of education and training to implement clinical handover improvement interventions. More importantly, Publication 4 provides guidance on the most effective role that education and training program can play in clinical handover improvement. Publication 4 shows that education and training programs need to be conducted prior to system change. The development of a defined standardised procedure and tool however, is the precursor to an effective education and training program.

Publication 5 demonstrates the example of an education and training program as part of the clinical handover improvement intervention. The education and training program begins with an emphasis on safety in patient care and the role of clinical handover in safe patient care. This is an important point to include in the education and training program in order to increase awareness of the essential role and safety value of clinical handover in clinical practice. The program then discusses local and global context of clinical handover improvement. It provides a specific practical approach within a particular clinical context of how clinical handover should be conducted, with a defined procedure and information standardisation process. By incorporating a pre-defined procedure and information standardisation tool, the education and training program can encourage practical application of knowledge and skills learnt.

This key finding suggests that an education and training program to improve clinical handover is the main priority from the perspective of a clinician. Clinicians want practical skills for immediate application delivered through the education and training program. As such, there needs to be a strong organisational-led foundation, including procedures, information standardisation, tools and artefacts available to support an effective education and training program. A successful education and training program can help the continual engagement of clinicians to improve clinical handover practice.
4.3.5 Key finding 5: Clinical handover improvement requires continual commitment from the organisation and continual engagement of clinicians working towards the common goal of safe patient care.

This key finding emerges from a combination of research work, publications listed and included in this PhD and the PhD candidate's involvement in local, national and international committees and organisations to improve clinical handover. In order to achieve the goal of patient care outcomes, clinical handover improvement needs to be sustainable and progressive. One component towards achieving that goal is the development and implementation of a standardised clinical handover procedure and information transfer platform, including the implementation of an electronic tool. This is discussed in Key finding 2. As discussed in Key finding 1 however, clinical handover is a clinical practice with varied understanding, expectations and practices. Furthermore, in Key finding 3, the effectiveness of a standardisation process is shown to be affected by clinical judgement and clinical communication practices. It is clear that clinicians want to improve their clinical handover practice. It therefore emerges that the effectiveness and sustainability of clinical handover improvement will only become apparent if there is a clear plan for continual organisational commitment and continual engagement of clinicians working towards the common goal of safer patient care.

Many clinicians want to be involved in clinical handover improvement and many clinicians want sustainable improvement in clinical handover. As such, Publication 4 indicates the need for evaluation and maintenance of clinical handover improvement programs. In order to achieve continual improvement, three important points emerge. Firstly, there needs to be continual organisation support. Publication 4 in the preparatory phase has highlighted the need to consider resources over time, with a time-resources diagram. Secondly, the evaluation process of clinical handover improvement needs to provide meaningful feedback to clinicians in order to engage clinicians in a continuous improvement cycle. The evaluation of clinical handover practice and feedback to clinicians must be in the form that allows self-reflection by clinicians to better understand the continual dynamic change of clinical handover practice. This point is conceptualised as the iterative feedback cycle contained in Publication 4 and subsequently re-produced in Publication 6, as shown below in Figure 8. Finally, clinical handover education and training programs need to be conducted on a regular basis, especially for new staff joining a particular clinical area or ward. Staff members, especially junior staff working in hospital settings are often on annual contracts. As such, the workforce is fluid. There is a need to maintain a critical mass of clinicians with knowledge and skills to conduct proper handover and to provide role models for new staff regarding standardised clinical handover practice.
Figure 8. Iterative feedback cycle.

Most importantly, clinicians need to be engaged in the process of continuous improvement. Encouragement for clinicians to continue the effort of improvement and to seek further updates and evidence based practice will ensure improvement of clinical handover processes and patient outcomes. The belief of clinicians on the safety value of clinical handover practice on patient care is the most important incentive to change their practice. As such, all these interventions and activities over time will allow clinicians to develop insightful reflections to guide and improve future practice.

This key finding shows that continual effort for clinical handover improvement is essential to improve clinical handover practices and patient outcomes. There needs to be a strong continual commitment from organisations and individual clinicians for this process. The standardisation of clinical handover practices and the development and implementation of electronic tools to help with the standardisation process are part of the effort to produce sustainable improvement. Feedback and education and training program are essential to continually improve clinical handover practices. Over time, insightful reflections from clinicians will change their belief and their practice of clinical handover.
4.4 Chapter reflections

This chapter has presented an overview and analysis of the 7 publications included as part of this thesis. This chapter then presented five key findings which emerged from the analysis of these publications.

This thesis has explored the fact that clinical handover is a complex clinical process, with varied understanding and practice within a particular profession, within a particular clinical setting as well as within different clinical settings across different healthcare disciplines (Key finding 1). Despite the variability in clinical handover practice, this chapter argued that the unifying underlying purpose of clinical handover was the transfer of responsibility and accountability of patient care. This chapter supported the need to standardise clinical handover practice through the standardisation of procedures and information transfer. This chapter however, argued that the key to successful standardisation was to take into account local clinical practice and socio-cultural context (Key finding 2). More importantly, this chapter highlighted the tensions between clinical judgement and communicative practices, and standardised clinical handover practice and standardised information transfer. These tensions affected the effectiveness of the standardisation process (Key finding 3). This chapter described the important role of education and training in clinical handover improvement. More importantly, this chapter put into context the most effective role of education and training programs in clinical handover improvement. The education and training program should incorporate a standardised procedure and tool to improve clinical handover (Key finding 4). Finally, this chapter brought all these interventions together to discuss sustainability in clinical handover improvement. While the standardisation of clinical handover practice and tools was important, organisational commitment and engagement of clinicians in the process of continuous improvement formed the foundation for sustainable improvement for safer patient outcomes (Key finding 5).

This chapter provided an analysis of the 7 publications that formed part of this thesis. It provided an interpretation of key findings that emerge from these publications from the PhD candidate’s current perspective, taking into account the experience over eight year of involvement in clinical handover research and improvement programs. These findings are further discussed in relation to the literature in Chapter 5. This chapter emphasises safety values of clinical handover assigned by clinicians and organisations as the most important element in clinical handover improvement. This leads to the development of the safety value alignment model of clinical handover improvement as discussed in Chapter 5.
Chapter 5      Discussion of key findings

5.1 Introduction

This chapter presents a discussion of the five key findings presented in Chapter 4, in relation to the literature. This chapter then presents and discusses the safety value alignment model for clinical handover to bring together all the data, publications as well as literature as a model to explain and improve clinical handover across institutions and healthcare professions.

- Section 5.2 presents a discussion of the five key findings which emerged from the analysis and synthesis of the 7 selected publications presented in chapter 4.

- Section 5.3 describes the safety value alignment model of clinical handover improvement. The safety value alignment model discusses a whole of system model to improve clinical handover. The model emphasises the concept of safety value by individual clinicians and the safety value of organisations. The model proposes that safer patient care can be achieved if there are internal alignment and external alignment of safety values for clinical handover improvement programs.

- Section 5.4 provides a summary reflection of the chapter.
5.2 Discussion of key findings

This section provides a discussion of the five key findings presented in Chapter 4, in relation to available literature.

5.2.1 Key finding 1: Clinical handover is a complex process, with varied understanding and practices among different clinicians and healthcare settings. The unifying underlying purpose of clinical handover is the transfer of responsibility and accountability of patient care.

This key finding suggests that clinical handover is a complex process. There is no universal understanding among clinicians regarding the meaning, functions and practices of clinical handover. Furthermore, this key finding suggests that despite the variability of clinical practice and understanding of clinical handover, there is a unifying underlying purpose of clinical handover, which is the transfer of responsibility and accountability of patient care.

A review of the literature seems to suggest that clinical handover is a commonly agreed term with uniform practice across individuals, disciplines and clinical boundaries (Australian Council for Safety and Quality in Health Care, 2005). In previous reports and literature reviews (Wong et al., 2008a; Australian Medical Association, 2006a; Australian Council for Safety and Quality in Health Care, 2005), clinical handover among nurses and doctors as well as different clinical settings, from community to acute hospital settings are all grouped together. There is only one review that focuses on intra-hospital handover and that review includes emergency department presentations (Scott et al., 2012). An in-depth review of each study and description of the literature however, reveals the complexity and variability of the process. A recent review of intra-hospital clinical handover has identified significant heterogeneity in the definition, understanding and practice of clinical handover (Robertson et al., 2014). This is especially important in clinical handover across different healthcare professionals. A study has shown that during multi-professional handover, no particular group dominated the information flow. Instead, each handover session exhibited different communication pattern and information flow (Benham-Hutchins and Effken, 2010). The variability and complexity of clinical handover, however has never been clearly described in the literature. As such, this thesis contributes significantly to the discussion of clinical handover and clinical handover improvement.

It is important to note that the literature uses the term clinical handover loosely. Different activities and different practices are all considered as "clinical handover" (Scott et al., 2012; Cohen and Hilligoss, 2010; Wong et al., 2008b; Australian Council for Safety and Quality in Health Care, 2005). These activities include discharge to community (Philibert and Barach, 2012), inter-hospital transfer (Victoria Quality Council, 2009) and other clinical activities (Australian Council for Safety and Quality in Health Care, 2005). This thesis focuses on shift-to-shift handover among nursing and medical staff. Within shift-to-shift handover, this research demonstrates complexities in the process and practice of clinical handover.
This thesis also argues that despite the differences in the understanding and practices of clinical handover that serves different functions in different clinical settings, there is a unifying underlying purpose for all clinical handover, which is the transfer of responsibility and accountability of patient care, often through the transfer of information.

Current available literature often discusses clinical handover as the transfer of information of patients (Wong et al., 2008a). Different functions and purposes of clinical handover have also been described in the literature. A literature review of functions of clinical handover has identified narration, information processes, double checking for errors, social interaction, decision support and transfer of responsibility and accountability of care as the main themes (Patterson and Wears, 2010). The education and training function of clinical handover for junior doctors and nurses is emphasised (Das et al., 2012). Didactic teaching for a particular topic during handover, however has been found to be problematic during clinical handover (Fassett and Bollipo, 2006). Opportunistic teaching and learning during handover are highly valued by clinicians (Sanfey et al., 2008, Hopkinson, 2002, Kerr, 2002). The debriefing and socialisation functions of clinical handover have also been described in the literature (Evans et al., 2008a, Hopkinson, 2002, O’Connell and Penney, 2001, Strange, 1996), although these studies only focused on nursing handover. It appears that the debriefing function is a necessary and important part of clinical handover that improves the well-being of clinicians. Finally, supervision of junior doctors during clinical handover has been described as an important part of clinical handover experience (Hopkinson, 2002).

A previous publication by the PhD candidate and colleagues has described various functions observed during clinical handover process (Turner et al., 2006). These functions include:

- Clinical handover serves as a time for education and training of junior doctors
- Clinical handover provides the opportunity for debriefing and socialisation
- Clinical handover serves as a double checking mechanism to follow up results
- Clinical handover is a time when senior doctors are available and junior doctors use the opportunity to seek supervision
- Clinical handover serves as a time for early referral to other disciplines and early review
- Clinical handover serves as a time to prioritise workload and management of workload

Despite all this variability however, there is one unifying purpose of clinical handover, which is the transfer of responsibility and accountability of patient care, often through the transfer of information.

In the current literature, clinical handover is often described as the process of transfer of clinical information for patient care. (Wong et al., 2008b, Talbot and Bleetman, 2007, Australian Council for Safety and Quality in Health Care, 2005). It is important to note that many interventional studies have focused on improving information transfer as the main purpose and outcome
(Robertson et al., 2014, Flemming and Hubner, 2013, Wong et al., 2008a). This thesis however, emphasises that the underlying goal for information transfer during handover is the transfer of patient care responsibility and accountability. As such information transfer should only be considered as the medium for the transfer responsibility and accountability of patient care.

This thesis echoes the definition of clinical handover described in the United Kingdom (Junior Doctors Committee, 2004), Australia (Australian Commission on Safety and Quality in Health Care, 2010a, Australian Medical Association, 2006a) and more recently the United States of America (Cohen and Hilligoss, 2010). The currently accepted and adopted definition of clinical handover is

"the transfer of professional responsibility and accountability for some or all aspects of care for a patient, or group of patients, to another person or professional group on a temporary or permanent basis" (Australian Medical Association, 2006a, Junior Doctors Committee, 2004)

This finding reconciles the differences between previous literature emphasising on information transfer and the current definition of clinical handover, emphasising on responsibility and accountability transfer. The transfer of information during clinical handover serves as the medium to transfer responsibility and accountability of patient care. As such, clinical handover improvement must emphasise the purpose of transfer of responsibility and accountability of care. It is important to note that a recent study has shown that the exact meaning of transfer of responsibility and accountability remains controversial among clinicians (Chin et al., 2012). Further research in this area is needed to understand what responsibility and accountability of care means during clinical handover.

The finding related to the complexity of clinical handover and the unifying purpose of transfer of responsibility and accountability of patient has important implications for clinical handover improvement. Quality and safety improvement programs are often designed to be transferable and applicable across different organisations and institutions (Ortiz and Clancy, 2003). The assumption is that clinical handover improvement strategies and interventions should be applicable and generalisable to all relevant organisations, which is described in most interventional studies (Wong et al., 2008a). This thesis challenges this assumption and cautions the adoption of clinical handover improvement strategies and interventions directly from other organisation without considering the complexity and interactions of different aspects of clinical handover.

This key finding has significant implications. Individual clinicians and/or healthcare organisations planning to implement clinical handover improvement must firstly have a clear understanding of the nature and context of clinical handover practice within their own clinical areas. Interventions reported in the literature are not adaptable directly from one organisation to the other. By understanding the nature and context of clinical handover, it is then possible to understand the literature and adapt suitable interventions for local use.
While standardisation is an important part of clinical handover improvement, it needs to take into account local socio-cultural context. This topic is further discussed in Key finding 2. This thesis suggests that this is a fertile ground for future research, especially studies that aim to understand the generalisation and adoption of clinical handover improvement strategies and interventions across different clinical settings. This key finding provides answers to research question 1 and research question 2.
5.2.2 **Key finding 2: Local socio-cultural context and clinical practice need to be taken into consideration in standardising clinical handover processes.**

This key finding suggests standardisation is a key step in clinical handover improvement. The standardisation process however, must take into consideration local clinical practice and local socio-cultural context.

This thesis shows that clinicians emphasise the need to standardise clinical handover processes and individual patient information transfers during clinical handover as one of the most important aspects of clinical handover improvement. The literature supports that the standardisation of clinical handover, especially information transfer plays a crucial role in clinical handover improvement (Wong et al., 2008a). In fact, the literature seems to focus mainly on information transfer standardisation using mnemonics (Riesenber et al., 2009, Wong et al., 2008a).

An extensive review of the literature as well as analysis of all the published work regarding standardisation has been published as a report by the PhD candidate and colleagues (Wong et al., 2008a). This is further updated in the literature review chapter of this thesis in Section 2.5. More recently, six reviews on various aspects of clinical handover improvement have been published and these publications discuss various interventions, especially the standardisation of different aspects of clinical handover (Abraham et al., 2014, Robertson et al., 2014, Smeele et al., 2014, Flemming and Hubner, 2013, Li et al., 2013, Scott et al., 2012). These reviews emphasise the need for standardisation of clinical handover practice.

The literature on standardisation of clinical handover practice can be grouped into two categories, firstly, comprehensive single unit standardised procedures, including standardised information transfer and checklists, and secondly, mnemonics to assist information transfer during clinical handover. The literature suggests that the use of comprehensive single unit standardised procedures, including information transfer and checklists might improve patient outcomes in highly specialised, high acuity clinical environment such as operating theatre to ICU (Petrovic et al., 2012a, Joy et al., 2011, Catchpole et al., 2007), ICU to the ward (Chaboyer et al., 2012), ambulance to DEM (Wood et al., 2014, Bost et al., 2012, Iedema et al., 2012, Owen et al., 2009, Jenkin et al., 2007, Bruce and Suserud, 2005, Thakore and Morrison, 2001) and DEM (Farhan et al., 2012b). When a comprehensive single unit standardisation process is being developed and implemented, it is important that whole system view is taken into account to ensure success. The experience of using a whole system view has been described in the literature and the evaluation of the end product has been supportive of this whole system approach (Abraham et al., 2012a, Abraham et al., 2012b). These comprehensive checklists, standardised procedures and information transfer, however, are ward and institution specific.

The second category of literature published involves the use of mnemonics to identify fields of information required for information transfer during clinical handover without the specific details. There are a total of 27 mnemonics described in the literature to support clinical handover to date.
A 2009 literature review of mnemonics has included 24 of them (Riesenbeck et al., 2009). The other three, JUMP, SHARED and ISOBAR are reviewed in Section 2.4.1 of this thesis. Twenty mnemonics are formulated via personal experience, personal opinion, antedoctal data or consensus opinions. Only 7 mnemonics have been studied through evaluation studies (Yee et al., 2013, Hatten-Masterson and Griffiths, 2009, Porteous et al., 2009, Yee et al., 2009, Budd et al., 2007, Horwitz et al., 2007, McCann et al., 2007, Talbot and Bleetman, 2007, Haig et al., 2006b). Out of all these studies, only one study (Talbot and Bleetman, 2007) shows a negative outcome associated with the use of mnemonics. As such, the literature supports the use of standardised clinical information transfer during handover. When all the mnemonics are analysed, many are based on the SBAR techniques promoted from work done and adopted into healthcare from the US military (Haig et al., 2006b). There are currently no comparative data to support the use of one mnemonic over the other. More importantly, other studies have not clearly described the involvement of clinicians in the design and development of these mnemonics, other than the data provided by this thesis. While 27 mnemonics have been described and published, the literature has not described the rationale of specific data field. It is also important to note that recent reviews have suggested that there are no data to support any particular clinical handover intervention (Robertson et al., 2014, Scott et al., 2012), any particular clinical handover type (Smeulers et al., 2014), any particular tool (Abraham et al., 2014) or any particular electronic tool (Flemming and Hubner, 2013, Li et al., 2013) is better than the other to improve clinical handover.

This key finding contributes to the current knowledge and literature of clinical handover from three aspects. Firstly, this thesis suggests that mnemonics for standardised information transfer in clinical handover should include 3 aspects. Mnemonics must include the identification of patient and the identification of the sender of message; objective data regarding patient care and the projection of a care plan and cognitive processes associated with continuity of patient care. These fields of information transfer provide a strong platform for the transfer of responsibility and accountability which is the underlying purpose for clinical handover as described and discussed in Key finding 1.

Secondly, this thesis argues that the standardisation process must take into account local clinical practice and socio-cultural context. This thesis discusses the concept of flexible standardisation, as demonstrated in Figure 9. The desired standardisation is derived from literature and experiences from other organisation. In order to ensure successful local adaptation, a critical component of that standardisation process must be identified and included. When the local clinical context is taken into consideration, there are changes and deviations from the desirable standardisation that need to be made, and this is termed flexible standardisation.
This literature thus far has not discussed flexibility in standardisation in clinical handover improvement. The literature, however, has suggested that while standardisation of clinical handover might be important, there are risks associated with standardisation and the effect of standardisation is difficult to measure (Patterson and Wears, 2010, Patterson, 2008). Recently, the PhD candidate and colleagues have discussed the tensions between standardisation and understanding user requirements and socio-cultural contexts of clinical handover practice (Wong et al., 2013). This finding has been echoed in recent research. (Hilligoss and Moffatt-Bruce, 2014). These studies suggest that flexible standardisation needs to be considered in clinical handover improvement. This concept of flexible standardisation warrants future research and consideration.

Publication 6 demonstrated the concept of flexible standardisation through the four-step clinical handover procedure, known as “HAND ME AN ISOBAR” (Yee et al., 2009). The mnemonic ISOBAR was originally created by the Western Australia team for inter-hospital transfer (Porteous et al., 2009). As both projects were funded under the Australian National Clinical Handover Initiative, collaboration of the researchers occurred and it was decided that both teams will use the ISOBAR mnemonic. The Tasmanian team created “HAND ME AN ISOBAR” to incorporate the local context of requiring 4 steps to improve clinical handover in the shift-to-shift handover setting. These four steps include: preparation for handover, organisation for handover, provision of environmental awareness and individual patient handover (Yee et al., 2009). Furthermore, the last letter “R” was changed from read-back to responsibility and risk management to reflect differences in inter-hospital transfer and shift-to-shift handover.
The detail of the mnemonics of “HAND ME AN ISOBAR” is provided here in Figure 10 (Yee et al., 2009).

<table>
<thead>
<tr>
<th>Step</th>
<th>Mnemonics</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preparation for handover</td>
<td>H = Hey, it’s handover time!</td>
</tr>
<tr>
<td></td>
<td>A = Allocate staff for continuity of patient care</td>
</tr>
<tr>
<td></td>
<td>N = Nominate participants, time and venue</td>
</tr>
<tr>
<td></td>
<td>D = Document on written sheets and patient notes</td>
</tr>
<tr>
<td>Organisation for handover</td>
<td>M = Make sure all participants have arrived</td>
</tr>
<tr>
<td></td>
<td>E = Elect a leader</td>
</tr>
<tr>
<td>Provision of environmental awareness</td>
<td>A = Alerts, attention and safety</td>
</tr>
<tr>
<td></td>
<td>N = Notice</td>
</tr>
<tr>
<td>Individual patient handover</td>
<td>I = Identification of patient and staff</td>
</tr>
<tr>
<td></td>
<td>S = Situation and status</td>
</tr>
<tr>
<td></td>
<td>O = Observations of patient and check for MET call criteria</td>
</tr>
<tr>
<td></td>
<td>B = Background and history</td>
</tr>
<tr>
<td></td>
<td>A = Action, agreed plan and accountability</td>
</tr>
<tr>
<td></td>
<td>R = Responsibility and risk management</td>
</tr>
</tbody>
</table>

Figure 10: The detail data field for HAND ME AN ISOBAR.

This key finding suggests that the standardisation of clinical handover processes and information transfer during clinical handover is an essential element to improve clinical handover. Clinical handover processes, however, need to consider current clinical practice including physical space, shift overlaps and the availability of information artefacts to support clinical handover. When considering mnemonics to standardise clinical handover, mnemonics might need to be changed to cater for characteristics of care and patient groups for that clinical area. Three important aspects of information transfer are required: the identity of patients and senders of handover messages, objective clinical data and the projection of a care plan and cognitive processes associated with continuity of patient care for effective clinical handover.

This thesis argues that standardised procedures and standardised information transfer is not enough to improve clinical handover. In Key finding 3, the PhD candidate describes the impact of clinical communicative practices and clinical judgement on the standardisation of clinical handover procedures and information transfer. The impact of standardised clinical handover information transfer is the greatest when the standardised procedure and standardised information fields are embedded into an education and training program, delivered to all clinicians. This is described in Key finding 4. This key finding provides answers to research question 2.
5.2.3 Key finding 3: Clinical judgement and communicative practices among clinicians affect the outcomes of standardisation of clinical handover.

This key finding argues that while standardisation is important, clinical judgement and communicative practices among clinicians have significant impact on the outcomes of standardisation on clinical handover and patient care.

This thesis suggests through Publication 7 and the interpretation of Key finding 3 in Section 4.3.3 that standardised individual patient information transfer is not being interpreted equally by clinicians (Yee et al., 2013). The sender, the receiver as well as the patient characteristics affect how the transferred information is being utilised for patient care delivery. Firstly, clinicians who initiate the clinical handover discussions exercise judgement regarding the content as well as the emphasis of some information and de-emphasis of others. Secondly, the incoming team receives the information and exercises their clinical judgement on potential actions after handover based in part on the trust that they have for the outgoing team rather than objective clinical information. Finally, patient characteristics have significant impact on how clinical information regarding these patients are received as well as potential actions after handover.

When the PhD candidate and research team published this analysis in 2013, there were no other publications describing this observation in clinical handover. Literature reviews by others (Cohen and Hilligoss, 2010, Riesenberg et al., 2010, Riesenberg et al., 2009, Australian Council for Safety and Quality in Health Care, 2005) and by the PhD candidate and colleagues (Wong et al., 2008a) did not discuss the complexities affecting the clinical handover standardisation process, especially the impact of clinical judgement and communicative practices on clinical handover improvement. More recently publications have started to emerge, describing similar phenomena and providing some discussions and explanations of the observed phenomena (Hilligoss, 2014, Hilligoss and Moffatt-Bruce, 2014).

In the first study, the researcher investigated the discourse of the language that doctors used during handover from the Department of Emergency Medicine to the ward in order to make sense of interactions and to uncover the interpretations that doctors used (Hilligoss, 2014). The researcher conducted a two year ethnographic study, including the use of semi-structured interviews, non-participant observations and recorded telephone handover conversations. The researcher found that there are four interpretive frames that doctors used to make sense of handover interactions: handover as persuasion, handover as competition, handover as expectation matching and handover as collaboration. Firstly, the researcher described handover as persuasion. Physicians at emergency department at times emphasised a particular aspect of information to the ward physician in order to ensure patients were accepted under inpatient care. It appeared that there was a balance between persuasion and truth. While persuasion was seen as a short term solution to the current problem, honesty in presenting facts was seen as the long term reputation to maintain. Secondly, the researcher found that handover could act as competition to protect one’s area of expertise. The ward physician might not accept a particular patient and there might
be interactions and conflict at times on who should look after a particular patient. Thirdly, the researcher found that handover required certain levels of expectations matching, especially the depth of diagnostic work out in emergency prior to ward transfer. Finally, the researcher found that clinicians did emphasise the need and importance of team work in handover in order to deliver best patient care (Hilligoss, 2014). While this research work was done in the USA and in an emergency department, it provides further validation to research work done by the PhD candidate and research team that clinical judgement and communicative practices of clinicians have significant impact on information transfer process itself as well as the utilisation of that information for patient care. This is an emerging area that requires further investigation and research in order to maximise the positive clinical impact of standardisation of information transfer during clinical handover.

In a conceptual model publication, researchers from the USA described the potential limits of checklists and standardisation of information transfer in clinical handover improvement (Hilligoss and Moffatt-Bruce, 2014). The authors applied social science theory of cognition to describe the clinical handover process. The authors described the paradigmatic mode of cognition in which knowledge was organised into categories and narrative mode of cognition in which knowledge was organised into a temporal plot in order to understand the holistic meaning of an event. While both modes of cognition were thought to be crucial, the narrative mode of cognition was emphasised in clinical handover due to the complexity and intensivity of interactions and communications. The standardisation of clinical handover information transfer, especially the use of checklists assumed the importance of paradigmatic mode of cognition. As such, the authors suggested that research needed to pay more attention to the narrative mode of cognition in order to improve patient care in clinical handover improvement (Hilligoss and Moffatt-Bruce, 2014).

These 2 new publications together with Publication 7 of this PhD provided new insights into the clinical outcomes of the standardisation of clinical handover practice, especially the standardisation of information transfer during clinical handover. Published literature on the information standardisation process suggests positive outcomes in regards to information transfer (Yee et al., 2013, Hatten-Masterson and Griffiths, 2009, Porteous et al., 2009, Yee et al., 2009, Budd et al., 2007, Horwitz et al., 2007, McCann et al., 2007, Haig et al., 2006b). Recent reviews suggest that improvement in information transfer during handover did not necessarily translate to improvement in patient care (Robertson et al., 2014, Flemming and Hubner, 2013). It is therefore important to consider context, clinical judgement, communicative practices and cognition in future research in order to maximise the positive clinical impact of standardisation of clinical handover information transfer.

This key finding challenges the assumption that improvement in information transfer through information standardisation process will always improve patient care. Positive patient outcomes through information standardisation during clinical handover could be maximised if the influence of clinical judgement and communicative practices is taken into consideration. This key finding requires further validation and clarification. This thesis contributes to the knowledge of clinical
handover by challenging the assumptions of the direct relationship between information standardisation process and patient care. This process is influenced by clinical judgement and communicative practices. The implementation of information standardisation processes and training programs to use protocols and tools to improve clinical handover is not enough to ensure safer patient care. Organisations and individual clinicians need to work together to emphasise the underlying purpose of clinical handover improvement. The framework for education and training needs to include safety practice, purpose of clinical handover and the practical skills to improve clinical handover (Key finding 4). This key finding provides answers to research question 2.
5.2.4 Key finding 4: An effective education and training program, developed based on a standardised procedure and tool, is essential to improve clinical handover.

This key finding emphasises the importance of education and training programs to support clinical handover improvement. Furthermore, this key finding suggests the importance of the availability of a standardised procedure and tool as an integral part of the education and training program for practical improvement.

This thesis included a clinical handover education and training manual developed to assist with clinical handover improvement at the Royal Hobart Hospital (see Publication 5, Section 4.2.5). It is worth noting that there is no standardised education and training program available in Australia for clinical handover at the time of this research. As such, Publication 5 was developed as a pilot program to understand essential elements of clinical handover education and training. Publication 5 suggests that education and training programs for clinical handover should include safety and clinical handover, local issues, priority of clinical handover improvement, the standardised process and the standardised information transfer for clinical handover improvement. This framework was subsequently adopted into the Australian National Guideline for Clinical Handover Improvement (Australian Commission on Safety and Quality in Health Care, 2010a). This framework was also adopted by the Australian Junior Medical Officer National Curriculum Framework for education and training of junior doctors in Australia (CPMEC, 2013).

The literature supports the important role of education and training in clinical handover improvement (Stojan et al., 2014, Thompson et al., 2011a, Catchpole et al., 2010b, Farnan et al., 2010, Johnson and Arora, 2009). The literature also suggests that education and training is lacking for good clinical handover practice, for junior doctors and junior healthcare professionals (Kennedy et al., 2009) and in undergraduate healthcare curricula (Liston et al., 2014, Gordon, 2013).

Despite the importance of education and training programs being recognised in the literature, there are few studies that investigated the delivery of education and training programs for clinical handover improvement, especially in Australia (Cohen and Hilligoss, 2010, Wong et al., 2008a, Australian Council for Safety and Quality in Health Care, 2005). In recent years, education and training programs for clinical handover have become more common as a subject of investigation in clinical handover improvement. These studies have been reviewed in Section 2.6.1. These studies will be used to discuss this key finding.

The literature has provided suggestions for frameworks, principles, competencies and the delivery of education and training programs to clinicians and students. A competency map and framework have been proposed for education and training in clinical handover in the USA (Arora et al., 2008). Various teaching methods and delivery methods have been studied, including a 2 hour teaching session applying adult educational theory (Nestel et al., 2005), a 1 hour communication teaching using face-to-face discussion model (Horwitz et al., 2007), monthly lecture sessions (Chu et al.,
2010), lecture series using SBAR (Malter and Weinshel, 2010), a 30 minute lecture with feedback sessions (Gakhar and Spencer, 2010) and simulated sessions using 90 minute workshop (Farnan et al., 2010). These studies show positive outcomes in participant satisfaction (Nestel et al., 2005), participant perception of clinical handover skills (Horwitz et al., 2007), perceived ability to conduct clinical handover (Chu et al, 2009), improvement in self-assessment of skills and knowledge (Malter and Weinshel, 2010) and improvement in preparedness for performing effective handover (Farnan et al., 2010). It is important to note that none of these studies specifically aim to investigate the transfer of skills into clinical practice by having a clear evidence-based procedure embedded within the education and training program. These are studies which only aim to deliver principles of good clinical handover to participants.

The literature suggests that the translation process of clinical skills and knowledge of clinical handover to real-life practice is complex. The literature showed that despite junior doctors having good skills and knowledge for clinical handover, these skills and knowledge were not used in clinical practice (Cleland et al., 2009). One possible explanation is that for education and training to make a difference, there must be clear evidence based procedures in place and embedded into the clinical handover education and training programs, as described in this key finding.

In recent studies, the combination of education and training programs with other interventions, especially with the use of standardised procedures, has been discussed (Airan-Javia et al., 2012, Aylward et al., 2012, Berkenstadt et al., 2008). A team of researchers developed a standardised protocol for clinical handover process in combination with stimulation training and teaching for clinical handover (Berkenstadt et al., 2008). The post intervention analysis showed that there is an increase in the communication of crucial information during handover. The clinical impact such as incidence of checking the monitor alarms and the mechanical ventilator had not changed (Berkenstadt et al., 2008). While outcomes analysis of this study showed improvement in clinical handover practice after the combined intervention, the results of the study, however did not specifically evaluate the role of education and training in improving clinical handover (Berkenstadt et al., 2008).

A recent study has shown that a teaching session can have a prolonged effect on the translation of knowledge to clinical practice. A recent study showed that after a 90 minute teaching session, there was a significant increase in the self-assessed preparedness to perform clinical handover by 26% (Aylward et al., 2012). More importantly the knowledge and skills delivered during the session were used by interns 3 to 6 months after the teaching session (Aylward et al., 2012).

In regards to improvement in clinical outcomes, a recent study showed that an educational program with a standardised protocol could improve handover performance as well as reduce communication failure (Airan-Javia et al., 2012). Using a controlled trial research design, the researchers investigated the impact of a 45 minute education and training program with feedback in combination with a standardised protocol. The study showed that interns who received education demonstrated better clinical handover practice. The study also showed that communication failures were less frequent in the intervention group. The study, however showed
that education and training program did not deliver benefits if an electronic handover program was used (Airan-Javia et al., 2012). This is an interesting research and the results require further clarification and validation.

As various studies demonstrate that the lack of education and training in clinical handover contributes to poor practice of clinical handover, recent curriculum frameworks have included clinical handover as part of the junior doctors training around the world. Clinical handover has been embedded and recommended in the curriculum in the USA (Accreditation Council for Graduate Medical Education, 2011) and Australia (CPMEC, 2013). Furthermore, a vertically integrated curriculum from medical school to post-graduate training has been advocated (Allen et al., 2014). An attempt to develop a common curriculum such as the IPASS curriculum forms the initial step towards standard setting in clinical handover education and training (Starmer et al., 2014). There is therefore further need to elaborate and validate the effectiveness of various education and training programs for clinical handover through research.

This thesis suggests that education and training programs should be developed as part of the clinical handover improvement program. Publication 5 in this thesis has provided a framework to support education and training programs, emphasising on embedding clinical handover improvement into the broader context of quality and safety in healthcare training. This framework emphasises teaching of practical skills and knowledge for patient care. This includes a standardised information transfer platform, a standardised clinical handover protocol and procedure as well as tools to support clinical handover improvement. This education and training program therefore provides participants with an understanding of the theoretical basis of good handover and practical skills to implement that during their routine clinical practice.

On review of the literature, it is clear that further research is needed in the field of education and training programs to support clinical handover improvement. A common education and training curriculum, a competency map and an agreed framework are needed. Further education research should also investigate pedagogical considerations and evaluations of education and training programs on clinical handover improvement. This thesis contributes to the understanding of the role of education and training in combination with standardised procedures and tools, to improve clinical handover. Education and training programs for clinical handover also serve the purpose of continual engagement with clinicians to improve clinical handover. This will be discussed in Key finding 5. This key finding provides answers to research question 2.
5.2.5 Key finding 5: Clinical handover improvement requires continual commitment from the organisation and continual engagement of clinicians working towards the common goal of safe patient care.

This key finding emphasises the need for continual commitment from the organisation and continual engagement of clinicians working towards improvement in clinical handover. More importantly, this key finding emphasises safe patient care as the common goal and the common ground for clinical handover improvement from all stakeholders within the healthcare organisation. Clinical handover improvement is a journey, not a destination as the most effective and efficient clinical handover practice has not been fully established. This research shows that continuous improvement requires organisational commitment, feedback and review, education and training as well as continual engagement of clinicians in the process. This key finding is discussed with reference to the literature.

While the literature acknowledges the longitudinal time duration required for clinical handover improvement (Horwitz et al., 2012, Catchpole et al., 2010b, Cohen and Hilligoss, 2010, Wong et al., 2008a, Australian Council for Safety and Quality in Health Care, 2005), many interventions reported in the literature are one off interventions without longitudinal consideration. Few studies discuss longitudinal follow up and evaluate long term sustainable improvement (Wong et al., 2008a). A few groups have published their longitudinal involvement in the field over the years (Yee et al., 2013, Horwitz et al., 2012, Catchpole et al., 2010a, Farnan et al., 2010, Hannan et al., 2010, Horwitz et al., 2009, Johnson and Arora, 2009, Turner et al., 2009, Yee et al., 2009, Arora et al., 2008, Wong et al., 2008b, Catchpole et al., 2007, Horwitz et al., 2007, Wong et al., 2007, Arora and Johnson, 2006, Fassett and Bollipo, 2006, Yee et al., 2006). These studies acknowledge the need for sustainable organisational commitment in ensuring continuous improvement (Horwitz et al., 2012, Catchpole et al., 2010b, Hannan et al., 2010, Johnson and Arora, 2009, Turner et al., 2009). These studies further suggest the role of continual education and training in maintaining clinical handover improvement (Horwitz et al., 2012, Farnan et al., 2010, Yee et al., 2006).

More importantly, this thesis emphasises the need for feedback, review and continual engagement of clinicians in the process. The feedback and review cycle, such as the traditional PDSA (Plan-Do-Study-Act) cycle, has been described in the literature in the context of clinical handover improvement. A team of researchers from the UK demonstrated the use of PDSA cycle to implement SBAR technique as a continuous improvement technique (Christie, et al 2009). They suggested a reduction of 65% in adverse event associated with the use of PDSA cycle to implement SBAR to improve clinical handover (Christie et al, 2009). It was however unclear from the manuscript how that outcome was derived as there was no description of the data collection process and the statistical analysis of the data. A separate study showed that using the PDSA cycle to implement SBAR handover technique significantly reduced handover related errors (Luther et al., 2014).
This thesis suggests an evaluation and feedback review mechanism, engaging clinicians as the central driving force for continuous improvement through the emphasis of safety and safe patient care. This iterative feedback cycle described in Publication 4 and Publication 6 is shown below (Yee et al., 2009). This model has subsequently been adopted into the Australian National Clinical Handover Improvement guideline (Australian Commission on Safety and Quality in Health Care, 2010a).

![Iterative feedback cycle to improve clinical handover.](image)

Two recent studies have provided further evidence that continual engagement and continuous improvement are necessary to maintain clinical impact of clinical handover improvement interventions (McQuillan et al., 2014, Yazici et al., 2013).

The first study investigated resident-driven quality improvement process to implement a standardised template for clinical handover improvement within a community hospital. A multi-step continual quality improvement approach was used. These steps included problems identification, standardisation template creation and implementation. While the study found positive results relating to improvement in attendance at clinical handover sessions and handover related errors, the study also found that reduction in missed contents has not been sustained at 3 months follow up (Yazici et al., 2013).

In a separate study with a different intervention on clinical handover, the research team investigated the implementation of a standardised operating protocol to improve clinical handover from day to night shift (McQuillan et al., 2014). Initially, the study found substantial improvement...
in omission errors during handover and out of hours patient deterioration after the introduction of the standardised protocol. These parameters, unfortunately deteriorated at 2 years follow up (McQuillan et al., 2014). The study concluded that the lack of continual commitment and conflicting interests and goals within a complex healthcare organisation were the cause of the lack of sustainability clinical handover improvement (McQuillan et al., 2014).

These two recent studies, using different clinical handover interventions demonstrated that despite initial improvement in clinical handover, the impact of clinical handover intervention was not sustainable over time. These studies further strengthened the argument of this key finding that continual engagement of clinicians and continuous improvement is essential. More importantly, this thesis recommends that the common goals of safety and safe patient care should be the underlying driving force for clinical handover improvement. This concept is further explored in the following section. This key finding provides answers to research question 2.
5.3 The safety value alignment model for clinical handover improvement

Key findings from this thesis have highlighted the need for clinical handover improvement to take a whole system perspective, involving clinicians as well as the healthcare organisation. There are different factors at play at a system level and at an individual level. There are, however overlaps between these factors and they do not function in isolation. It is clear that a conceptual model to understand clinical handover improvement from the perspective of clinicians and from the perspective of healthcare organisations and the relationship between them is essential in order to achieve substantive clinical outcomes. The safety value alignment model for clinical handover improvement has been developed based on reflection of the research conducted, review of these selected 7 publications, review of the literature and reflections on the experiences gained through participation in clinical handover improvement committees locally, nationally and internationally.

Recent literature suggests that clinical handover appears to be a continual problem in Tasmania, Australia and other parts of the world. A report by the Tasmanian Commission in Healthcare Delivery recently identified poor clinical handover process and the lack of a whole system clinical handover initiative as one of the major healthcare problems, in urgent need of improvement (Commission on Delivery of Health Services in Tasmania, 2014). Other reviews have also suggested that improvement in clinical handover is urgently needed (Robertson et al., 2014, Smeulers et al., 2014, Wood et al., 2014, Flemming and Hubner, 2013, Scott et al., 2012, Gordon and Findley, 2011, Sujan, 2011). An analysis of recent studies showed that the recommended interventions include audit of current clinical handover practices (Commission on Delivery of Health Services in Tasmania, 2014), design of tools (Flemming and Hubner, 2013), policy and procedures implementation (Wood et al., 2014), standardisation of clinical handover practices (Robertson et al., 2014) and education and training programs (Gordon and Findley, 2011). On reflection of published work and literature, the same recommendations were made in literature reviews and reports in 2005 (Australian Council for Safety and Quality in Health Care, 2005), 2008 (Wong et al., 2008a) and 2010 (Cohen and Hilligoss, 2010) by various teams around the world.

This thesis supports all these interventions to improve clinical handover. This thesis, especially supports the need for standardisation of clinical handover processes and the need for standardisation of information transfer during clinical handover (Cohen and Hilligoss, 2010, Wong et al., 2008a). This thesis argues that due to the complexity of clinical handover practice, standardisation needs to take into consideration local clinical practice and local socio-cultural contexts. Furthermore, this thesis supports the strong emphasis on education and training programs to improve clinical handover. These interventions are however, already known and have been described in the literature over the last decade. So, why is clinical handover practice still unsafe?

The literature describes interventions to improve clinical handover as independent steps, similar to the biomedical science model of disease management using different medications and interventions in combination to achieve control of diseases and symptoms. The assumption is that each intervention and step will achieve a generalisable process outcome which will translate to the...
ultimate outcome of safer patient care. Furthermore, the assumption is that each individual step and intervention can achieve combined effect in patient care improvement. This thesis challenges these assumptions and proposes a new model to consider and to conceptualise clinical handover improvement for safer patient care.

This thesis identified five important interventions in clinical handover improvement: understanding of clinical handover practices, standardisation of clinical handover processes, standardisation of information transfers, education and training of healthcare professionals and continual engagement of clinicians through evaluation and feedback. Each of these five interventions will result in a specific process outcome. These process outcomes are often reported in the literature to support each individual intervention. These interventions and associated process outcomes are listed here:

- Understanding of clinical handover practices will achieve the process outcome of identification of organisation infrastructure and resource requirements for clinical handover improvement
- Standardisation of clinical handover process will improve the reliability and occurrence of clinical handover sessions
- Standardisation of information transfer will improve the accuracy and adequacy of information transfer during handover
- Education and training program will improve knowledge and skills of healthcare professionals regarding clinical handover
- Evaluation and feedback will assist in the maintenance and continuous improvement in clinical handover

The literature has investigated, reported and proposed these interventions as independent interventions. On reflection of these publications, this thesis proposes the safety value alignment model for clinical handover improvement, challenging the existing assumptions. This model argues that clinical handover improvement should be about patient safety. While specific goals or process outcomes as listed above might help in the short-term, in the long term and for whole system improvement, clinical handover improvement is about the safety value that the organisation and individual clinician assigned on clinical handover. This point is emphasised by the recent studies which questioned the sustainability of clinical handover improvement interventions (McQuillan et al., 2014, Yazici et al., 2013). This model proposes that in order for clinical handover interventions to achieve substantive and sustainable clinical care improvement, there needs to be internal and external alignment of safety value of clinical handover, assigned by the organisation and by clinicians working within that organisation.

Safety value is the value that each organisation and each individual clinician assigns on a particular clinical process and a quality and safety improvement program. Every organisation assigns a safety value for each program that the organisation operates, especially quality and safety improvement programs. From an organisational perspective, the safety value of clinical handover is determined by the combination of accreditation requirements, national quality and safety priority and...
reporting requirements, risk management priority, recent adverse events and incidences as well as research/management interests of leaders working within the organisation. Each individual clinician within an organisation, consciously or subconsciously assigns a safety value for each activity of their daily routine, including their practice of a particular clinical process such as clinical handover. This is based on a combination of their individual knowledge, skills and interests in the area, their clinical experience especially adverse events and the external environment of peer pressure, legal and legislative requirements and organisational culture. The safety value determines the attention that one pays to a particular activity in delivering patient care.

The model suggests that two alignments are important, the external alignment and the internal alignment of safety values. The safety value alignment model proposes that the external alignment for clinical handover is the alignment between the safety value assigned by the organisation and the safety value assigned by clinicians on clinical handover. The internal alignment of safety value is the alignment of all interventions in a clinical handover improvement program to safety value. This model further proposes that the goal of clinical handover improvement should concentrate on improving the safety value of clinical handover with each intervention and the alignment of the safety value assigned by the organisation and clinicians within that organisation.

This model is further discussed with diagrams assisting in demonstrating the model. The current assumption reported in the literature is presented in Figure 12. The current literature suggests that each intervention for clinical handover can achieve a particular process outcome. This in turn delivers an improvement in patient care, which in the safety value alignment model correlates with an improvement in the safety value of clinical handover for the organisation and individual clinician. A dark blue dotted line is used to represent the assumed impact on safety values and process outcomes. As each intervention is seen as independent step, the relationship between intervention, process outcome and safety value is assumed to be linear.
The safety value alignment model for clinical handover improvement challenges the assumption of independence of each intervention. The safety value alignment model emphasises the importance of internal alignments of interventions to safety value improvement in clinical handover. This model suggests that there are three important effects at play when interventions to improve clinical handover are considered. These three effects are: the multiplier effect, the consecutive-continuity effect and the cohesiveness effect.

The first effect that this model proposes is the multiplier effect. The literature suggests that each intervention is independent and can be applied to an organisation independently or in combination as desired. While combining different interventions in an organisation might achieve the desired combination of process outcomes, this does not always produce the same effect on safety value. On the other hand, when all five interventions for a whole system improvement program as described in this thesis are considered, it produces a combined effect in improvement of safety value far more than the addition of safety value effect of each intervention. The whole is greater than the sum of its parts. The multiplier effect is demonstrated in Figure 13. The blue dotted line represents the linear assumption in the literature. The black solid line represents the safety value alignment model.
The second effect that this model proposes is the consecutive-continuity effect of clinical handover interventions. This thesis argues that all five interventions in clinical handover improvement need to be considered and these interventions need to be acted upon in the sequence described in this thesis. In other words, each intervention must be followed by the next intervention in a consecutive fashion. More importantly, this thesis argues that there needs to be a continual effort in order to achieve substantive and sustainable clinical impact through improvement and alignment of safety value of clinicians and organisations.

From the point of view of consecutive effect, this thesis argues that all five interventions must be considered in the sequence presented in this thesis. If these five interventions are not acted upon in this sequence, internal alignment of these interventions to safety value cannot be achieved. For example, if an organisation considers an education and training program for clinicians to improve clinical handover first before considering standardisation, some unintended consequences might occur. Firstly, the education and training program will not be complete without specific teachings regarding the use of a standardised tool to improve clinical handover. Therefore, there is a lack of translation of knowledge into skills and into clinical practice. Secondly, if clinicians apply their knowledge learnt from the education and training program into clinical practice, a routine clinical practice and culture will be established over time. If the organisation then decides to implement a
standardisation process, especially if the standardisation is different from the initial education and training program, there will be confusion and conflicts that result in less than optimal outcomes in the improvement of safety value and the improvement in clinical handover. As such, internal alignment of process outcomes of intervention to safety value can only be achieved if the first intervention is followed by the second as discussed in detail in this thesis.

This consecutive effective is demonstrated in Figure 14. The blue dotted line represents the assumption in the literature that each intervention is independent. As such, when intervention 4 is followed by intervention 2, the literature assumes that a combined improvement can be achieved. The black solid line represents the safety value alignment model proposed by this thesis. It suggests that if the interventions are not in sequence, while the combined process outcomes can be achieved, the safety value might not improve, and in some cases, might deteriorate.

![Figure 14 Demonstration of the consecutive effect.](image)

This second effect also emphasises the need for continuity of clinical handover improvement effort within a manageable time-frame. Each intervention must be closely followed by the next intervention. In order to achieve this, there needs to be a strong commitment from the organisation as well as from clinicians. The lack of commitment, including resource commitments might lead to stagnation and time-lapse between interventions. This often not only leads to a
reduction in enthusiasm but also disengagement of clinicians from the process. As such, the safety value of the clinical handover improvement program is lost. Future interventions, therefore will not be able to achieve an alignment in process outcomes to safety value. This continuity effective is demonstrated in Figure 15. The blue dotted line represents the assumption in the literature that each intervention is independent. As such, the combined process and safety outcomes are achieved when the two interventions are combined despite a time lapse in between two interventions. The black solid line represents the safety value alignment model proposed by this thesis. This figure demonstrates the effect of time lapse on reduction in safety and patient outcomes. The safe value alignment model argues that time lapse reduces the improvement in safety value although the combined process outcomes might still be evident.

![Figure 15: Demonstration of the impact of time lapse on safety value.](image)

The third effect that this thesis suggests is the cohesiveness effect. This thesis argues that not only does the organisation need to consider the consecutive and continual effect by clear commitments to clinical handover improvement, it also argues the need for cohesiveness in between these interventions for internal alignment of the safety values. All five interventions must be cohesive in order to achieve the best outcome. For example, if the organisation has decided to implement bedside handover, then the first intervention of clinical handover improvement, i.e. understanding...
of clinical handover practices must include considerations for space, privacy and shift overlap to allow for walk around and bedside handover. The design and implementation of a standardisation tool must be mobile and be able to move from one bedside to the other. The standardisation of information transfers must respect the privacy of patients in bedside handover situation. The education and training program must emphasise and deliver knowledge and skills transfer to implement bedside handover. Evaluation and feedback must be bedside handover specific. The cohesiveness of all the five interventions will ensure the internal alignment of process outcomes from each intervention to safety value of clinical handover practice.

The internal alignment of process outcomes and safety values addresses issues surrounding the design and implementation of a clinical handover improvement program. The organisational impact and sustainability of clinical handover improvements must be considered in order to achieve better patient outcomes over time. This aspect of improvement is considered as the external alignment in the safety value alignment model. Each individual organisation and individual clinician assigns a particular safety value on clinical handover from their own perspectives. For clinical handover improvement programs to make a substantive and sustainable impact on clinical care, there must be an alignment of the safety value of the clinical handover improvement program assigned by the organisational and the safety value of clinical handover practice assigned by clinicians within that organisation. Clinical handover improvement must be a priority from both the perspectives of the organisation and individual clinicians. The safety value assigned by the organisation on clinical handover improvement and safety value assigned by clinicians on clinical handover practice must be aligned in order to achieve sustainable outcomes.

This thesis proposes a safety value alignment model for clinical handover improvement. The thesis argues that there are three very important effects to consider regarding interventions to improve clinical handover. More importantly, this thesis argues that in order to achieve the ultimate outcome of clinical handover improvement for safer patient care, there must be an internal and an external alignment of safety value of clinical handover. From the perspective of internal alignment, all interventions within a clinical handover improvement program must consider the multiplier effect, the consecutive-continuity effect and the cohesiveness effect. The internal alignment of interventions and process outcomes to safety value can be achieved if these three effects are considered. The external alignment of safety value can be achieved through a continual commitment from both the organisation and clinicians to place clinical handover as a priority for patient care.

The safety value alignment model provides managers and frontline clinicians with substantial insights into their respective role in clinical handover improvement. From an organisational and managerial perspective, this model argues that resources and commitment from the organisation as well as continual engagement of clinicians form the platform to achieve good clinical outcomes over time. From the perspective of individual clinicians, clinical handover improvement is a dynamic process. The standards of practice will change over time. The underlying purpose of clinical handover and the underlying purpose for clinical handover improvement however, remain
the same. The underlying purpose of clinical handover is the transfer of responsibility and accountability of patient care. The underlying purpose of clinical handover improvement is the delivery of safer patient care. Safety and safety value need to be the driving force for clinical handover improvement and form the dialogue between clinicians and organisation in clinical handover improvement.

By aligning the safety value assigned on clinical handover and clinical handover improvement, the organisational wide clinical handover improvement program can achieve very significant outcomes. Firstly, the complexity of clinical handover practice is acknowledged and the standardisation process will be locally adapted to fit into local clinical context. Secondly, clinicians will place significant emphasis on the value of clinical handover on safe patient care, reducing the potential adverse impact of clinical judgement and communicative practices on patient safety. Thirdly, sustainable organisation commitments and clinicians engagement can be achieved through a common goal and a common value. Finally, the role of education and training is firmly established to continually improve clinical handover practices.

From the perspective of clinical practice, the safety value alignment model proposes that:

- All five interventions are necessary as combined effect is much greater than individual intervention.
- Interventions need to be carried out in a specific order and without significant interruption
- There must be explicit cohesiveness between these interventions.

Most importantly, organisations must be prepared to prioritise clinical handover improvement and provide resources necessary for clinical handover improvement. Individual clinicians must be prepared to commit time and effort, as well as continuous learning and improvement in order to achieve safer patient care. By focusing on safety values of clinical handover, clinicians and organisations can continue to establish better practice to support safer handover and safer patient care.
5.4 Chapter reflections

This chapter has presented the discussion of five key findings that emerged from the analysis of 7 publications presented in Chapter 4. This chapter discussed these five key findings in relation to the literature. This chapter finally presented and discussed a new model for clinical handover improvement, the safety value alignment model.

This thesis argued that the current literature in clinical handover improvement suggested the need to achieve a standard in clinical handover practice. The evidence to suggest a particular standard in clinical handover practice remained weak. Furthermore, this thesis suggested that clinical handover process was complex and variable. As such, the standardisation of clinical handover practice and information transfer during clinical handover, while essential, needed to take into consideration local clinical practice and local socio-cultural contexts. Furthermore, clinical judgement and clinical communicative practices affected the outcomes of the standardisation of clinical handover practice and information transfer. As such, this thesis proposed a safety value alignment model for clinical handover improvement. In order to successfully design and implement a clinical handover program for safe patient care, an internal alignment between safety values and process outcomes of each intervention in clinical handover improvement is required. The internal alignment needed to consider the multiplier effect, the consecutive-continuity effect and the cohesiveness effect. To achieve sustainable outcomes, clinical handover improvement should be a continual process with continual engagement of clinicians. The underlying goal of improvement should emphasise safety and safety values of clinical handover improvement. This model emphasises the importance of external alignment between the safety value of clinical handover assigned by the organisation and the safety values of clinical handover assigned by clinicians. If clinical handover improvement programs can achieve internal and external alignment of safety values, then clinical handover improvement interventions can lead to sustainable improvement in patient care.

The next chapter provides the answers to research questions and discusses limitations of the research, biases and future research directions.
Chapter 6  Findings and conclusion

6.1 Introduction
This final chapter provides answers to research questions as listed in Chapter 1. This chapter then highlights the limitations of the research followed by suggestions for future research in this area.

• Section 6.2 provides a synthesis of the key findings presented in this thesis. It links together all the key findings to provide answers to the research questions and associated research objectives as stated in Section 1.3. This section firstly provides an overview of clinicians' view on clinical handover and clinical handover practices. It then provides insights into clinical handover improvement. Finally, this section discusses the safety value alignment model for clinical handover improvement as the critical success factor for clinical handover improvement as presented in Section 5.3.

• Section 6.3 highlights and discusses the limitations of this research and publications that form this thesis as well as potential research bias.

• Section 6.4 suggests areas for future research. This research has identified many areas in clinical handover practice in need of a strong evidence base to guide clinical practice. This research forms the foundation for these future research projects to be built upon.

• Section 6.5 provides a summary reflection of the chapter and this thesis.
6.2 Synthesis of findings and answering of research questions

This thesis has linked 7 publications generated from clinical handover research projects from 2005-2013. It has provided an overview of the literature, research approaches and processes guiding the data collection and analysis process of these research projects and key findings derived from these publications. The five key findings were then discussed in relation to the literature in Chapter 5. This thesis has presented a conceptual model for clinical handover improvement: the safety value alignment model (see Section5.3).

This thesis provides answers to the following research questions.

**RQ1:** What are the understanding and practices of clinical handover from the perspective of clinicians?

- **RQ1-O1:** To explore clinicians’ understanding, expectations and experiences of clinical handover.
- **RQ1-O2:** To identify the purpose of clinical handover practice.

**RQ2:** What interventions are required to improve clinical handover from the perspective of clinicians?

- **RQ2-O1:** To identify strategies for clinical handover improvement from the perspective of clinicians.

**RQ3** What are the essential elements of clinical handover improvement?

- **RQ3-O1:** To identify critical success factors for clinical handover improvement process.

The five key findings and the proposed model have provided significant understanding and insights into shift to shift handover and the purpose of clinical handover, which answers research question 1. These key findings have identified strategies for clinical handover improvement, which answers research question 2. Finally, these key findings identified critical success factors to support clinical handover improvement and these factors have been synthesised into a conceptual model, which answers research question 3. The key findings identified above will now be used to address the research questions and associated research objectives:
6.2.1 Understanding of shift to shift clinical handover and identification of purpose of clinical handover practice.

The first research question and associated research objectives are listed as follows:

RQ1: What are the understanding and practices of clinical handover from the perspective of clinicians.

  RQ1-01: To explore clinicians' understanding, expectations and experiences of clinical handover.

  RQ1-02: To identify the purpose of clinical handover practice.

In addressing RQ1-R01, this thesis has found that clinical handover is a complex process. There are varied understanding, expectations and practices of clinical handover from the perspective of clinicians within an organisation (Key finding 1).

In addressing RQ1-R02, this research has found that despite the varied understanding and practices of clinical handover, there is a unifying underlying purpose of clinical handover, which is the transfer of responsibility and accountability of patient care (Key finding 1). The transfer of responsibility and accountability of patient care is often achieved through the transfer of information.

6.2.2 Strategies for clinical handover improvement

The second research questions and the associated research objective are listed as follows:

RQ2: What are the essential elements of clinical handover improvement from the perspectives of a clinician?

  RQ2-01: To identify strategies for clinical handover improvement from the perspective of clinicians.

This thesis has identified important strategies for clinical handover improvement from the perspective of clinicians. This research has shown that all levels of staff within an organisation must be involved and engaged in clinical handover improvement. More importantly, the emphasis of clinical handover improvement should be about the safety value of clinical handover practice.

Strategies to improve clinical handover identified in this thesis include a guide to understand clinical handover practice and context, flexible design of tools and procedures to standardise clinical handover practice, standardisation of clinical handover practice, education and training program as well as continual feedback, engagement and improvement.
In addressing RQ2-RO1, the thesis suggests that standardisation is necessary but the standardisation process must take into account local clinical practice and local socio-cultural contexts (Key finding 2). This thesis suggests that education and training programs are essential to improving clinical handover. Education and training program however should include a pre-determined clinical handover procedure, information standardisation platform and artefact to support that process (Key finding 4). This thesis emphasises the need to provide resources and commitment for continual feedback and improvement in order to achieve the goal of safe patient care (Key finding 5).

6.2.3 Critical success factors for clinical handover improvement

The third research questions and the associated research objective are listed as follows:

**RQ3** What are the essential elements of clinical handover improvement?

**RQ3-O1:** To identify critical success factors for clinical handover improvement process.

This thesis suggests that organisations must provide strong commitment to ensure clinical handover improvement programs are implemented completely. Clinicians must be engaged and involved in all the steps of clinical handover improvement programs. This thesis argues that the main critical success factor is the safety value of clinical handover practice assigned by the individual clinicians within the organisation and the organisation itself.

In addressing RQ3-RO1, this thesis has found that the standardisation process might not achieve the expected outcomes due to clinical judgements exercised by clinicians during clinical handover (Key finding 3). Furthermore, this thesis emphasises the need to continually engaged clinicians in clinical handover improvement, with the common goal of achieving safe patient care (Key finding 5). As such, this thesis presents the safety value alignment model of clinical handover improvement, presented in Section 5.3. Through this model, this thesis discusses three effects which are crucial conceptually and practically for clinical handover improvement: the multiplier effect of multiple interventions, the consecutive-continuity effect of interventions and the cohesiveness effect of interventions. The purpose of clinical handover improvement programs need to be about the alignment of safety values, and safety values will unite both clinicians and organisational stakeholders towards the ultimate outcome of excellence in handover and therefore safer patient care.
6.2.4 Contributions to knowledge

This thesis has made substantial contributions to knowledge in the field of clinical handover. Many of these contributions have now been validated and accepted by researchers around the world. Specific contributions of this thesis are summarised in the following text box.

Contributions to knowledge

1. Clinical handover is a complex process with varying functions. There is substantial divergent apprehension of what clinical handover is and how this could be improved.

2. The primary objective of clinical handover is the transfer of responsibility and accountability of patient care.

3. There are unintended consequences when clinical handover processes and communicative practices are standardised.

4. Clinical handover improvement programs need to take local socio-cultural contexts into account and adopt a flexible standardisation approach.

5. Real world clinical judgments and communicative practices affect the outcomes of standardisation of communicative practices.

6. Education and training programs are essential in clinical handover improvement but education and training programs need to be implemented after the development of a standardised clinical handover process and information transfer template.

7. Clinical handover improvement is a dynamic and continual process.

8. Clinical handover improvement programs require sustained organisational and clinical leadership and resources.

9. To achieve safer patient outcomes, healthcare professionals and healthcare organisations need a convergent motivation and this can be achieved through understanding and application of the safety value alignment model.
6.3 Research limitations

Every research method, however has its own strengths and limitations. Research limitations associated with this particular research and this particular research approach are discussed below.

6.3.1 Research setting

The research project was based on the clinical practice within one acute care hospital, in medical, surgical and DEM wards. Each hospital or healthcare institution functions differently. As such, this research might well inform other acute care hospitals but it is unclear as to whether the results of this research can be used to improve clinical handover processes in other healthcare institutions such as subacute hospitals, rehabilitation services, institutional care with special needs such as psychiatric hospitals. Furthermore, each ward area might be different. It is unclear whether principles derived from this research are applicable to other types of clinical handover settings such as theatre to ICU or DEM to theatre within acute care hospital setting.

This research only examined shift-to-shift handover among medical and nursing staff, due to the intensive involvement of these professionals in patient care on a daily basis for all patients. The applicability of these results to other healthcare professionals, such as pharmacists, and physiotherapists, whose involvement in patient care might be intermittent and selective is unclear.

This research focused on the views of frontline clinicians and clinician managers. There might be legislative requirements, legal requirements and hospital policy requirements for each individual hospital and healthcare areas that clinicians are not familiar with. These have not been captured in this study.

This research did not discuss the use of electronic tools in clinical handover. Some hospitals might already be using electronic tools in clinical handover. This aspect of clinical handover improvement is discussed in separate publications that the PhD candidate has been involved in. This aspect has not been included in this PhD.

6.3.2 The use of qualitative research methods and generalisability

The PhD candidate acknowledges that the use of qualitative research methods goes against the traditional biomedical science model of clinical practice and the double-blinded control trial requirements of clinical interventions for patients. This PhD thesis has articulated strong arguments for using qualitative research methods in order to generate in-depth insights and understanding into the issues associated with clinical handover and potential solutions.

The PhD candidate acknowledges the possibility that these specific research findings might not be generalisable to other organisations. At a theoretical level, however, qualitative research data can be argued to be generalisable via naturalistic and theoretical generalisations. Principles derived from these research findings are generalisable, but not specific findings. Each individual healthcare organisation needs to understand these principles and each institution has to determine the applicability of these principles to their own healthcare organisation.
6.3.3 Research bias

The nature of qualitative research is that research bias can be introduced by researchers, participants, relationships between researchers and participants and the environment. The researchers can influence data collection sampling, the data collection process, data analysis, interpretation and the translation of research to practice. The PhD candidate acknowledges the fact that he was working as a registrar at that time. As such, interviews with interns were conducted by a third party researcher in order to reduce the overall impact of power relationship. The PhD candidate conducted some interviews with registrars and consultants, other than his immediate supervisor and line manager. This was done to reduce bias, taking into consideration the power relationship.

Nonetheless, the impact of participants' reactions and the researchers' reactions during observations and interviews on results and findings are acknowledged. It is also acknowledged that the emotional state of mind of participants, eg. fatigue after work, length of the interview, timing of the interview, interruptions during interviews due to medical service requirements as well as interview settings could all contribute to research bias. These factors have been discussed in Chapter 3.

In qualitative research, it is impossible to prevent bias completely. The combination of different data sources as well as triangulation of all the data, collected by different researchers serve as a way to reduce the bias associated with data collection. The triangulation of data to reduce bias is well described in the literature (Miles and Huberman 1994).

6.4 Future research

This thesis has explored the understanding of clinical handover and clinical handover improvement as well as presented and discussed the safety value alignment model for clinical handover improvement. This thesis challenges the current research direction in the field of clinical handover and provides the foundation for future research to be built upon.

This thesis identified the complexity in clinical handover practice (Key finding 1, Section 4.3.1). The impact of this complexity and the interactions of environment, organisation and clinicians on clinical handover practice and patient outcomes remains to be determined.

This thesis found that clinical handover has a unifying underlying purpose, which is the transfer of responsibility and accountability of patient care (Key finding 1, Section 4.3.1). This thesis identified different functions of clinical handover and the role of information transfer in clinical handover (Key finding 1, Section 4.3.1). It is acknowledged that in recent literature, the exact meaning and perception of transfer of responsibility and accountability in clinical handover has been brought into question (Chin et al., 2012). This is an area of importance for future research.

The standardisation of clinical handover practice has been considered as an important step to improve clinical handover but standardisation should take into consideration local clinical practice and local socio-cultural contexts (Key finding 2, Section 4.3.2). This thesis alerted the fact that there
were many mnemonics and standardised information transfer platforms described in the literature. Studies that compare the effectiveness of these mnemonics are urgently needed.

This research reported tensions between clinical judgement, clinical communicative practices and standardised information transfer (Key finding 3, Section 4.3.3). This is a new and very important area for future research in order to maximise the positive impact of standardisation of clinical handover practice.

Education and training programs have been emphasised by clinicians as an important step to improve handover. This thesis suggests that education and training programs must incorporate pre-defined standardised information transfer, tools and procedures to achieve best clinical outcomes (Key finding 4, Section 4.3.4). This thesis raises the question of evaluations of education and training in clinical handover as an independent intervention. These areas require further investigations and research.

This thesis found that feedback, evaluation and continuous improvement were important (Key finding 5, Section 4.3.5). More importantly, this thesis proposed a model for clinical handover improvement: the safety value alignment for clinical handover improvement (see Section 5.3).

The safety value alignment model challenges important assumptions in clinical handover interventions and clinical handover research. While each individual intervention is currently being studied as an independent intervention which can be combined and adopted by organisations as desired, this thesis and the safety value alignment model challenges this assumption. In order to achieve safer patient care, a whole of organisation view is needed. All interventions are important and need to be implemented to achieve a better combined effect. The sequence of implementation and time-lapse and interruptions affect the clinical outcomes of clinical handover interventions. The cohesiveness effect of interventions must be considered. Most importantly, both organisations and individual clinicians must commit time, resources and effort to continuously address the challenges of clinical handover improvement based on safety values and safety principles.

There is currently a lack of whole of organisation research which investigates the combination of interventions as well as the combined perspectives from the organisation and individual clinicians. This thesis challenges future researchers to consider this whole system view to improve clinical handover for safer patient care.
6.5 Chapter reflections

This chapter has discussed the key findings of this thesis and how they contributed to answering the three research questions. This chapter then discussed limitations of this research and potential bias. This research has challenged the current research assumptions and presented a new perspective for future research in clinical handover improvement.

In conclusion, this thesis has discussed the varied understanding, expectations and practices of clinical handover from the perspective of clinicians. The unifying underlying purpose for clinical handover was identified, which is the transfer of responsibility and accountability of patient care. This thesis then explored interventions required to improve clinical handover as well as critical success factors to improve clinical handover. The standardisation of clinical handover practice was identified as one of the key strategies to improve clinical handover. This thesis however, argued the need to take into consideration local clinical practices and local socio-cultural contexts. Furthermore, clinical judgement and communicative practices might have significant impact on clinical handover standardisation. The role of education and training programs in clinical handover improvement was emphasised in this thesis, especially when these education and training programs incorporated standardised procedures, tools and information platforms. This research suggested that continuous improvement, supported by resource commitments, continual training, feedback and revisions as important for clinical handover improvement programs to have a substantial and sustained impact on patient care. More importantly, this thesis suggested that safe patient care is the common goal of all these activities. Clinical handover improvement must address the alignment of safety values assigned by clinicians and healthcare organisations on clinical handover improvement. This thesis therefore presented a new model, the safety value alignment model for clinical handover improvement to guide clinical practice and future research.


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