INFORMATION TRANSFER FOR MULTI-TRAUMA PATIENTS ON DISCHARGE FROM THE EMERGENCY DEPARTMENT

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Abstract

**Aim:** This study aimed to improve the access, flow and consistency of trauma care information on discharge of the multi-trauma patient from the Emergency Department (ED). This was achieved by identifying best practice in this context, the communication structures that were in place, any barriers and conduits to information transfer. Strategies to overcome these barriers were then developed.

**Background:** Communication is the cornerstone to quality care, particularly when patients transition between care providers. Communication quality is consistently identified as one of the most important factors related to errors, missed injuries, adverse events and fragmented care. Despite this, the adequacy of structures and processes used for communicating patient information is unknown. This is of particular concern for trauma patients due to the time pressure involved in their care and the number of clinicians involved at any one time.

**Methods:** This was a multi-phase, mixed method, concurrent study. Phase 1 included a context appraisal consisting of a literature review, focus group interviews, a chart audit, staff survey and a review of national and international trauma forms. In Phase 2 an intervention was developed based on data from Phase 1. In Phase 3 the intervention was implemented. Phase 4 measured the intervention’s effect on information transfer.

**Results:** There were complex interactions between factors that influenced information transfer; however, principles of information transfer were able to be identified, along with the creation of a minimum data set for the multi-trauma patient. There is wide variability in how patient care is documented, showing little current standardisation internationally. The strategy developed to improve information transfer focussed on identifying information that should be handed over at patient transition points; raising staff awareness of barriers/conduits to information transfer; and implementation of tools such as a handover template to assist staff when recording information and at handover, and a minimum data set required to support continuity of patient care.
The conduits to information transfer were: having time to prepare for handover; relational continuity where the nurse handing over was the one caring for the patient in the ED; handover using a minimum data set and commonly agreed structure and sequence (standardisation); the patient chart was with the patient at the point of handover; staff receiving the patient were expecting them; handover participants used active listening skills and information was accurate and concise, but still comprehensive enough to build a picture of the patient and show trends in how the patient responded to interventions.

Barriers to information transfer included fragmentation of care, including the persons giving handover not having cared for patient; time of day for different receiving units; specialty bias affecting expectations; too little or too much information documented; inconsistent quality of information at handovers; no time or opportunity to ask questions; equipment malfunction or patient deterioration during handover and documentation templates that were no longer completely relevant or were difficult to use (which led to documentation degradation).

Areas of improvement post-intervention included improved notification of when to expect the patient from the ED for staff receiving patients, improvement in documented information, decreased information duplication, improved legibility, increased ease and efficiency in being able to navigate to key information. Other factors such as patient flow, timeliness and completeness of handover communication showed little improvement. Staff’s overall perception of information transfer did not change despite improvement in documented information.

**Conclusion:** Information transfer for patients at transition points between wards includes more than just ‘handover’ and is integral to continuity of care. This process is complex and often affected by wider organisational influences rather than just the knowledge, skills and attitudes of the staff involved in the patient transfer. A structured, informed and engaged approach is required for clinicians to be successful in improving information transfer for patients in their environments.
Information transfer for multi-trauma patients on discharge from the Emergency Department
Statement of Original Authorship

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

Signature: __________________________________

Date: ____________________________________
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<th>Description</th>
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<tr>
<td>ACSQHC</td>
<td>Australian Council for Safety and Quality in Health Care</td>
</tr>
<tr>
<td>AIHW</td>
<td>Australian Institute of Health and Welfare</td>
</tr>
<tr>
<td>AIS</td>
<td>Abbreviated Injury Scale</td>
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<tr>
<td>ED</td>
<td>Emergency Department</td>
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<tr>
<td>HDU</td>
<td>High Dependency Unit</td>
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<tr>
<td>ICU</td>
<td>Intensive Care Unit</td>
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<tr>
<td>MO</td>
<td>Medical Officer</td>
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<tr>
<td>PERIOP</td>
<td>Perioperative Unit</td>
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<tr>
<td>RN</td>
<td>Registered Nurse</td>
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<tr>
<td>TSU</td>
<td>Trauma Service Unit</td>
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<td>TT</td>
<td>Trauma Team</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<td>USA</td>
<td>United States of America</td>
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<tr>
<td>VIPS</td>
<td>Acronym for Swedish documentation model (words not in English)</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
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Acknowledgement of published papers included in this thesis

Included in this thesis is a published paper in Chapter 2.


Conference papers


Chapter 1: Introduction

1.1 BACKGROUND

Information transfer for the multi-trauma patient upon discharge from the Emergency Department (ED) was addressed in this study. This is an aspect of trauma care that is integral to the continuing care patients receive, but one which has not been comprehensively investigated. An introduction to the study, including the background, statement of the problem and significance of the work undertaken is presented in this chapter.

A multi-trauma patient is defined as a patient who has injury to more than one area of the body. In order to successfully provide care to the multi-trauma patient, trauma teams use specific strategies, knowledge and skills to facilitate survival and reduce possible disability resulting from injuries sustained. There has been much interest in how health care teams work towards this goal, with communication appearing as a common issue (Bergs, Rutten, Tadros, Krijnen, & Schipper, 2005; Cole & Crichton, 2006; Mackenzie, Xiao, & Horst, 2004; Xiao & Moss, 2001). Despite its regular identification, communication improvement, including aspects of both quality and quantity, has generally not been the focal point of these studies. Instead, the issues or errors brought about by poor communication have been the focus, with communication improvement a recurring recommendation. One study that focused on communication in trauma teams, found that team communication was very complex (Bergs et al., 2005). Another study that researched handover practices for patients transferred from the ED to the Intensive Care Unit (ICU) found that communication was largely unstructured and health care professionals felt quality handover of emergency patients was vital to the quality of continuing care (McFetridge, Gillespie, Goode, & Melby, 2007). In this study communication among health care teams was found to be affected by multiple factors due to the time to treatment deadlines. The environment in which trauma care is provided is often described as time pressured, with many health professionals involved in the immediate and ongoing care provision (Mackenzie et al., 2004). These factors may have a higher impact when providing care for the multi-trauma patient, as time pressure is reported to increase proportionally with the number of severe injuries. The
aim of the current study was to identify barriers to effective communication and factors that would enhance effective communication in order to develop, implement and evaluate strategies to improve communication in this setting.

1.2 TRAUMA

Traumatic injury can be caused by contact with blunt or penetrating external force or energy to the body (Bergeron et al., 2007). According to the World Health Organization, injury is among the leading causes of death and burden of disease across national, age and economic related borders (Peden, McGee, & Krug, 2002). Trauma and the effect it has on the patient and health care system continues to be a priority both nationally and internationally. In Australia in 2005-06, 7.5% of all deaths resulted from external trauma or poisoning (AIHW: Henley & Harrison, 2009). In Australia in 2005-06, 5.5% of all hospitalisations were due to injury and poisoning (370,000 people hospitalised due to injury) with the main causes of injury including accidental falls (36%), transport crashes (14%), assault (6%) and intentional self-harm (6%) (AIHW: Kreisfeld & Harrison, 2010). Generally males were hospitalised for injury more often than females (AIHW: Kreisfeld & Harrison, 2010). In young people (aged 12-24 years old) injury accounted for a higher proportion of hospitalisations, with 16% of all admissions and two thirds of all deaths being due to injury and poisoning (AIHW: Eldridge, 2008).

Traumatic injury is a continuing health care issue in Australia, with injuries rating as the fifth highest burden of disease (AIHW, 2006a). In addition to death, there is often a resulting disability experienced by those who survive traumatic injuries. Disabilities can range from transient to permanent and the results of traumatic injury or subsequent disability can become a chronic condition (Aitken et al., 2007). The time of recovery from injuries can range from a few days, to months and years with a number of disabilities remaining a permanent feature of life (AIHW, 2006a).

A recurring theme of providing trauma care to support recovery and prevent disability is prominent in the literature. This is generally believed to be achieved by providing definitive care to the patient in the shortest time possible (Arnold & Boggs, 2007), as trauma is conceived to be a time sensitive emergency (Mattice, 2002; Xiao & Moss, 2001). A delay in patient transfer to specialised trauma care provision is considered
detrimental to patient recovery and outcomes (Bridgeman, Flores, Rosenbluth, Pierog, & Emergency Medicine Specialists of Orange County, 1997). Another widely held belief is that reducing time to definitive care results in better patient outcomes (Bushby et al., 2005; Chappell, Mileski, Wolf, & Gore, 2002; Mann, Pinkney, Price, Rowland, & et al., 2002); however, very few studies demonstrate a direct relationship between these two factors. While some studies show a weak association between decreased time to care and improvement in patient outcomes (Chalfin, Trzeciak, Likourezos, Baumann, & Dellinger, 2007; DiBartolomeo et al., 2007; Lerner, Billittier, Dorn, & Wu, 2003), all state that the correlation between these two factors cannot be clearly demonstrated due to a number of other uncontrolled variables affecting patient outcomes.

Trauma care is provided in a number of settings. Initial care is most often implemented at the location where the injury occurred and is most often provided by pre-hospital emergency services (Farrow, Caldwell, & Curtis, 2007). This care and subsequent transfer of the patient is often referred to as the primary retrieval. In rural Australia, the next stage of care is usually provided at the closest ED where the injured receive definitive care or transfer to a tertiary referral hospital is arranged for care provision (Farrow et al., 2007; McDonnell, Aitken, Elcock & Veitch, 2009). In most metropolitan areas in Australia trauma systems in place require the ambulance to transport the patient to the nearest Major Trauma Centre where definitive care can be provided (Delprado, 2007; McDonnell et al., 2009; State of Victoria & Department of Human Services, 2009). After this, the patient receives stabilisation care in the ED and is then usually discharged from the ED to the ICU, High Dependency Unit (HDU) [although some hospitals do not have a HDU and patients may be cared for in an ICU step-down unit or go straight to the ward], Perioperative Unit (PERIOP) or another ward for ongoing care. The most severely injured usually receive care in either the HDU, PERIOP or ICU, with less severely injured going to a general orthopaedic, surgical or neurological ward with or without immediate surgical care. Trauma care is provided by a number of health professionals including ambulance personnel, paramedics, nurses, allied health and medical officers, along with those involved in rehabilitative care after the initial resuscitation phase. Considering the large number of health professionals involved in the immediate and ongoing care of the multi-trauma patient at any one time, it is unsurprising that communication is often compromised in this time-pressured and often complex setting.
1.3 COMMUNICATION IN TRAUMA CARE

Communication is essential for effective care provision, but especially so when large numbers of people are involved in the delivery of care, as is often the case for a multi-trauma patient (Xiao, Schenkel, Faraj, Mackenzie, & Moss, 2007). Communication breakdown was a finding of most studies investigating trauma team processes and performance (Cole & Crichton, 2006; Curtis, 2001; Mackenzie et al., 2004; Pape et al., 2000; Xiao & Moss, 2001).

For trauma care teams, a patient who has one major injury is usually less difficult to manage than a patient who has a number of severe injuries all impacting on different body systems (Bergs et al., 2005). Providing care for a patient with one major injury and no other issues to distract the team’s focus is usually less complex than managing a patient with concurrent severe injuries that escalate the complexity of care and increases their mortality risk. While a trauma team may manage a patient with a single trauma very well, often more people from other disciplines are required to care for a patient with multiple severe injuries. In this situation, communication may not be optimal because care and team dynamics become more complex as a result and this in turn increases the opportunity for error and a potential reduction in the quality of care for the patient (Cole & Crichton, 2006; Curtis, 2001).

Excellent communication is the cornerstone to reliable, efficient collaboration in health care delivery (Patterson, Roth, Woods, Chow, & Gomes, 2004). The current study was directly concerned with information transfer for the patient when they left the care of ED staff, and as such the handover processes (also known as handoff) and care documentation were relevant. At transition points of care, communication of patient care information is undertaken in two formats, verbal handover and written information. Written information may be in the form of electronically generated medical record documentation or hand written documentation.

For the effective provision of care that promotes recovery and reduces disability, communication within the trauma team and with ongoing care providers must be thorough, accurate, complete, timely and easy to access (Calleja, Aitken, & Cooke, 2011). There is little in the literature in regard to documentation and communication.
during trauma care. Findings from the literature include the following issues about communication:

- Traits such as open, clear communication skills, leadership skills, people management skills and conflict resolution skills are desirable in a Trauma Team Leader in order to improve the performance of the trauma team (Cole & Crichton, 2006) rather than surgical skill specialty (Ahmed, Tallon, & Petrie, 2007).

- Nurses in one Australian hospital found communication was the highest priority issue when providing trauma care. Nurses in this study felt that poor communication affected nursing practice and care and this subsequently resulted in poorly managed overall coordination of care (Curtis, 2001).

- Video footage in a study of trauma teams showed failure to communicate was an issue, alongside time pressure and peer stress in regard to providing complex patient care in a trauma team setting (Mackenzie et al., 2004).

- Encouraging verbal checks of team progress and awareness of the patient’s condition was a positive influence in improving outcomes of trauma team performance (Xiao & Moss, 2001).

- Structured communication was essential in major trauma cases and audible communication was not as common as expected (Bergs et al., 2005).

- A study of a traditional communication support tool, such as a whiteboard in an OT trauma suite, found that this may help communication in trauma team resuscitation settings (Xiao et al., 2007).

A common issue of not being able to collect complete data sets is usually due to gaps in written or recorded care and patient condition markers. In regard to trauma documentation, only one study by Pape et al., (2000) was found to discuss in detail this issue that many trauma registry staff experience. Using complete data sets to form the basis of research and recommendations is a difficult goal for trauma registry staff to achieve due to the amount of data to be collected and the incompleteness of documented patient care. Data completeness can be a significant measure of information transfer for not only trauma registries but also other health professionals who must rely on documentation completeness to influence patient care decisions. Apart from the verbal
handover of patient care, written sources are often the only point of reference for subsequent care provision. Although the trauma registry studies were not conducted in the clinical environment, incomplete data obtained by trauma registries can indicate incompleteness of trauma documentation.

Investigation into handover in the trauma setting (or related settings) was initially limited to three studies (Catchpole et al., 2007; Currie, 2002; McFetridge et al., 2007). The first tested a hypothesis that Formula 1 pit stop and aviation principles of handover could be successfully implemented to improve handover performance for patients being admitted to the ICU from PERIOP. The most significant finding was that the adopted principles reduced errors and missing information in relation to patient information (Catchpole et al., 2007). The second study focused on what topics should be included for handover in the ED. Issues of missing information, distractions, errors in information, and a lack of confidentiality were identified as problems in ED nursing handover (Currie, 2002). The third study explored the process of handover and communication between ED and ICU nurses. McFetridge, et al., (2007) found unstructured and inconsistent approaches to handover and that nurses in both settings valued the information given or received and believed that the information was important to continuity of care and quality of care, but that there were often major gaps in handovers. More recently the focus has been on flow and disruptions during handover. Some authors have published findings about flow disruptions in emergency related handovers being a major factor in errors and poor handover quality (Catchpole et al., 2013), evaluation outcomes of trauma or emergency setting handovers (Braun, 2012; Cheung et al., 2010; Horwitz et al., 2009; Laxmisan et al., 2007; Maughan, Lei, & Cydulka, 2011; Owen, Hemmings, & Brown, 2009; Ye, McD Taylor, Knott, Dent, & MacBean, 2007; Yong, Dent, & Weiland, 2008) and reports on how standardised proformas have improved trauma patient handovers (Ferran, Metcalfe, & O'Doherty, 2008). Common elements in these studies included varied approaches to handover within the one setting, that expectations of handover framed practice, that structure and agreed processes improved handover quality, and that trauma and emergency settings, due to their specific context, increased the chances of error, pressure on clinicians and interruptions even when undertaking patient handover.
1.4 SIGNIFICANCE

Communication quality is constantly identified as a significant issue in health care, both nationally and internationally (World Health Organization, 2007), especially in trauma care (Sugrue, Seger, Kerridge, Sloane, & Deane, 1995). A gap exists in the literature regarding the perceived effects of missing, fragmented, unclear and inconsistent patient care information on the patient. Anecdotal evidence suggests information continuity and consistency is a particular issue in trauma care provision and missing or fragmented patient care information appears to be a continuing challenge in providing care for the trauma patient.

Trauma care is mostly provided by teams of health professionals, and the patient is likely to have many transition points while receiving the care that they require as a result of their injuries (Farrow et al., 2007). This creates extensive opportunities for possible communication breakdowns during the transitions of multi-trauma patients.

It is widely accepted that communication is the cornerstone of teamwork (Bergs et al., 2005; McFetridge et al., 2007) especially for teams that provide care for multi-trauma patients (Bergs et al., 2005). Gaps in information transfer can be the cause of serious breakdowns in the continuity of care, lead to inappropriate treatment, and potentially be harmful to the patient (World Health Organization, 2007). The implications from communication breakdown or poor communication have become such an important issue that new roles have been appearing to combat problems associated with communication of clinical information. An example of this in trauma care is the Trauma Case Manager, a role usually undertaken by an experienced trauma nurse to coordinate, track, communicate and organise post-resuscitation care for the trauma patient (Curtis, Lien, Chan, Grove, & Morris, 2002; Curtis, Nocera, Mitten-Lewis, & Donoghue, 2004; Curtis, Zou, Morris, & Black, 2006). Considerable impact on information transfer for multi-trauma patients can occur due to the time pressure factors involved, the number of transition points of care providers (for example: primary retrieval by ambulance/pre-hospital professionals, ED treatment, PERIOP, HDU and ICU), the complexity of injuries and the variety of communication processes used, as these aspects can significantly affect patient care (Curtis, 2001).
Communication of patient information is such a vital issue that a number of national and international projects have been implemented. Recently a joint project called “Priority Program 5 – National Clinical Handover Initiative” was put in place by the World Health Organization (WHO) Patient Safety Alliance in partnership with the Australian Commission for Safety and Quality in Health Care (Australian Commission on Safety and Quality in Health Care, 2007). For this initiative the Australian government invited tenders from private and public organisations to contribute to the development, implementation and evaluation of transferrable products in the following areas:

- Specific handover processes.
- Electronic tools and processes that provide systems to support handover of patient information.
- Communication training and team training to support handover.
- Tools for ongoing observation, monitoring and evaluation of handover practices in the workplace.

This project was finalised over 2009 and early 2010, with publications continuing to be produced from these studies. This national initiative focused on clinical handover of all patient information in all areas of health care, with projects focussed on improving facets of clinical handover in many contexts using a variety of methods. This national priority was a response to an international issue, that of communication during care and patient handoff that supports care continuity between clinicians and care contexts.

It is evident from current research that teams only function well where communication is effective, and the more people involved in a team the more the complexity of team based communication increases. Due to the models of trauma and acute care used in Australia many clinicians from different disciplines and different care areas are involved in the multi-trauma patient’s care. As a result it is essential to understand the process of information transfer for multi-trauma patients from the perspective of the people involved, especially if improvements in a people driven process such as handover and information transfer are expected.

The communication processes and standards of information transfer for multi-trauma patients on discharge from the ED at one major metropolitan tertiary referral hospital
were investigated in this study. In this process the barriers and conduits to information transfer were identified and strategies were developed to overcome barriers and improve the access, flow and consistency of trauma care information for care providers within the organisation. These strategies (aimed at improving information transfer for multi-trauma patients) were then implemented and evaluated.

1.5 STRUCTURE OF THESIS

This thesis has six chapters. Chapter 1 has provided a background to the study, the significance and sets the scene for the study. Chapter 2 will present the literature reviewed for this study and is presented as a published peer reviewed paper. Chapter 3 will present the research methods implemented and Chapter 4 will present the results based on the methods used. Chapter 5 discusses the results compared to current literature and Chapter 6 presents a conclusion to the thesis.
Chapter 2: Literature Review

Statement of contribution to co-authored published papers

This chapter includes a co-authored published paper.

The bibliographic details of the published paper, including all authors, are:


Contribution to the published paper is as follows:

PC was responsible for the study conception and design with supervision from LA and MC. PC performed the data collection with off-site supervision and guidance from LA and MC. PC performed the data analysis with supervision from LA and MC. PC was responsible for the drafting of the manuscript with small contributions to some sections by LA and MC. PC, LA and MC made critical revisions to the paper for important intellectual content. PC, LA and MC provided statistical expertise. PC obtained funding with supervision of LA and MC. PC, LA and MC provided administrative, technical or material support. LA and MC supervised the study.

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Co-author of published paper and supervisor: Professor Leanne Aitken

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Co-author of published paper and supervisor: Professor Marie Cooke
2.1 INTRODUCTION

The research literature supporting the issues of information transfer for multi-trauma patients upon discharge from the Emergency Department (ED) has been published as a mixed method narrative review in a peer reviewed journal. This publication has been included in this chapter in its final submitted form (Calleja et al., 2011).

The research reviewed has supported the identification of problems related to information transfer for multi-trauma patients on discharge from the ED. Continuity of care has become an important focus for health care provision, and adequate information transfer continues to be vital to support the continuity of patient care. The surrounding issues and their impacts on information transfer for multi-trauma patients upon discharge from the ED critiques in the review of literature have been categorised into four major areas: trauma team performance, errors and missed injuries, communication during the acute phase of trauma resuscitation, and patient handover. Finally the chapter concludes with the rationale for this current study.

2.2 LITERATURE REVIEW AS PUBLISHED

Publication: Information Transfer for Multi-Trauma Patients on Discharge from the Emergency Department: Mixed-method narrative review

Publication status: Published

Publication details:

INFORMATION TRANSFER FOR MULTI-TRAUMA PATIENTS ON DISCHARGE FROM THE EMERGENCY DEPARTMENT: MIXED-METHOD NARRATIVE REVIEW

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Abstract

AIM: This paper is a report of a review conducted to identify: a) best practice in information transfer from the emergency department for multi-trauma patients; b) conduits and barriers to information transfer in trauma care and related settings; and c) interventions that have an impact on information communication at handover and beyond.

BACKGROUND: Information transfer is integral to effective trauma care, and communication breakdown results in important challenges to this. However, evidence of adequacy of structures and processes to ensure transfer of patient information through the acute phase of trauma care is limited.

DATA SOURCES: Papers were sourced from a search of 12 online databases and scanning references from relevant papers for 1990-2009.

REVIEW METHODS: The review was conducted according to the University of York’s Centre for Reviews and Dissemination guidelines. Studies were included if they concerned issues that influenced information transfer for patients in healthcare settings.

RESULTS: Forty-five research papers, four literature reviews and one policy statement were found to be relevant to parts of the topic but not all of it. The main issues emerging concerned the impact of communication breakdown in some form, and included communication issues within trauma team processes, lack of structure and clarity during handovers including missing, irrelevant, and inaccurate information, distractions and poorly-documented care.

CONCLUSION: Many factors influence information transfer but are poorly identified in relation to trauma care. The measurement of information transfer, which is integral to patient handover, has not been the focus of research to date. Nonetheless documented patient information is considered evidence of care and a resource that affects continuing care.
Introduction

Information processes are important for communicating all patient care. For multi-trauma patients (who have injuries to more than one area of the body) communication issues may be further intensified by care context, time, patient acuity, patient complexity and number of people involved in their care.

Information transfer is the process surrounding the transition of patients between departments/wards. This is a larger process than handover, which is often referred to as a discrete point in patient transition. Information transfer includes the lead up to handover and the remaining information accessible after the handover is complete. For multi-trauma patients this includes trauma team communication, handover and the documentation process. Information transfer for trauma patients is especially crucial, as trauma care is usually given by many inter-disciplinary teams that provide acute and ongoing care, often at the same time. Effective information transfer enables quality patient care and is a vital aspect of patient transition and handover in all care contexts.

Internationally, strategy development for prevention and management of trauma is a high priority (Peden et al., 2002). Unintentional injuries were the six highest cause of death for males and females combined, worldwide, in 2004 (World Health Organization, 2008). In Australia in 2004-05, the principal diagnosis of ‘Injury, poisoning and certain other consequences of external causes’ was the second highest reason for public hospital discharges (AIHW, 2006b). Once trauma occurs, a number of factors are believed to influence patient outcomes, but are not yet completely understood (Richmond, Kauder, Hinkle, & Shults, 2003).

Communication is the cornerstone of teamwork (McFetridge et al., 2007; Miller, Riley, & Davis, 2009), especially for teams that provide care for multi-trauma patients (Bergs et al., 2005). Poor communication can cause serious breakdowns in continuity of care and inappropriate treatment, which may be harmful to the patient (Wong, Yee, & Turner, 2008; World Health Organization, 2007). While a trauma team may manage a patient with a single severe trauma very well, often more people are required to care for a patient with multiple severe injuries. As a result, communication of patient information may not be optimal because care and team dynamics become more complex, increasing the opportunity for error and reducing the quality of ongoing care.
Communication of patient information is such a vital issue in many countries that international collaboration is occurring on a number of projects. One such joint project is “Priority Program 5 – National Clinical Handover Initiative”, administered by the World Health Organization (WHO) Patient Safety Alliance and the Australian Commission for Safety and Quality in Health Care (Australian Commission on Safety and Quality in Health Care, 2007). This project includes a number of different initiatives using different methods which were piloted across Australian healthcare settings to improve clinical handover. The outcomes of these are to be adapted for healthcare settings in developing countries.

The inherent risks of communication breakdown for any patient transition are worrying, but may be magnified when considering the increased patient acuity and time pressures present in trauma care.

THE REVIEW

Aims

This literature review was the first phase in a multi-phase intervention study designed to improve information transfer for multi-trauma patients. The aims of the literature review were to identify:

a) best practice in information transfer from the ED for multi-trauma patients.

b) conduits and barriers to information transfer in trauma care and related settings.

c) interventions that impacted on information communication at handover and beyond and their effect.

Design

This narrative review followed the principles described in the University of York’s Centre for Reviews and Dissemination guidelines for undertaking reviews in health care (Centre for Reviews and Dissemination, 2009). An initial search identified gaps in the literature describing and/or testing transfer of multi-trauma patients, and indicated the need for a narrative review.
A conceptual framework of the mechanics of patient transition points from trauma occurrence to discharge from acute care was initially mapped. With input from clinical experts (trauma service, trauma team, intensive care and emergency clinicians) and our clinical experience, the issue of what constitutes difficulties in patient transition at these points was identified. Although the research study for which this review was conducted concerns multi-trauma patients only (due to scope of the study, time and resource constraints), studies on other acute care transition points (for information transfer and surrounding issues such as trauma team performance, clinical handover and communication during the acute phase of trauma resuscitation) were also included in the review.

**Search methods**

The search was limited to papers published between 1990 and 2009, as 1990 was the earliest date when trauma systems and trauma teams were studied and reported. A systematic search of general to specific terms limited to English in relation to trauma and communication was conducted via the databases of Medline, OVID, CINAHL, Proquest, Blackwell Synergy, Google Scholar, Ingenta, PubMed, Science direct, EBSCO, Informit and Cochrane Database. The reference lists from retrieved papers were also checked for other relevant studies.

Search terms were cross-referenced with each other (e.g. Trauma AND documentation). Terms included trauma (care, injury, nursing, teams, communication, documentation, chart), emergency (department, care, documentation), information (continuity, transfer, patient, transmission), handover (patient, handoff, nursing, clinical), documentation (clinical, nursing), transfer (inter-hospital, patient, intra-hospital), transition points, continuity of care, transition care, patient outcomes.

Inclusion of studies in the review was based on issues identified in the literature and by us and the expert clinicians we consulted. Studies were included if they addressed one or more aims of the review. There have been numerous published studies in some topic areas, for example, clinical handover has many studies (Wong et al., 2008), but not all were included in this review. Studies were excluded if the issues or interventions were not related to trauma care and issues of information transfer at inter-department transition points.
Titles and abstracts were scanned for possible relevance to the review aims. The process of selection continued with data extraction. As the studies were read through and a data extract sheet completed, if the content was not relevant, the paper was excluded.

**Search Outcomes**

In the absence of specific studies related to trauma-specific information transfer, any studies including surrounding issues of patient, team and process factors affecting communication of patient care were assessed for inclusion in the review. Initial searches after scanning titles identified 316 possible papers to be included. Data extraction sheets were then completed for all papers, and further inclusion and exclusion decisions made. In total, 50 papers were included in the review.

**Quality Appraisal**

Included papers were those published in peer-reviewed journals or from government websites. As there were no papers that addressed this topic in its entirety, any study report that could be reasonably linked to the inclusion criteria was included. No formal appraisal of study quality was undertaken.

**Data Extraction**

For each paper a cover sheet was completed summarising date, author, paper title, problem definition/objective, background, methodology, ethical issues, sample, sample size, data collection strategies, results/findings/conclusions, strengths, limitations, and relevance or link to study topic.

**Data Synthesis**

The conceptual framework for this mixed method narrative review was initially developed based on discussions with clinicians in the field of trauma care. This was to guide the analysis of the current body of knowledge in the area of information transfer for multi-trauma patients. Analysis of the identified literature then involved a narrative synthesis aimed at analysing relationships within and between studies, especially as the studies were too diverse to combine in a meta-analysis (Centre for Reviews and
Dissemination, 2009). This involved critical analysis of the content, from studies that were considered relevant to the topic. The papers analysed were limited to research papers, literature reviews and government reports. After reading articles in detail, the aims and outcomes of the papers were compared to identify similarities. Tables of information from the studies were developed to aid synthesis by enabling the content details to be tabulated into issues identified in each paper (Green, Johnson, & Adams, 2001), for example, the effect of interruptions on nursing documentation, the use of whiteboard as a strategy to improve communication (see supporting information Tables S1-S4). These issues were then condensed into overarching themes and specific factors that affect information transfer for multi-trauma patients and the conceptual framework was modified based on the issues and themes identified. Individual studies were reported on and their importance for the topic discussed. Table 1 summarizes the papers included in this review.

Results

The four overarching themes having an impact on information transfer for multi-trauma patients were: impact of trauma teams, communication, documentation and clinical handover. Within these themes, a number of factors emerged: patient factors, team factors, process factors, ethics, resources, organisational factors, legal elements, environmental factors and individual (healthcare professional) performance factors.

The results are discussed below under these headings and the applicable factors are listed at the end of each section. Further details of the individual studies, tabulated under the overarching theme, can be seen in Tables S1-S4, while the relationship of factors to overarching themes can be seen in Table 2.

Trauma Teams

Trauma teams (TTs) are usually multidisciplinary teams specifically formed for immediate, expert assessment and treatment of a trauma patient (Wong & Petchell, 2003). Despite the belief of many clinicians that TTs improve care outcomes, many countries have a varied uptake of the use of TTs, usually due to organisational culture and resources (Wong & Petchell, 2003).
Trauma teams remain a current focus of many studies and discussions in the literature (see Table S1), with major issues centring on team composition (Cummings & Mayes, 2007; Patient, 2007; Wong & Petchell, 2003), from which specialty the team leader should come (Lavoie, Tsakonas, Sampalis, & Fréchette, 2003; Wong & Petchell, 2003), how effectively team members work together or perform their roles (Cole & Crichton, 2006; Sugrue et al., 1995; Xiao & Moss, 2001), and team formulation and activation (Wong & Petchell, 2003).

For teams to work effectively, there must be clear roles and relationships and trust that all are able to fulfil their roles (Xiao & Moss, 2001). Teams termed “resistant to failure” (Xiao & Moss, 2001) were those whose work and environments increased the risk of major errors and poor outcomes, but which usually avoided adverse outcomes. Trauma healthcare teams were compared to these. In the trauma care setting, factors likely to increase the risk of error (e.g. missed injuries) can be either environmental/resource-specific, patient-oriented or clinician-based (Howard, Sundararajan, Thomas, Walsh, & Sundararajan, 2006). Practices and behaviours that reduced this level of risk included the ability of team members to work effectively in their team roles using structured audible communication (Xiao & Moss, 2001)

Trauma team culture was found to have an impact on team performance (Cole & Crichton, 2006), with communication skills considered fundamental to successful performance. Communication was affected by patient acuity and stability, and became more complex with higher risks for error as patient acuity increased (Cole & Crichton, 2006). Failure to communicate was a common error in TT practice (Mackenzie et al., 2004), and had an impact on missing or fragmented patient care information (Howard et al., 2006). Trauma team functioning was also affected by the noisy, busy environments inherent in trauma care (Cole & Crichton, 2006).

Factors related to the Trauma Team theme included individual performance of team members (knowledge, skills and attitudes), patient complexity, acuity and neurological status, and access to enough additional information (history, co-morbidities usually from family/ambulance staff). Overall, team issues and performance, legal issues, resources and environment were also identified as relevant.
Communication

Transition points for patients are high risk areas for patient safety (Wong et al., 2008). As a result, discussions about best practice at transition points of care are becoming more prevalent (World Health Organization, 2007). Patient transition linked to safety has become an international priority. Until very recently, this issue has only attracted small amounts of research and local policy-making (or none at all) to inform patient care, but is fast being developed at national and international levels. Some examples of this include WHO initiatives (World Health Organization, 2007), the WHO-commissioned Australian project called National Clinical Handover Initiative (Australian Commission on Safety and Quality in Health Care, 2007) and a United States of America-based policy statement for transition of care (Snow et al., 2009).

Interest in how healthcare teams work towards facilitating survival and improving patient outcomes has led to a number of research-based reports of communication breakdown as a common issue (Bergs et al., 2005; Cole & Crichton, 2006; Mackenzie et al., 2004; Xiao & Moss, 2001). Overall communication in trauma teams is very complex, becomes more problematic with pressures of multiple injuries and multiple care providers involved (Al-Naami, Al-Faki, & Sadik, 2003; Bergs et al., 2005), and is largely unstructured during inter-department handover (Horwitz et al., 2009; McFetridge et al., 2007).

Healthcare professionals believe that quality handover of emergency patients is vital to the quality of continuing care but a number of barriers have been shown to be present in most contexts (Curtis, 2001; McFetridge et al., 2007). Barriers to communication between medical officers and nurses were (i) the perceived level of nurse competence by the medical officer, (ii) that medical officers would be unpleasant and not value nurses’ opinions (Curtis, 2001), and (iii) the environment of emergency care includes multi-tasking with consistent interruptions, which is cognitively taxing for professionals and leaves room for errors affecting patient safety (Laxmisan et al., 2007). Nurses have indicated that episode of care coordination is often poorly managed, and that during complex or critical interactions, errors or poor care frequently occur (Curtis, 2001; Miller et al., 2009). Effective communication strategies include an appropriate knowledge base, range of behavioural skills, positive attitude towards communication.
and the availability of opportunities to communicate (Curtis, 2001). Reports of support tools for communication indicate that a whiteboard in a trauma operating theatre was effective and may be transferrable to other trauma care environments (Xiao et al., 2007).

Factors identified in this theme were patient factors, especially patient acuity and multi-trauma due to multiple health care team members involved (team factors), organisational issues, team culture, individual performance of the health care professional, the environment where clinicians are required to multi-task, process factors, and available resources. Reports that mentioned communication errors but were better placed under other themes (e.g. documentation) are not tabulated in Table S2, but are discussed under the appropriate theme.

**Documentation**

Investigating documentation is one way of identifying issues in information transfer which last beyond the oral handover. One review investigated how nursing documentation was evaluated and researched, finding little collaboration and agreement on auditing tools, and that most tools were not tested; this therefore prompted questions about the validity of the study results (Saranto & Kinnunen, 2009).

Documentation issues directly related to trauma care were confined to trauma registry studies, being unable to find required data, and data being fragmented and incomplete (Pape et al., 2000; Probst, Paffrath, Krettek, Pape, & The German Trauma Registry, 2006) (see Table S3). All the studied registries revealed poor documentation of treatment, thus having an impact on the ability to collect data (Pape et al., 2000).

Other related documentation issues came from the wider healthcare field and included poor quality, fragmented information and complex barriers to documentation improvement. Staff reported that they felt unsupported to manage appropriate documentation in their care contexts (Cheevakasemsook, Chapman, Francis, & Davies, 2006). Where documentation was measured, standardised documentation studies showed more positive than negative outcomes (Saranto & Kinnunen, 2009), but that poor documentation also had legal and quality care impacts (Saranto & Kinnunen, 2009).
Long-term improvement in nursing documentation is possible with a standardised documentation implementation tool, but also requires change in the organisational culture to be successful (Bjorvell, Wredling, & Thorell-Ekstrand, 2002). Added to this is providing standards and guides as resources to support education about documentation is important (Considine, Potter, & Jenkins, 2006). Nurses have positive attitudes towards documentation but, while they demonstrate good knowledge of the documentation system, they lacked analytical skills about documented content (Darmer et al., 2004). This suggests that a high degree of management support is required for nursing documentation to be improved and maintained (Darmer et al., 2004).

Another study showed that initial assessment and evaluation of care were inadequately recorded, but then the researchers successfully used chart audit as a framework for practice development and performance improvement (Griffiths & Hutchings, 1999). Documentation investigation can be problematic if audit tools do not actually measure what they are intended to, and yet audit tools are a common method in documentation research. Common factors related to documentation include legal elements, process factors, individual performance, and resource and organisation factors.

**Clinical Handover**

Handover is part of the process of patient transition from one care provider to another, as well as one care area to another (Australian Council for Safety and Quality in Health Care, 2005). However, handovers may not provide all information that is essential for safe care (see Table S4). This can interrupt continuity of care, lead to inappropriate treatment and potentially cause harm (World Health Organization, 2007). A report on clinical handover and patient safety identified three main factors that impacted upon patient safety, namely organisational, cultural factors and individual factors (Australian Council for Safety and Quality in Health Care, 2005).

Primarily handover is seen by healthcare professionals as a basis for care continuity (Currie, 2002; Manias & Street, 2000; McFetridge et al., 2007). Only two studies examined inter-departmental handover involving the ED (Horwitz et al., 2009; McFetridge et al., 2007). One of these focused on nurses’ handover and communication from ED to ICU (McFetridge et al., 2007) and found similar issues to a study of physician experiences of handover from ED to an internal medicine unit (Horwitz et al.,
Specifically, errors were likely when communication and interpersonal failures occurred. These were related to the need for a discrete time and place for handover without distractions, difficulties in communication, absence of a structured or consistent approach, differences in expectations, and that the quality of the handover relied on good information resources and interactive communication.

Problems within handover processes in most disciplines and contexts included lack of structure (Bomba & Prakash, 2005; Borowitz, Waggoner-Fountain, Bass, & Sledd, 2008; Horwitz et al., 2009; McFetridge et al., 2007), not understanding each other’s roles and expectations about handover (Australian Council for Safety and Quality in Health Care, 2005; Horwitz et al., 2009; McFetridge et al., 2007), a marked variation in content and approaches for handover (Borowitz et al., 2008; Horwitz et al., 2009; McFetridge et al., 2007; O'Connell & Penney, 2001). Many of these issues were especially evident in the emergency context (Horwitz et al., 2009; Manias & Street, 2000; Owen et al., 2009). Five researchers recommended the development of a guide for processes and structure for handover (Currie, 2002; Horwitz et al., 2009; McFetridge et al., 2007; O'Connell, Macdonald, & Kelly, 2008; Ye et al., 2007). The culture of handover between nurses has often been described negatively by nurses. Despite this, the processes were indoctrinated during practice and perpetuated by staff (Manias & Street, 2000).

Fragmented communication between staff disciplines can exacerbate the problems identified (Jenkin, Abelson-Mitchell, & Cooper, 2007; Yong et al., 2008). The oral culture in handover can mean that information is likely to be lost (Pothier, Monteiro, Mooktitar, & Shaw, 2005) and, regardless of the model of nursing handover, there can be information gaps, mostly due to uncertainty about a patient (O'Connell & Penney, 2001). Inadequate handovers can result in large amounts of time spent by nurses on the oncoming shift having to search for the required information (O'Connell & Penney, 2001).

Inadequate handovers also include information missing, incorrect or irrelevant. Missing information or incorrect information handed over in one study of medical staff handing over to each other in the ED were linked by participants to adverse patient events (Ye et al., 2007). Most study participants have found handover to be ‘good’, but this
perception can change radically when they experience a handover that is inadequate and or an adverse patient event or near miss (Ye et al., 2007).

In the emergency context, a number of researchers have investigated handover from pre-hospital paramedics to ED staff. These studies have identified tensions about the transfer of information and the physical transfer of patients. This has been discussed as a tension between ‘doing and listening’ (Owen et al., 2009), and that when it was perceived that the ‘doing’ was taking priority over the ‘listening’, this caused frustration and concern for the transfer of information (Jenkin et al., 2007; Owen et al., 2009; Yong et al., 2008).

When comparing strategies employed during handoffs (similar to handover in health settings) in four settings in North America (USA and Canada) with major consequences for failure (NASA space centre, a nuclear power centre, a rail road dispatch centre and an ambulance dispatch centre), similar characteristics were identified between the agencies studied and healthcare settings (Patterson et al., 2004). However, the difference for patient handover was that healthcare personnel lacked knowledge of the overview status of patients and historical information displays, meaning that more information must be covered in a healthcare handover (Patterson et al., 2004). A simple trainable protocol at patient transition between wards made a positive difference for handover, resulting in a reduction in errors and missed information during handover (Catchpole et al., 2007).

A simulated experiment to assess the differences in information retention for three handover styles over a cycle of nursing handovers showed major issues with incorrect and missing data, which were attributed to the handover style used (Pothier et al., 2005). These styles were oral only, oral with note-taking, and typed information sheet with oral handover. Degradation of data was found in all styles in the study, but oral-only handover showed the most data loss until after the fifth cycle, and no original or correct data was handed over for any of the simulated patients. This data substitution was not present in the other handover styles. The note-taking group had a steady data loss, but not as much as the oral group. With the note-taking group, only 31% of data was accurate on simulation completion. The group with typed information accompanying
oral handover had very little data loss over the simulation, and retained the most accurate information (Pothier et al., 2005).

The main issues with handover were little structure and poor clarity in oral handovers where patients changed departments/wards or caregivers. Topics or issues handed over were inconsistent and the content of handovers changed with different staff. A frequent recommendation was the need for a structured guide for handover of patient information. Other problems identified included missing information (particularly in documented information), distractions, lack of confidentiality and irrelevant and inaccurate information given. Interventions that were implemented showed positive outcomes when focussed on improving the structure of handover. Factors identified as specific issues for clinical handover include process factors, patient factors, resources, individual factors, environment and ethical elements.

Discussion

Review Limitations

Due to the limited number of papers directly applicable to this topic, similar issues in other care contexts were reviewed and links to the trauma care context presented. There was no consistency in the research designs used for the studies reported, and therefore this review is a critical analysis of the content only. There was no quality appraisal of individual studies. All evidence was included irrespective of study quality, and this is a weakness when interpreting findings and may reduce the ability for them to be generalised. The review was limited to papers in English, and no studies investigating the effectiveness of communication strategies in trauma-specific handovers were found.

Communication Issues

Communication quality is constantly identified as an important issue in health care, both nationally and internationally (World Health Organization, 2007), and especially in trauma care (Sugrue et al., 1995). A gap exists in the literature about the effects on patient care of missing, fragmented, unclear and inconsistent information. Opinions of missing information having an impact on adverse events have started to emerge from studies conducted about medical handover (Borowitz et al., 2008; Horwitz et al., 2009;
Ye et al., 2007). The influencing factors have not been measured for trauma patients and they are not reported to be the focus of further study. Anecdotal evidence suggests that information transfer and consistency of information handed over is a particular issue of concern, and missing or fragmented information appears to be a continuing challenge in providing care.

Gaps in communication transfer can be the cause of serious breakdowns in continuity of care and inappropriate treatment, and these may be potentially harmful to patients (Borowitz et al., 2008; Horwitz et al., 2009; Wong et al., 2008; Ye et al., 2007). Patient safety and continuity of care when treated by multiple teams rely on good communication. When this fails, safety risks can occur. For multi-trauma patients, this can be further affected by the requirement to provide patients definitive care in appropriate time frames and the clinical context of the emergency setting, adding complexity to an already acute situation with multiple team players involved in care provision (Bergs et al., 2005; McFetridge et al., 2007; Miller et al., 2009).

The implications of communication breakdown or poor communication are so important that new roles have appeared to support information transfer to ensure continuity of care. In trauma care, an example is the Trauma Case Manager role, usually undertaken by an experienced trauma nurse to coordinate, track, communicate and organise post-resuscitation care (Curtis et al., 2006). Information transfer for multi-trauma patients can be influenced considerably by time pressure factors, the complexity of injuries and information discontinuity that results from the communication processes used and the number of transition points and care providers [for example: primary retrieval of the patient by ambulance and subsequent treatment in the emergency department, operating theatre, and high dependency or intensive care unit (ICU)] (Curtis, 2001).

To provide care successfully to multi-trauma patients, trauma teams use specific strategies, knowledge and skills to facilitate survival and reduce possible disabilities (Xiao & Moss, 2001). Research has focused on how teams work towards this goal, with communication having a major impact on outcomes (Bergs et al., 2005; Cole & Crichton, 2006; Mackenzie et al., 2004; Xiao & Moss, 2001). Despite its regular identification, the need for communication improvement (including aspects of both quality and quantity) has not usually been the focal point of these studies. Instead,
issues or errors brought about by poor communication have been the focus, with the need for communication improvement a recurring recommendation.

Communication amongst healthcare teams was found to be affected by multiple factors related to timely treatment. In a study (Bergs et al., 2005) team communication was found to be complex due to multiple factors specific to trauma patients. Another study of handover practices for patients transferred from ED (not trauma specific patients) to the ICU showed communication to be unstructured, even though healthcare professionals thought that quality handover of emergency patients was vital to the quality of continuing care (McFetridge et al., 2007). Several improvements for communication were suggested; however, the scope of this study did not include an improvement intervention. Strategies and tools that have been tested in other care areas could be adapted to benefit trauma patients and staff.

Patient handover is a topical issue, with many resources now being allocated to improve it (for example, WHO & Australian Commission for Safety and Quality in Health Care project’s National Handover Initiative). One aspect is documented information, which does not seem to be being studied as a specific factor for patient transitions. The patient record can be accessed by every healthcare provider caring for a patient, and is the definitive and unchanging repository for information about previous care. Oral handover, however, only survives for those who receive it. After handover, unless tape-recorded and kept with the medical record (not a current practice), oral information cannot be retrieved and can be affected by memory and perception of communication. Further, when documentation is studied there is little congruence between auditing tools used, and in many cases no reporting or pilot-testing of these tools. This leads to questioning of the validity of the results, and particularly the transferability of such audit tools.

Handover as a process also relates to who has responsibility for the patient, and the strategies and structures studied in the literature were aimed at improving this process of communication during the handover as a whole. However, there seems to be a gap in linking the documentation to support effective clinical handover. The written patient record survives far into the future and should serve to give a clinical picture of the
patient that is accurate, legible, clear and precise. Continuity of care and avoidance of errors depend on this.

Conclusion

This review has raised a number of issues and indicated some suggestions for future research and practice. Further research should be undertaken to develop and test strategies to improve information transfer for multi-trauma patients. The perceived relationship between how documented patient information supports or informs continuing care before, after and during patient handover should be investigated. Communication strategies and tools used in other healthcare areas should be considered for how they may be transferred and adapted to trauma patient care. If strategies can be developed to help reduce barriers and prevent communication breakdown, there is great potential to improve patient care.

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Conflict of Interest

No conflict of interest has been declared by the authors.

Author Contributions

PC, LA and MC were responsible for the study conception and design. PC, LA and MC performed the data collection. PC, LA and MC performed the data analysis. PC, LA and MC were responsible for the drafting of the manuscript. PC, LA and MC made critical revisions to the paper for important intellectual content. PC, LA and MC provided statistical expertise. PC, LA and MC obtained funding. PC, LA and MC provided administrative, technical or material support. LA and MC supervised the study.

What is already known about this topic
• Communication issues are identified as impacting on patient care in most areas of health care.

• Patient care transition points use handovers to pass information on about patient care, and deficits in the quality, amount and appropriate content have often been identified as a major issue with clinical handovers.

• Multi-trauma patients have multiple transition points and care providers, and this makes the potential for communication deficits significant.

What this paper adds

• Communication issues in the care of the multi-trauma patient exist and relate to trauma team processes, and lack of structure and clarity during handovers, including missing information, fragmented, irrelevant and inaccurate information, and poorly documented care.

• Despite communication being regularly identified as needing improvement in health care, very little is reported about efforts to improve communication, particularly at transition points of care and about documented information.

• Gaps in knowledge exist about information transfer for trauma patients, and a model of factors that impact upon this issue is proposed.

Implications for practice and/or policy:

• Specific handover measures in use may not take into account the need for coherent, locatable documentation that is available about patient care after the handover phase is complete.

• Research is needed to test interventions to improve information transfer in the multi-trauma care context.
Principles of patient safety and risk management should inform processes for trauma care including handover and documentation, with the aim of facilitating effective information transfer for multi-trauma patients during inter-department transition.
Table 2-1 Summary of papers included in review

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<th>Reference</th>
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<th>Participants</th>
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<tr>
<td>Wong and Petchell</td>
<td>Estimate use of trauma teams in Australian hospitals, composition,</td>
<td>Trauma Teams (TTs) in Australia</td>
<td>Questionaries with telephone follow up</td>
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<td>(2003) Australia</td>
<td>leadership and activation criteria</td>
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<td>Lavoie, et al., (2003)</td>
<td>Identify current distribution of Trauma Team Leader (TTL) role in</td>
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<td>Xiao and Moss (2001)</td>
<td>Identify practices to ensure reliability in teams with high failure</td>
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<td>Sugrue, et al., (1995)</td>
<td>Measure overall performance of TTL role in Liverpool Hospital</td>
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<tr>
<td>Bergs, et al., (2005)</td>
<td>Describe and evaluate communication during multidisciplinary trauma</td>
<td>Trauma patients</td>
<td>Observation over 4 months, prospectively and consecutively evaluated</td>
</tr>
<tr>
<td>USA</td>
<td>resuscitation</td>
<td></td>
<td>with criteria</td>
</tr>
<tr>
<td>USA</td>
<td>exam at level II trauma centre</td>
<td></td>
<td>exam form and missing injuries tabulated</td>
</tr>
<tr>
<td>Curtis (2001), Australia</td>
<td>Identify issues relating to nursing care of trauma patients</td>
<td>Nurses providing trauma care</td>
<td>Focus groups with consistent moderator</td>
</tr>
<tr>
<td>Xiao, et al., (2007), USA</td>
<td>How a traditional whiteboard in operating theatre (OT) can support</td>
<td>Whiteboard communication in an OT</td>
<td>Observation by 10 people over 5 years using the Distributed Cognition</td>
</tr>
<tr>
<td></td>
<td>communication in dynamic and collaborative workplace</td>
<td></td>
<td>Model</td>
</tr>
<tr>
<td>Issues of Communication</td>
<td>Measure markers of key nursing behaviours in interdisciplinary teams</td>
<td>Health care team members in labour</td>
<td>In-situ simulation based on actual event with inbuilt prompts to display</td>
</tr>
<tr>
<td>Miller, et al., (2009)</td>
<td>during critical events to assess the extent of high reliability</td>
<td>rooms in 3 hospitals</td>
<td>specific skills</td>
</tr>
<tr>
<td>USA</td>
<td></td>
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</tr>
<tr>
<td>Al-Naami, et al., (2003)</td>
<td>Evaluate Quality Improvement (QI) data following a mass casualty</td>
<td>All involved in a single motor</td>
<td>Pilot study, Pre-designed QI forms used to collect data- from</td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td>event and its impact on trauma care process and outcomes</td>
<td>vehicle crash</td>
<td>admission - 8 weeks post trauma</td>
</tr>
<tr>
<td>Laxmisan, et al., (2007)</td>
<td>Identify factors that constrain safe decision making in patient</td>
<td>Physicians in EDs in decision</td>
<td>Non-participant observation, semi-structured</td>
</tr>
<tr>
<td>USA</td>
<td>care in the ED. Focussed on interruptions, multitasking and shift</td>
<td>making capacities</td>
<td>interviews. Ethnography for method, grounded theory for data analysis</td>
</tr>
<tr>
<td>Snow, et al., (2009)</td>
<td>change</td>
<td>N/A</td>
<td>Executive committees agreed to jointly develop a</td>
</tr>
<tr>
<td>Issues of Documentation</td>
<td>USA.</td>
<td>“Transitions of Care Consensus Conference” in 2007</td>
<td>policy statement of transitions of care</td>
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</tr>
<tr>
<td>Pape, et al., (2000)</td>
<td></td>
<td>Identify modes and options for European trauma care documentation standardisation</td>
<td>Trauma documentation systems in 3 European countries</td>
</tr>
<tr>
<td>Germany</td>
<td></td>
<td></td>
<td>Comparative review of documentation system</td>
</tr>
<tr>
<td>Probst, et al., (2006)</td>
<td>Germany</td>
<td>Demonstrate lessons learnt and identify possible changes due to changes in communication and medical and economic requirements</td>
<td>Literature on trauma registry and documentation from 7 countries</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Database and literature search, comparative review using specified success parameters</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Interview, participant observation, time and motion study of nursing activities, chart audit</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Find factors that acute care RNs perceived as important to document</td>
<td>Comparative descriptive design using questionnaire</td>
</tr>
<tr>
<td>Griffiths and Hutchings (1999) UK</td>
<td></td>
<td>Determine adequacy of documentation in nursing care plans by district nurses</td>
<td>Retrospective criteria based audit of patient notes. Piloted data collection tool</td>
</tr>
<tr>
<td>Saranto and Kinnuenen (2009) Finland</td>
<td></td>
<td>Assess the research methods applied in the evaluation of nursing documentation</td>
<td>Literature review of terms related to nursing documentation, care plans, record systems, assessment and evaluation</td>
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</tr>
<tr>
<td>Issues of Clinical Handover</td>
<td></td>
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</tr>
<tr>
<td>ACSQHC (2005)</td>
<td>Australia</td>
<td>Conduct a literature review on clinical handover and patient safety</td>
<td>English publications since 1994 in multiple databases</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Literature review. Search terms: handover, communication between shift variables, and patient or customer outcomes. Evidence based review guided by five questions</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Evidence based review guided by five questions</td>
</tr>
<tr>
<td>Messam and Pettifer (2009) UK</td>
<td></td>
<td>Identify and appraise what is known about best practice within nurse inter-shift handover and evaluate implications for practice</td>
<td>English publications since 1997 in Medline, CINAHL &amp; BNI</td>
</tr>
<tr>
<td>Catchpole, et al., (2007) UK</td>
<td></td>
<td>Improve handover quality and safety for patients from OT to ICU using analogy of Formula 1 pit stop and aviation expertise</td>
<td>Literature review of terms related to reporting and handover between both nurses and inter-disciplinary team members</td>
</tr>
<tr>
<td>Patterson, et al., (2004)</td>
<td></td>
<td>Describe strategies employed during handoffs in four</td>
<td>Prospective intervention with direct observation of handover</td>
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</tbody>
</table>

Chapter 2: Literature Review
<table>
<thead>
<tr>
<th><strong>USA and Canada</strong></th>
<th><strong>McFetridge, et al., (2007)</strong>, UK.</th>
<th>Explore patient handover and communication between ED and ICU nurses on patient transfer from ED to ICU.</th>
<th>RNs from ED and ICU</th>
<th>Qualitative documentation review analysis, semi-structured interviews, focus groups.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Currie (2002)</strong> UK</td>
<td><strong>O’Connell and Penney (2001)</strong> Australia.</td>
<td>Identify content requirements of handover in the ED and ICU.</td>
<td>ED nurses</td>
<td>Questionnaire.</td>
</tr>
<tr>
<td><strong>Horwitz, et al., (2009)</strong> USA.</td>
<td></td>
<td>Investigate functions of nurses’ communication during shift-to-shift handover.</td>
<td></td>
<td>Data matched with field notes of non-verbal communication</td>
</tr>
<tr>
<td><strong>Strange (1996)</strong> UK</td>
<td></td>
<td></td>
<td></td>
<td>Interviews and examination of documented care.</td>
</tr>
</tbody>
</table>

**Chapter 2: Literature Review**
<table>
<thead>
<tr>
<th>Reference</th>
<th>Country</th>
<th>Study Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owen, et al., (2009)</td>
<td>Australia</td>
<td>Investigate perceptions by paramedics and hospital receiving staff about what enables and constrains handover in the ED.</td>
</tr>
<tr>
<td>Ye, et al., (2007)</td>
<td>Australia</td>
<td>Determine problems resulting from the ED handover, deficits in procedures and if patient care or ED processes are adversely affected.</td>
</tr>
<tr>
<td>Bomba and Prakash (2005)</td>
<td>Australia</td>
<td>Analyse communication process during handover and identify common problems.</td>
</tr>
</tbody>
</table>

**KEY**

ED = Emergency Department, TT= Trauma Team, TTL= Trauma Team Leader, QI= Quality Improvement, RNs= Registered Nurses, OT= Operating Theatre, RNs= Registered Nurses, ICU = Intensive Care Unit, IM= Internal Medicine, ACSQHC= Australian Council for Safety and Quality in Health Care, BNI – British Nursing Index.
<table>
<thead>
<tr>
<th>Authors, Year, Origin</th>
<th>Aim</th>
<th>1. Population 2. Sample size 3. Design</th>
<th>Findings &amp; important considerations</th>
<th>Strengths (S) &amp; Limitations (L)</th>
</tr>
</thead>
</table>
| Wong & Petchell (2003), Australia | Estimate use of trauma teams in Australian hospitals & composition, leadership & activation criteria | 1. Trauma Teams (TTs) in Australia. 2. 111 hospitals (response rate of 57% - 74 hospitals) remaining hospitals contacted to achieve 100% response rate. 3. Questionaries with follow up | - 56% hospitals had a TT, 95% placed TT on standby or assembled in response to pre-hospital information  
- Not all hospitals have ED consultant are often unavailable/difficult to contact  
- Reasons for no TT: not enough doctors; too few trauma patients; surgeons have commitments elsewhere/no interest; insufficient expertise; no perceived need; too close to a major trauma service  
- TT uptake, composition, activation & after hours changes variable | S-100% response rate |
| Lavoie, et al. (2003), Canada | Identify current distribution of Trauma Team Leader (TTL) role in Canada | 1. Trauma centres in Canada 2. 30 trauma centres in 9/10 Canadian provinces | - Majority of TTLs surgeons, with ED physicians with no difference in care outcomes identified.  
- Lack of clear description of number of severe trauma cases or TT activations/year | L-Only gathered at one location, Data analysis not discussed |
| Xiao & Moss (2001), USA | Identify practices to ensure reliability in teams with high failure risk | 1. Trauma Teams 2. 50 patient cases, 23 semi-structured interviews staff. 3. Observation, semi-structured interviews | Underlying strategies to ensure highly reliable, failure resistant performance in TTs were;  
- Learning & trusting other roles in the team  
- Highly shared responsibilities  
- Ensuring team awareness  
- Adaptive/anticipatory teams  
- Areas that were most deficient were;  
  - Failure to write the history on the whiteboard  
  - Failure to communicate clearly with other team members  
- Next step in improving trauma care is improve communication within TT | L-Method- produces only one version of events, - allows for focus bias (i.e. on the TTL role), Small study, one centre |
| Sugrue, et al. (1995), Australia | Measure overall performance of TTL role in Liverpool Hospital | 1. TTLs in Liverpool Hospital 2. 50 consecutive TT activations over 2 month during 0800-1700hrs 3. Observation | - Six major categories identified as affecting TT process & interactions including- Leadership, Role competence, Conflict, Communication (fundamental to TT performance), Environment (noisy, affecting interactions), Patient status & acuity  
- TT education should include leadership skills, team management skills, inter-professional team work, conflict resolution, | |
Chapter 2: Literature Review

MacKenzie, et al., (2004), USA
- Video task analysis methodology for research data, & analysis
- 1. TT Anaesthesia care providers
- 2. 48 videos of trauma cases
- 3. Retrospective Video analysis during tape review, semi-structured interviews, Questionnaires

Bergs, et al., (2005), Netherlands
- Describe & evaluate communication during multidisciplinary trauma resuscitation
- 1. Trauma resuscitation teams (Multidisciplinary)
- 2. 205 resuscitations (12 lost due to technical problems)
- 3. Observation over 4 months in 2003. Resuscitations prospectively & consecutively evaluated with criteria

Howard, et al., (2006), USA
- Assess statistical significance of missed injuries using tertiary exam at level II trauma centre
- 1. Trauma patients
- 2. 90 patients
- 3. Observational prospective study- implementation of trauma tertiary exam form & missing injuries tabulated

Curtis, (2001), Australia
- Identify issues relating to nursing care of Trauma patients
- 1. Nurses providing trauma care
- 2. 4 groups of 6-8 nurses (purposive sampling)
- 3. Focus groups with consistent moderator, followed questions & prompts, thematic analysis

Xiao, et al., (2007), USA
- How a traditional whiteboard in operating theatre can support communication in dynamic &
- 1. Communication & interaction of staff with a whiteboard in an operating theatre
- 2. 1 whiteboard in a 6 bed surgical suite dedicated to trauma service over 5 years

- Failure to communicate a common error, time & peer pressure stress were evident during intubating unstable or combative patients
- The cognitive function from video records can provide insights to the team’s cognitive function, often assessed verbally, video allows non-verbal communication to be assessed along with verbal-important as communication often non-verbal in nature
- Structured communication more essential in major trauma cases - group dynamics are more complex & consequences of mistakes likely more severe
- Audible communication more frequent in major trauma team
- Clear absence of knowledge transfer during resuscitation
- Audibility of communication measured but not effectiveness
- Identified the need for structured verbal communication during trauma care provision

- Communication was most important issue & affected nursing practice, patient care, & nurses’ feelings of themselves
- Effective communication required;
  - An appropriate knowledge base
  - A range of behavioural skills
  - A positive attitude towards communication
  - The availability of opportunities to communicate

- 8 ways the whiteboard supported collaborative work were identified:
  - Task management, Team attention management, Task status tracking, Task articulation, Resource planning & tracking, Synchronous & Asynchronous communication, Multidisciplinary problem solving & negotiation, Socialisation & team building
- Characteristics improving the communicative workplace using the

S- observable; reveals covert actions/events
L-Time intensive; poor audio quality; rationalisation during review due to known outcomes
S- Physicians focused-peer observation, Study population relevant to other TTs
L-Culture affects applicability, communication effectiveness not measured
S-Results reflective of other studies
L-Not every trauma patient had a tertiary survey
L-Focus group method, nurses only - one data collection tool, Some themes discussed findings not apparent in findings discussion
L- Only conducted at one site - questionable generalisability, descriptive summary, Analysis process open to individual interpretation & possible bias of the
3. Ethnography-Observation by 10 people over 5 years using the Distributed Cognition Model (DCM) - 300 Photographs of the whiteboard taken

- Location & installation for common information space
- Interactivity & usability
- Expressiveness
- Visibility of transition points to support articulation work

KEY

ED = Emergency Department, TT = Trauma Team, TTL = Trauma Team Leader
Table S2. Issues of Communication

<table>
<thead>
<tr>
<th>Authors, Year, Origin</th>
<th>Aim</th>
<th>1. Population</th>
<th>2. Sample size</th>
<th>3. Design</th>
<th>Findings and important considerations</th>
<th>Strengths (S) &amp; Limitations (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miller, et al. (2009) USA</td>
<td>Measure markers of key nursing behaviours in interdisciplinary teams during critical events to assess the extent of high reliability</td>
<td>1. Health care team members in labour rooms in 3 hospitals</td>
<td>2. 420 staff</td>
<td>3. In situ simulation based on actual events. Designed to prompt skills like leadership, situational awareness, SBAR-R, closed loop communication &amp; shared mental model</td>
<td>- Inconsistent display of skills by nurses to ensure high reliability-constitutes breaches in defensive barriers necessary for ensuring patient safety&lt;br&gt;- Nurses impact on team performance through transfer of critical information to teams.&lt;br&gt;- A key element of a highly reliable team is shared understanding of information vital to patient care. Nurses play a major role in verifying &amp; communicating with all team members to ensure care decisions are based on all/correct clinical information.&lt;br&gt;- Nurses as individual caregivers can impact on safety of the patient at point of care through effective communication &amp; require training to do this.&lt;br&gt;- Trauma management variations through all care phases associated with a 10% (initial assessment) &amp; 9% (resuscitation) incidence of preventable morbidity &amp; mortality respectively due to missed injuries.&lt;br&gt;- QI data in following care phases included other care areas but showed most QI indicators were present in the Emergency Room (n=218) , wards (n=54) &amp; operating room &amp; ICU/IMCU (n=36 each).&lt;br&gt;- Preventable morbidity &amp; mortality highest in the ER &amp; were variable throughout other areas.&lt;br&gt;- Communication becomes difficult with patient overload.</td>
<td>S-High fidelity simulation based on real critical events that occurred.&lt;br&gt;L-Simulation is not authentic team interactions. Forced errors written into scenarios were specific to context therefore may impact on generalisability of outcomes&lt;br&gt;S-All care for all patients was undertaken at the one hospital, so data is consistent for comparison in the study group.&lt;br&gt;L-Clarity of processes was poor.</td>
</tr>
<tr>
<td>Al-Naami, et al. (2003) Saudi Arabia</td>
<td>Evaluate Quality Improvement (QI) data following a mass casualty event &amp; it’s on trauma care process &amp; outcomes</td>
<td>1. All involved in a single motor vehicle crash</td>
<td>2. 103 injured patients. Excluded patients who did not survive initial resuscitation</td>
<td>3. Pilot study, Pre-designed QI forms used to collect data- from admission - 8 weeks post trauma.</td>
<td>- Interruptions common, varied in nature &amp; source; average interruptions every 9mins for attending physician &amp; 14mins for residents.&lt;br&gt;- Workflow analysis shows gaps in information flow due to multitasking &amp; shift changes.&lt;br&gt;- Information transfer began at discernable points (shift change/hand-offs) &amp; continued through other activities (e.g. documentation, consultation, teaching activities, &amp; using computer resources).&lt;br&gt;- The nature of the communication process in the ED is complex &amp; cognitively taxing for clinicians which can compromise patient safety.</td>
<td>L- Specific to one ED, in a North America</td>
</tr>
<tr>
<td>Laxmisan, et al. (2007) USA</td>
<td>Identify factors that constrain safe decision making in patient care in the ED. Focussed on the nature of interruptions, multitasking &amp;</td>
<td>1. Physicians in emergency departments in decision making capacities</td>
<td>2. Number of physicians not discussed, observation taken over 3 month period.</td>
<td>3. Non-participant observation, semi-structured interviews.</td>
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</tr>
</tbody>
</table>
shift change  Ethnography in method & grounded theory in analysis of data

- Effective functioning of ED is dependent on human aspects. Technology plays an important role in the ED but is not at full potential & is dependent on the efficiency of other departments (e.g. radiology, laboratory, pharmacy)
- Multitasking is a necessary skill, but may be overwhelmed with high attendance numbers
- Higher risk for errors in relation to flow of patients at triage, overlap between patient assessment & the staff member multitasking according to assessment findings

Snow, et al., (2009) USA

Policy statement for transitions of care


- 5 principles for effective care transitions developed by the Stepping Up To The Plate Alliance of the American Board of Internal Medicine Foundation are: accountability; clear, direct communication of treatment & follow-up expectations; timely feedback & feed-forward of information; involvement of the patient & family member, (unless inappropriate in all steps); respect of the hub of coordination of care
- The following 8 standards of care transitions developed to uphold the above principles are:
  o Coordinating Clinicians
  o Care Plans & Transition records
  o Communication infrastructure
  o Standard communication formats
  o Transition responsibility
  o Timeliness
  o Community standards
  o Measurement

KEY  ED = Emergency Department, ER= Emergency Room, ICU= Intensive Care Unit, IMCU= Intermediate Care Unit, QI= Quality Improvement, SBAR-R = Mnemonic for communication structure meaning: S-Situational awareness, B- background, A- Assessment, R-R –recommendation-response
Table S3. Issues of Documentation

<table>
<thead>
<tr>
<th>Authors, Year, Origin</th>
<th>Aim</th>
<th>Population 1.1.</th>
<th>Sample size 1.2.</th>
<th>Design 1.3.</th>
<th>Findings and important considerations</th>
<th>Strengths (S) &amp; Limitations (L)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pape, et al., (2000)</td>
<td>Identify modes &amp; options for European trauma care documentation standardisation</td>
<td>Trauma documentation systems in Europe</td>
<td>3 systems in 3 countries</td>
<td>Comparative review of documentation system</td>
<td>Major issue in all registries was documentation quality. Data completeness reliant on amount of data collection needed. Education of those documenting is crucial to documentation completeness</td>
<td>S- Goal - standardisation across Europe, examples of registry’s documentation  L- cost calculation discussion does not fit discussion</td>
</tr>
<tr>
<td>Probst, et al., (2006)</td>
<td>Demonstrate lessons learnt from &gt;10years of trauma documentation. Identify possible changes as a result of changes in communication &amp; medical &amp; economic requirements</td>
<td>Literature on trauma registry &amp; documentation</td>
<td>Trauma registry databases from 7 countries, United States of America, United Kingdom, Canada, France, Victoria (Australia), Euro-TARN (Europe), Germany.</td>
<td>Database &amp; literature search, comparative review using specified success parameters.</td>
<td>Systems differ greatly in regard to documentation. Success of documentation is difficult to measure. No data is available so far for rate of insufficient documentation  Overall beneficial influence of the documentation systems  Datasets of the registries are comparable in terms of general data &amp; trauma diagnosis  Three aspects relevant to future development; o Data entry should be facilitated as much as possible o Trauma documentation systems should facilitate the recruitment of financial support o A minimum dataset should be used to satisfy primary goals &amp; completeness of documentation systems – a constant effort is required to minimise the inconsistent &amp; incomplete datasets &amp; publish the rate of these datasets left in their database</td>
<td>S- Shows current comparative state of trauma systems internationally  L- No information on why the registries were chosen other than reputation from Medline &amp; Cochrane database findings</td>
</tr>
<tr>
<td>Bjorvell, et al., (2002)</td>
<td>Evaluate long-term effects of intervention on</td>
<td>RNs in a University Hospital in Sweden 269 patient records</td>
<td></td>
<td></td>
<td>Evidence of improved documentation over long time - without continued support, improvement was difficult to maintain</td>
<td>S- Measurement over long time, multifaceted intervention, Change</td>
</tr>
<tr>
<td>Study Reference</td>
<td>Country</td>
<td>Methodology and Findings</td>
<td></td>
<td></td>
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<td>----------------------------------------------------------------------------------------</td>
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</tr>
<tr>
<td>Bjorvell, et al., (2003)</td>
<td>Sweden</td>
<td>Quasi-experimental longitudinal design. Standardised forms improved documentation content for longer yrs. Most participants felt nursing documentation is important for patient safety. Most RN’s agreed written documentation could replace verbal handovers. Insufficient time &amp; physical facilities major barriers to documentation. Most felt had enough knowledge to document. Authors acknowledge this may be because of the intensive implementation of the VIPS model in Sweden over the previous few yrs.</td>
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<tr>
<td>Saranto &amp; Kinnuenen</td>
<td>Finland</td>
<td>Literature review. Many designs for researching documentation employed, but were typically retrospective. International collaboration is not evident- all studies using different audit tools, with validity of these tools rarely tested. Standardised documentation studies showed more positive outcomes than negative. Less electronic recording in practice then anticipated. Implications of poor or inaccurate documentation have legal &amp; quality care impact.</td>
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<td></td>
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<td>L- High staff turnover - diluting effects over time.</td>
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<td>L- No true control group due to the nation-wide intervention of the VIPS model.</td>
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<td></td>
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<td>Demographics of groups was different but no analysis about this as an effect on outcomes</td>
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<tr>
<td></td>
<td></td>
<td>L- VIPS model = intervention for the study group. No true control group due to the nation-wide intervention of the VIPS model.</td>
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<tr>
<td></td>
<td></td>
<td>S- Data collection tool informed by literature &amp; piloted.</td>
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<td>L- Process reliant on reasons for implementation &amp; usefulness of outcomes.</td>
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<td></td>
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<td>S- clear collection &amp; synthesis reporting.</td>
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<tr>
<td></td>
<td></td>
<td>L – limited to nursing documentation only but discusses patient charts as mostly being multidisciplinary, search limited to 3 databases.</td>
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</tbody>
</table>
Epping, Victoria, Australia

To examine the effect of written ED nursing practice standards augmented by an in-service education programme on the documentation of the initial nursing assessment

1. Emergency nurses documenting initial assessment on adult patients presenting with chest pain & triaged to general care cubicles
2. Pre-test group n=78, post-tests group n=74 randomly selected from identified patient groups
3. Pre-test/post-test design

- Intervention included a series of written nursing standards with in-service education & real chart examples of documentation – PQRST used as a particular assessment measure
- Results post-intervention included:
  - Improvements in documentation of all variables assessed except for quality of pain
  - Significant improvements in documentation of historical variables both in pre-hospital care, cardiac risk predictors & past medical history
  - Improvements were variable for documentation of some elements of the primary survey
  - Highlights the issue of organisational change & trying to change behaviours, further study needed on the relationship of interventions to actual behaviour changes

KEY
RN= Registered Nurses, VIPs model = standardised documentation model name, PQRST= assessment mnemonic for Provoking/palliatiing factors, Quality, Region and Radiation, Severity and Timing

S- Use of random selection of charts for review, no major changes to ED policy in this time & no other identifiable confounding variables to influence findings
L- Use of historical control group
Table S4. Issues in Clinical Handover

<table>
<thead>
<tr>
<th>Authors, Year, Origin</th>
<th>Aim</th>
<th>1. Population</th>
<th>2. Sample size</th>
<th>3. Design</th>
<th>Findings and important considerations</th>
<th>Strengths (S) &amp; Limitations (L)</th>
</tr>
</thead>
</table>
| Australian Council for Safety & Quality in Health Care (2005) Australia | Conduct a literature review on clinical handover & patient safety | Literature review. Inclusion criteria published after 1994, English, search terms: handover, communication between shift variables, & patient or customer outcomes | 3 factors impacting on patient safety from clinical handover:  
- **System factors** = the organisation processes, continuity of care, policy & research, lack of agreement of what is best practice  
- **Organisational cultural factors** = communication components, organisation culture & context, staff skills, communication policy, comprehensive communication processes endorsed, evaluated & supported  
- **Individual Factors** = adequate expectation, measurement, development & support of good communication practices | - Clinical handover is high risk to patient safety with dangers of discontinuity of care, adverse events & legal claims of malpractice  
- High risk scenarios include:  
  - Inter-professional handover (e.g. between paramedics & ED staff), Inter-departmental handover (e.g. ED to ICU), Providing verbal only handover, use of abbreviation in handover, Patient characteristics (complex cases, mental health & behavioural emergency presentations)  
  - Interventions include:  
    - Minimum data sets & Information management, Standard operating protocols, Creation of new roles to assist in handover, Education & training, Electronic tools, Reflective methods, Change management, Handover types  
    - Evidence gaps in clinical handover include  
      - Professional anxiety & handover, Frameworks & handover, Work process mapping & design methods, Education & training of students, Electronic documentation & medical records, Legal dimensions | S-comprehensive systematic review |
| Wong, et al., (2008) Australia | Conduct a comprehensive review of the literature based on 5 questions on behalf of The Australian Commission for Safety & Quality in Health Care | Questions guiding the evidence based review were to identify:  
- The highest risk clinical handover situations for patients  
- Most effective clinical handover interventions; including critical success factors & limitations of interventions  
- Gaps in the evidence base on handover? And  
- Interventions which show evidence of sustainability & transferability | | S-handover viewed from a constructive view | |
| Messam & Pettifer | Identify & appraise what is | 1. Medline, CINAHL & British Nursing Index | | Discussed from a perspective of identifying & describing best practice | |

Chapter 2: Literature Review
known about best practice within nurse inter-shift handover & evaluate implications for practice within a specialist palliative care unit searched for: Reports, shift report, nurse handover, inter-shift report, palliative care, specialist palliative care, hospice, verbal & non-verbal handover, audiotaped handover, communication, multidisciplinary team. Articles limited to English from 1997-2009 2. 3 reports & 19 studies 3. literature review

1. Purpose (in addition to transferring patient care at shift change):
   a. Facilitating patient care
   b. Clinical decision making- assists in making sense of patient information & sharing judgements about care with oncoming nurses, allows construction & reconstruction of team goals for patient care
   c. Staff support & education- depending on type of handover style (verbal or audio taped) can provide differing levels of staff support & education. Whether staff support should be offered within the function of handover is raised

2. Type:
   a. Maintaining confidentiality while handling sensitive information
   b. Patient involvement

3. Content:
   a. Type of information involved – requires a framework to guide context specific content
      • It is possible to utilise Formula 1 & aviation principles to improve handover performance
      • A simple, easily trainable protocol at transition point can make a performance difference. The authors postulate this may be applicable to other areas of medicine where handovers are conducted frequently, under time pressure & with limited opportunities for training
      • The new protocol focused on leadership, task allocation, rhythm, standardised processes, checklists awareness, anticipation & communication
      • A reduction in errors & missed information at handover was measured
      • Similar characteristics between the studied agencies & the health care setting include; all made up of complex interconnected systems, are event driven, time-pressured, are resource-constrained, have the potential for high consequences for failure
      • Some unique experiences for patient handover not shared by the studied locations include: health care personnel do not have ‘at a glance’ overview status & historical displays, meaning that more information must be covered in a health care handover than in the studied groups

   L- Only limited to handover within shifts, limited number of databases searched, no studies beyond 2007 included.

Catchpole, et al., (2007) UK
Improve handover quality & safety for patients from OT to ICU using analogy of Formula 1 pit stop & aviation expertise
1. Ferrari racing team, health teams in OT & ICU
2. 50 patient handovers, 23 before intervention; 27 post-intervention
3. Prospective intervention with direct observation of handover

   • 1.Ferrari racing team, health teams in OT & ICU
   • A simple, easily trainable protocol at transition point can make a performance difference. The authors postulate this may be applicable to other areas of medicine where handovers are conducted frequently, under time pressure & with limited opportunities for training
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   • Some unique experiences for patient handover not shared by the studied locations include: health care personnel do not have ‘at a glance’ overview status & historical displays, meaning that more information must be covered in a health care handover than in the studied groups

   S- Large amounts of observation time to collect data
   L- data were collected for another purpose, generalisability of findings unknown

Patterson, et al., (2004) USA & Canada
Describe strategies employed during handoffs in four settings with high consequences for failure
1. Handover staff- NASA Space Centre, nuclear power plant, railroad dispatch centre & ambulance dispatch
2. 422 hrs observation. 69 staff.
3. Observation thematic analysis

   • Need for identified & uninterrupted time to complete handover
   • No structured or consistent approach to handovers
   • All RNs recognised importance of handovers & its influence on quality & positive approach

Explore patient handover & communication between ED & 1. RNs from ED & ICU
2. 12 individual interviews 16 in focus groups

   • Need for identified & uninterrupted time to complete handover
   • No structured or consistent approach to handovers
   • All RNs recognised importance of handovers & its influence on quality & positive approach

L- Small pilot study in a specialised area, Study size too small to examine patient mortality or morbidity outcomes as a result of reduced errors

L- Discrepancy of number of nurses the authors say were in the focus groups
<table>
<thead>
<tr>
<th>Study</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Currie (2002) UK</td>
<td>Identify content requirements of handover in the ED</td>
<td>Need handover guide &amp; collaborative approach for understanding of roles &amp; expectations. Key content: demographics, injury details &amp; current condition, medical history &amp; investigations. Key documentation to be exchanged: patient details, medical &amp; nursing notes, observation chart, investigations, fluid balance chart, drug chart. Problem areas identified included: missing, irrelevant or inaccurate information, distractions, lack of confidentiality, handover directed to nurse in charge rather than all nursing staff.</td>
</tr>
<tr>
<td>Manais &amp; Street (2000) Melbourne, Australia</td>
<td>Examine communication practices used among nurses during handover</td>
<td>5 major practises uncovered about nursing handover: 'Global handover' - intended to provide overview of patients, functioned as communication forum between nurse coordinators of the changing shifts; 'The examination' - scrutinised nurses &amp; their care; 'The tyranny of tidiness' - patient tidiness during bedside handover, nurses feelings of guilt; 'The tyranny of busyness' - compulsion to perform physical tasks at patient’s bedside area; 'The sense of finality' - nurses driven by need to finalise/complete tasks before handing over. Regardless of negative feelings experienced utilising these processes they were replicated.</td>
</tr>
<tr>
<td>O’Connell &amp; Penney (2001) Melbourne, Australia</td>
<td>Discuss strengths &amp; limitations of three handover methods (verbal in the office, tape-recorded, &amp; bedside handovers)</td>
<td>Information/content varied between nurses. Usefulness depended on the type of information handed over. Nurses more comfortable with verbal communication due to the changing context of practice - verbal culture in handover = more information likely to be lost. Regardless of the type of handover - gaps in information due to uncertainty about a patient. Fragmented communication between nurses &amp; medical officers exacerbated problems. Lots of time spent by nurses on oncoming shift finding missing, fragmented or uncertain patient information.</td>
</tr>
</tbody>
</table>

S- checklist piloted in similar area
L- Lack of detail given for checklist
S- Complete immersion of researchers in process, allowed investigation of undercurrents in communication not previously explored
L- Power struggles evident in group - result of researcher immersion
L- While there were three types of handover all were verbal, which serves the purpose for comparison but are variations of the same type of handover
L- Study did not ask nurses what they
<table>
<thead>
<tr>
<th>Source</th>
<th>Location</th>
<th>Research Design</th>
<th>Findings</th>
</tr>
</thead>
</table>
| Melbourne, Australia   | perceptions of handover & determine strengths & limitations of the handover process | 2. 176 nurses from 21 wards  
3. Survey - quantitative & qualitative data collected & analysed | information, information often subjective. Too time consuming & frequent interruptions; Nurses value handover from the nurse responsible for care, thus decreasing the risk of ‘Chinese whispers’ phenomenon.  
• Guidelines may help make handover more streamlined with relevant consistent information  
• Different groups of nurses may have different handover needs: Discrepancy between staff who had worked at organisation for a long time (thought handover was too long) & those who were casual or new (disagreed with this), regardless of years of experience.  
• Handover practices functions included:  
  o Informational – based on patient goals & information for care continuity  
  o Social – support, stress relief within safe environment  
  o Organisational – Immediate plans for the shift, allocation etc  
  o Educational – explicit teaching through examples, experiential learning & enculturation  
• Different phases had different functions & roles for the nurses  
• Handover is a highly complex communication event  
• Emergent themes is handover is a system with inherent tensions including:  
  o Formal vs. Informal processes  
  o Comprehensiveness vs. Overload  
  o Confidentiality vs. Family-centred care  
  o Single vs. Multiple functionality  
• Handover is robust & can still function with conflicting demands opposing tensions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Kerr (2002)            | Sheffield, UK.  | Understand handover practices & functions & their implications for effectiveness | 1. Nursing staff in shift handover on two paediatric wards  
2. 20 handovers, 12 individual interviews & 2 group interviews  
3. Cross-sectional, comparative, case study design. All interactions were audio taped. Observation (non-interventionist & semi-structured), semi-structured individual interviews, Group interviews at end of data collection phase  
 L-setting was specialised (paediatrics) & may have different issues in other contexts that deal with adult patients. Possibility for observer bias.  
• Handover practices functions included:  
  o Informational – based on patient goals & information for care continuity  
  o Social – support, stress relief within safe environment  
  o Organisational – Immediate plans for the shift, allocation etc  
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  o Single vs. Multiple functionality  
• Handover is robust & can still function with conflicting demands opposing tensions.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
2. 23 handovers  
3. Observation & audio taping, voluntary participation.  
 L-Actual documented information not compared with handover information. In analysis context of speech is lost if large passages are broken down. Represents one ward in one hospital.  
• Some handovers promoted confusion & often did not clarify issues regarding patient status, treatments or management  
• Haphazard nature of handovers may reflect haphazard nature of the shift, impacted on by nursing shortage, & number of casual nurses trying to ‘survive’ the shift.  
• If documentation sources are kept current, clear & concise, handover time could be shortened  
• Lack of clear guidelines for handover reporting  
• In handovers more than just simple information exchange occurred  
• Some handovers promoted confusion & often did not clarify issues regarding patient status, treatments or management  
• Haphazard nature of handovers may reflect haphazard nature of the shift, impacted on by nursing shortage, & number of casual nurses trying to ‘survive’ the shift.  
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• L-Actual documented information not compared with handover information. In analysis context of speech is lost if large passages are broken down. Represents one ward in one hospital.  

Lally (1999) 
Bristol, UK  
Investigate the functions of nurses communication during shift-to-shift handover  
1. Handover between nurses at shift change at one ward in general hospital.  
2. 6 handover reports  
3. Ethnography- Unstructured observation, audio tape recordings. Data recorded matched with field notes of non-verbal communication  
- Information transfer not the only function- also includes education, social interaction, team building & group cohesion. These multiple functions may be hidden at times & while the emphasis is on information transfer socialisation of new nurses & protection of ward processes also occurred.  
- Model developed for “symbolic interactionism” needs to be tested in other ward areas to be verified in different contexts – creates the handover as the place & time that nurses articulate, communicate & define their practice.  
L- could use semi-structured interviews as a way of triangulating observed data & compare handed over information with documented information for congruence between what was said, & documented patient condition.

Philpin (2006) 
Swansea, UK  
Part of a larger study- this articles explores & interprets elements of ritual & symbolism inherent in verbal bedside handovers & written accounts.  
1. Nurses in an Intensive Therapy Unit (ITU)  
2. 15 nurses  
3. Ethnography, interviews & examination of documented care  
- Along with transfer of information & responsibility of care both verbal & written reports convey essential meanings & group values  
- Both handover modes use visual & /or audible symbolic representations of care in the ITU  
- This representation confirms & validates acre given & espouses the value of nursing work within the unit.  
- Latent functions of handover are important to continuing commitment of nurses to care for patients & support each other.  
L- Limited to one ITU in one hospital so limits generalisability. Also dealing with a fluid concept of culture within a unit therefore may be difficult to apply elsewhere.

Gloucester & Bristol, UK  
Assess differences in information retention for various handover styles  
1. Nurses performing handover  
2. 5 volunteer nurses, 12 simulated patients, 5 consecutive handover cycles with 1 hour lapse between handovers  
3. Observation, descriptive analysis  
- Three styles evaluated in this simulation exercise – purely verbal, note-taking style (considered traditional), & a typed sheet with verbal handover  
- Degradation of data found in all three groups  
- Verbal only style experienced the most data loss, until no original or correct data was handed over for any of the simulated patients. This substitution was not present in the other handover styles  
- Note-taking group=steady data loss, less then verbal group. At end of 5 cycles- 31% of data was accurate  
- Group with typed page accompanying verbal handover had little data loss over 5 cycles  
- 30% of respondents reported an adverse event/near miss related to ED to inpatient handoff.  
- These were related to difficulties in communication, differences in  
S- Simulation= no ethical issues for outcomes affecting patient care  
L- Pilot study, Small study sample, simulated environment, therefore questionable for representation of actual practice  
L- Survey: some data would be more detailed & be verified if

Horwitz, et al., (2009) 
USA  
Identify, describe & categorise vulnerabilities in  
1. Medical officers & physician assistants from ED & IM

Chapter 2: Literature Review 48
Emergency Department (ED) to Internal Medicine (IM) patient transfers

2. 139 (of possible 236)
3. Cross-sectional survey study (pilot tested for clarity & content).
Financial incentive to win a book gift certificate for participating.

- Expectations, confusion of responsibility, lack of good information resources & work environment pressures.
- Hazards ED patient transition are complex & would likely resist simple solutions. Understanding where & why vulnerabilities occur important in designing interventions.
- Interactive communication integral to the quality of the transfer
- Contributions to error included:
  - Inaccurate & incomplete information (e.g. vital signs) & difficulty accessing key data
  - Cultural & professional conflicts
  - Crowding & high workload
  - Non-linear patient flow & “boarding” in the ED
  - Ambiguous responsibility for sign-out & follow up
- Failures in communication were implicated in most errors & included failure of message (due to no structure of what should be included & lead to a shared mental model)
- Failures of interpersonal relations (divergent across care areas & specialty groups- could be improved by having shared expectations for transfer)

Bruce & Suserud (2005) Boras, Sweden

- Explore nurses experiences receiving emergency patients from ambulance crews analysing handover & triage process
- 1. Emergency nurses
2. 6 nurses
3. Phenomenology- Qualitative descriptive interview study

- 3 elements to handover; a verbal report, handing over documentation, final symbolic handover when patient physically transferred to hospital bed.
- Verbal communication between ambulance personnel & nurses very structured
- Ideal handovers observed for patients with very clear & distinct medical problems
- ‘Difficult’ handovers were for patients with significantly more complex health issues & situations
- Handover was pivotal in ensuring correct care was given to the patient at an appropriate level
- Other important themes included the importance of experience-based knowledge for nurses, assessment skills & type of information provided for the home situation & acceptable content of the everyday handover in opposition to the trauma patient handover & resource allocation for patients who present for non-traumatic reasons.

Strange (1996) Devon, L-

- To discover the features & functions of
1. nurses in the handover process
2. One ward of one

- Found it difficult to separate technical functions of handover to that of ritual behaviour
- Discovered that handover served multiple functions;

L- single site study, some elements of findings will be specific to processes at that hospital

L- No reporting of sample size. Results may not be
Chapter 2: Literature Review

<table>
<thead>
<tr>
<th>Study</th>
<th>Country</th>
<th>Handover Methodology</th>
<th>Findings</th>
</tr>
</thead>
</table>
| United Kingdom everyday nursing handover | United Kingdom  | 1. Nursing staff who handover 2. 5 nursing staff, 5 handovers of 15 patients selected at random over 4 week period 3. Pre-post implementation, audit pro forma | - Staff were generally positive about using the implemented guide  
- There was significant improvement in 10 of the 13 categories studied  
- Identified the need to modify the guide to incorporate the ward team suggestions. The guide was measurable in that the staff could use it as a fill in pro forma for handover to accompany verbal handover  
- Seems to become a tested intervention only after the intervention was implemented |
| Fenton (2006) South Birmingham | United Kingdom   | To identify if the development of a guide for improving structure of handover was effective | - ED staff need to be aware that a lack of listening can cause frustration on part of the Ambulance service  
- Ambulance service staff MUST expect to repeat handover  
- Handover for critically ill patients should be delivered in 2 phases. Phase 1 = essential information given immediately, Phase 2 = after initial treatment has been undertaken rest of information should be given |
| Jenkin, et al. (2007) Plymouth, | United Kingdom   | To identify the current process of information transfer between ambulance staff & ED staff during patient handover | - ED staff mostly satisfied with handovers from paramedics  
- Perceived to be highly relevant except for behavioural presentations  
- Only 50% of staff reported referring to written handover reports from paramedics (may be due to already having verbal information & written handover not being available until at or after verbal handover. |
| Yong, et al. (2008), Melbourne, | Australia        | 1. To evaluate emergency clinician attitudes towards handover from 2. 51 (of possible 79) surveys. 311 (of 1068) | - Survey was piloted  
- Small scale. All data collected in one region & is self-reported. Survey with hospital staff only, so was not representative of the full sample population  
- Reasonable steps taken to decrease observer bias, but cannot rule out Hawthorne effect. |
<table>
<thead>
<tr>
<th>Study</th>
<th>Methodology</th>
<th>Findings</th>
</tr>
</thead>
</table>
  o Difficulties in creating a shared mental model of patient condition: often failed to understand each other’s context - contributed to by a lack of shared language.  
  o Tensions between ‘doing’ & ‘listening’: ED staff not always listening, tension existing between urgency to start patient care (ED staff) & listening to handover. Many distractions in this environment adds difficulty  
  o Fragmenting communication – ‘Chinese whispers’ [information being lost or changed during communication sequences]: - information changed during handover process. Most felt a lack of structured handover process contributed to this problem.  
  - Need to develop a common or shared language between ED & paramedic staff; develop shared experiences; & a standardised approach to handover. |
  - No reliable discussion of all patients who were identified to be of concern with few information tools being used to support handover  
  - Monday morning picture of events for patients over the weekend remained fragmented.  
  - After the intervention of introducing three information tools designed to enrich the ‘information environment’ results were that the tools supported greater continuity in who was discussed at handover but not the content of the discussion.  
  - Researchers need to exercise caution when intervening in an information environment.  
  - Handover is a complex process & tools for supporting handover can have significant impacts.  
  - The information environment is distinctly less important than face-to-face communication. |
tools. Pre & post-intervention observation engagement & communication. Tools (especially electronic tools) need to augment without distracting information transfer.

<table>
<thead>
<tr>
<th>Ye, et al., (2007) Melbourne, Australia</th>
<th>Determine problems resulting from the ED handover, deficiencies in current procedures &amp; whether patient care or ED processes are adversely affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Patient handovers by medical staff in the ED 2. 914 patients over 60 handover sessions in a 3 month period observed. 707 post handover surveys. 50 general surveys 3. Multi-site study in 3 Melbourne hospitals. Handover observation with checklist completed. Post handover survey of receiving doctors 2 hours after handover. General survey of all doctors about handover.</td>
<td></td>
</tr>
<tr>
<td>- Deficiencies in medical handovers exist, especially in communication &amp; disposition of patients. Significant difference in perceived quality of handovers when information was missing. - While most doctors (88%) thought handover was ‘good’, at times information was lacking (15.4%), especially management details of care (5%), investigations (4.7%), lack of disposition (4.7%). - As a result of these instances, in 8.8% of cases the ED/doctor were adversely affected, &amp; 4.7% time the patient was adversely affected. - Most doctors felt communication problems were with inpatient units, inaccurate &amp; incomplete information &amp; disorganisation. - Recommendations include o development of handover guidelines, o standardisations of handover processes, o greater use of information technologies as tools, o ongoing feedback to staff about handover performance o structured quality assurance &amp; education activities.</td>
<td></td>
</tr>
<tr>
<td>S-both perceptions of handover &amp; actual observations as measures improve validity of results. L-Observer effect could bias results; many study endpoints were subjective &amp; open to perception. Handover at nightshift was not observed. Handover format changed in two of the EDs during the study period. Results are specific to the types of handover processes used in the study hospitals.</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Borowitz, et al., (2008) Virginia, USA</th>
<th>To characterise the effectiveness of the sign-out process between resident physicians on an acute ward</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.Resident physicians in acute paediatric ward after night shift sign out 2. 158 (of possible 196) 3. Prospective study, survey</td>
<td></td>
</tr>
<tr>
<td>- Often important information is omitted from sign-out, was unstructured &amp; variable - Effective verbal communication is crucial to for transmission of patient information - Analysis of these missed opportunities can help develop education programme for residents - On ≥ 33% of nights an adverse event or unexpected event the doctors were not prepared for but could have been anticipated &amp; discussed at sign-out occurred. - Sign-out was not useful if the data provided was not up-to-date. - Important to include a rationale for care plan to understand context in case changes occur</td>
<td></td>
</tr>
<tr>
<td>S - Prospective design L - hindsight bias due to post on call survey. Single institution study</td>
<td></td>
</tr>
<tr>
<td>Author</td>
<td>Location</td>
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<tr>
<td>------------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>Yee, et al., 2009</td>
<td>Hobart, Tasmania, Australia</td>
</tr>
<tr>
<td>Quin, et al., 2009</td>
<td>Victoria, Australia</td>
</tr>
<tr>
<td>Bomba &amp; Prakash, 2005</td>
<td>Wollongong, Australia</td>
</tr>
</tbody>
</table>
KEY

ED = Emergency Department, ICU = Intensive Care Unit, IM = Internal Medicine, ITU = Intensive Therapy Unit, KPI’s = Key Performance Indicators, MDS = minimum data set, MET = Medical Emergency Team, SOP = standardised operating protocol, OT = Operating Theatre, RNs = Registered Nurses,
Table 2: Relationship of factors affecting information transfer for multi-trauma patients to themes

<table>
<thead>
<tr>
<th>Themes</th>
<th>Trauma Teams</th>
<th>Communication</th>
<th>Documentation</th>
<th>Handover</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Ethical elements</td>
<td>X</td>
<td></td>
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<tr>
<td>Legal elements</td>
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<tr>
<td>Team factors</td>
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<td>Patient factors</td>
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<td>Environment factors</td>
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<td>X</td>
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<tr>
<td>Process factors</td>
<td>X</td>
<td>X</td>
<td></td>
<td>X</td>
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<tr>
<td>Individual performance</td>
<td>X</td>
<td>X</td>
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<tr>
<td>elements</td>
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<tr>
<td>Resource factors</td>
<td>X</td>
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<td>X</td>
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<tr>
<td>Organisational factors</td>
<td>X</td>
<td>X</td>
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<td>X</td>
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</tbody>
</table>

End of published paper.
2.3 RATIONALE FOR STUDY AND CONCLUSION

The underlying issues identified from the published literature review included in this thesis were about communication processes, barriers and breakdown. This study aimed to identify barriers and conduits to information transfer, then develop strategies to overcome the barriers and improve the access, flow and consistency of trauma care information at the transition point of discharge from the ED. This has been an important development in trauma care considering that most multi-trauma patients require care from multiple care givers from different health care disciplines. Health care professionals are dependent on each other in order to provide ongoing care for these patients. Without communication processes that support and encourage continuity of information, patient care and recovery can be sub-optimal. If strategies could be developed to help improve information transfer and communication between healthcare professionals, the potential to improve resulting patient outcomes could be significant. The next chapter presents the multi-phase mixed methods approach taken to explore information transfer processes for multi-trauma patients on discharge from the ED.
Chapter 3: Method

3.1 INTRODUCTION

A range of issues in relation to communication processes during the care of multi-trauma patients upon transfer from the Emergency Department (ED) were highlighted in the literature review. Consultation with the staff in the clinical area where this current study took place confirmed that these issues regarding information transfer where also relevant in this context. These issues formed the basis of a plan for research so that they could be ethically and accurately studied (Hedrick, Bickman, & Rog, 1993) and assisted to define the scope of this study. In this chapter an overview of the methodology of the study is presented. A multi-phase, mixed-method approach was chosen in order to address the aim and to answer the research questions. The phases of the study are described, including data collection methods, sample and setting. Methods for data analysis and ethical considerations are also presented.

3.2 RESEARCH PURPOSE, AIMS AND QUESTIONS

The purpose of this study was to explore the information transfer process for the multi-trauma patient at discharge from the ED, to identify barriers and conduits to meaningful information transfer and to develop and evaluate strategies to improve this process.

This study sought to address three aims:

a) To identify best practice for information transfer from the ED for multi-trauma patients, as perceived by health professionals.

b) To identify and develop strategies that facilitate optimal information transfer from ED staff to other staff involved in the care of multi-trauma patients.

c) To measure the relationship between the use of the developed strategies and the accuracy, timeliness and completeness of handover communication, information flow and documentation of communication, compared to current practices.
Based on these aims seven research questions were developed.

1. How is patient information communicated at transition from the ED for multi-trauma patients?
2. What information should be conveyed at patient transition points?
3. According to trauma staff, are the current processes adequate for information transfer to occur?
4. What are the deficits in communication of trauma care on discharge from the ED?
5. What do clinicians caring for trauma patients at transition of care perceive as barriers preventing effective communication of information?
6. Which factors (people, resources and environmental) can improve communication?
7. Did the developed strategies improve patient care information recording, information flow and transfer?

3.3 DESIGN

The development of mixed method research as a viable and defendable design has been seen by many as the solution to the inherent gaps present in a wholly qualitative or quantitative design (Creswell, 2003). The assertions about qualitative and quantitative research as being best applied in a pure form have encountered many long standing arguments amongst researchers. Into this gap the ascendance of a mixed methods approach as an overall design is growing in popularity and practical application (Creswell, 2003; Tashakkori & Teddlie, 1998). While there are few examples of purely qualitative or quantitative studies, traditional qualitative and quantitative studies operate under a set of beliefs and values which are the polar opposites of each other and which focus the study from a particular paradigm (Tashakkori & Teddlie, 1998). Most researchers identify studies as falling somewhere along a continuum of qualitative to quantitative. Mixed method research takes a deliberate view of a paradigm that works from a pragmatist point of view. This point of view invites the deliberate, carefully considered use of both qualitative and quantitative methods to address the research problem (Creswell, 2003; Denscombe, 2007; Tashakkori & Teddlie, 1998). Denscombe
warned that misinterpretation of using a pragmatist paradigm could lead to a perception of ‘anything goes’ in choosing mixed methods and argued the need for matching the methods to the research questions and aims as vitally important. While debate continues about the compatibility of methods that are philosophically different, there are many arguments as to why mixed method research may be the best design choice for particular topics. This includes studies that require a rich description of an issue and a subsequent intervention. Both qualitative and quantitative approaches have been selected for pragmatic reasons to meet the design needs of the different phases and questions involved in this study. This approach was chosen to describe with detail one issue for which there was little written about in the literature and to measure the effects of the developed strategy.

All methods and approaches have biases and weaknesses, as well as strengths (Denscombe, 2007). By choosing methods that contribute different types of information and have different strengths and weaknesses, a balance between these can be achieved and this is referred to as triangulation of methods (Creswell, 2003). Alongside compensating strengths and weaknesses of methods, other arguments for utilising a mixed method approach include improved accuracy of findings by using method triangulation and gaining a more complete picture and understanding of the problem (Denscombe, 2007).

According to different sources, there are various definitions for mixed methods as a research design. The study design and overarching paradigm chosen for this study was pragmatic and included a combination of qualitative and quantitative approaches within the different phases of the study; these were chosen as the researcher was best able to investigate specific issues using these approaches (Tashakkori & Teddlie, 1998). Pragmatic knowledge claims ascend out of actions, situations and consequences and an ideal basis for finding solutions to real world problems (Creswell, 2003). As such the defined study problem is more important than the methods and researchers should use any method appropriate to gain an understanding of the problem (Creswell, 2003; Denscombe, 2007).
3.3.1 Theoretical basis for this investigation

A number of frameworks were used to augment this study’s design and conception. The overarching context for this study was continuity of care. Continuity of care is a concept that has been at the basis of many quality improvement concerns across the health care industry and has risen from the concerns of fragmentation of care for patients who often see many health care providers in various settings (Haggerty et al., 2003). Continuity of care has two core elements that set it apart from other descriptors of health care and include care of the individual patient and care delivered over time. Three types of continuity are identified by Haggerty et al., (2003), and these are:

*Informational continuity* - The use of information on past events and personal circumstances to make current care appropriate for each individual.

*Management continuity* - A consistent and coherent approach to the management of a health condition that was responsive to a patient’s changing needs.

*Relational continuity* - An ongoing therapeutic relationship between a patient and one or more providers.

(Haggerty et al., 2003, p. 1220).

Information was seen by these authors as the link that connects health providers and health care events that surround an individual patient’s care, and included information that was documented and that which was held in the health provider’s memories of the patient (Haggerty et al., 2003). Management was seen as working towards one purpose for the individual, which without continuity may see providers working at cross purposes. For management continuity to occur services are delivered “in a complementary and timely manner” (Haggerty et al., 2003, p. 1220). For management continuity to occur, informational continuity must be present. Relational continuity refers to linking both past and present care to that of future care. Even in care where establishing a relationship with one or more practitioners over a period of time is not possible, “a consistent core of staff involved in care provides patients with a sense of predictability and coherence” (Haggerty et al., 2003). Without informational and management continuity, issues such as those identified in the literature review can have
a significant impact on the patient’s care and outcomes. The construct of relational continuity as impacting on care is also considered in this study.

This study had three specific items for measurement of informational continuity: documented information, clinical handover processes as perceived by staff, and staff expectations of these two practices. As discussed in the literature, both clinical documentation and clinical handover are complex in nature. Jeffcott et al., (2009) discussed measurement of handover improvement for quality and safety as being complex as well, and as such required a mixed methods approach to allow these complexities to be explored.

Defining where handover and written documentation existed in the larger context of communication systems and organisation related to patient care was useful for conceptual purposes and the design of this study. Figure 3.1 illustrates the aspects of handover in relation to system constructs that handover exists within, the aspects of information transfer needed for successful handover, and, the aspects of responsibility and accountability. In the centre, the instances where handover is generally expected to formally occur are shown. How these aspects of handover relate to the three aspects of continuity was also considered in this study for the multi-trauma patient on discharge from the ED (a hospital department to hospital department transition point). Jeffcott et al., (2009) believed that effective handover could not be embedded into practice unless issues of culture and teamwork were understood and that handover only formed part of a complex adaptive system.

The model depicted in Figure 3.1 has been slightly modified. Under the heading Responsibility and Accountability, Jeffcott et al., (2009) notes the final aspect of this as Medical Culture. From the clinical context and research reported within the literature review the researcher felt this was not the most encompassing descriptor and changed the term Medical Culture to Clinical Culture (Figure 3.1). Clinical handover is undertaken by many disciplines aside from medicine and handover practices of the medical profession does not necessarily influence nursing handover style and as such needed a more comprehensive term applied. This model was specifically used to:

- plan and direct the research in as far as the type of questions chosen to prompt responses in the focus groups,
• how data was considered in groupings

• the data’s relationship to each other in the analysis and discussion of results,

• and finally who the stakeholders for outcomes of information transfer quality would be and how this impacted on the recommendations made.

Figure 3.1 - Defining handover- information, responsibility and accountability, and system elements (adapted from Jeffcott et al., 2009, p. 273)

3.4 SETTING

The setting for this study was one major metropolitan ED with a trauma service in Queensland, Australia. The context of the hospital was a tertiary referral centre, undergoing magnet credentialing.
3.5 PROCESS

This study was conducted as a four-phase, mixed method study. The method of inquiry was naturalistic in nature as it was carried out in a health care environment. Data collection for this study was planned to specifically address the research problem and questions, taking into consideration what was found in the literature and from anecdotal knowledge of the issues and challenges that may occur in the clinical environment of trauma care. This method of matching ‘what we want to know’ to ‘how we can find out that information’ was supported by a number of mixed method researchers (Creswell, 2003; Denscombe, 2007; Miles & Huberman, 1994).

The phases are discussed below in terms of design, population, data collection and data analysis. Phase 1 was context appraisal, Phase 2 was strategy development, Phase 3 was strategy implementation and Phase 4 was post-implementation data collection (Figure 3.2).

![Figure 3.2 Study design including phases and methods.](image-url)
3.6 PHASE 1 - CONTEXT APPRAISAL

In a concurrent study the quantitative and qualitative data collection may be presented in separate sections, but the analysis and interpretation combines the two forms of data to see convergence or similarity among the results. The structure of this type of mixed methods study does not make a clear distinction between qualitative and quantitative phases. Data integration in this study occurred when the qualitative and quantitative data were merged through a comparative approach or through data transformation. In this study some data were collected for triangulation (e.g. staff survey), rather than for exploration purposes alone (Creswell, 2009).

As there was little known about the problem of information transfer for multi-trauma patients at care transition points, the aim of this phase was to explore and describe what was currently occurring in the transfer of patient information upon discharge from the ED, what was reported in the literature and what could be deducted from other EDs, both nationally and internationally. This information informed the development and implementation of the subsequent phases to attempt to improve information transfer for multi-trauma patients upon discharge from the ED using the method of a strategy development working group. Methods in this phase included:

- staff consultations in the form of focus groups and questionnaires,
- collation and analysis of national and international practices, tools and strategies, and
- a patient chart audit for all trauma patients over a six-month period.

It was important to identify what was occurring within the context of multi-trauma care within the literature, from other health care institutions (analysis of national and international trauma forms), along with the hospital involved in this study. Organisations themselves have an effect on the behaviour of the staff within them (Robbins, Millett, Cacioppe, & Waters-Marsh, 1998). Professional standards and expectations also have an effect on clinician behaviours, for example, Australian Nursing and Midwifery Council competencies (ANMC) for RNs form the basis for contextualised practice and behaviour expectations in clinical areas (ANMC, 2005).
Information already known about the problem, as identified in the literature review, was used as the starting point for staff consultations with senior management at the study site, and as a framework for establishing significance (Creswell, 2003). The researcher conducted the literature review for this study to explore what was already known about the issue of information transfer for multi-trauma patients, along with the surrounding issues of communication, clinical handover, trauma teams and trauma care provision. Before commencing a study a researcher should have a comprehensive understanding of the topic (Creswell, 2003; Elliott, 2007; Polit, Beck, & Hungler, 2005; Roberts, 2002). As the aim of this study was to develop and evaluate strategies or tools to improve information transfer, it was prudent to assess what was already in use as support documentation and strategies or tools in similar health care delivery contexts.

3.6.1 Focus group interviews with staff

3.6.1.1 Sample

Participants for the focus groups were staff working in roles where patient information was communicated at transition points of care for multi-trauma patients leaving the ED. Focus group participants were informed that for this study, a multi-trauma patient was defined as having trauma to multiple body regions, where one region had an AIS of ≥ 3 and a second region had an AIS ≥ 2. These defining limits were suggested by the staff at the Queensland Trauma Registry, and supported by the trauma experts within the study site, as most patients who fell into these parameters were unwell enough to be transferred from ED to ICU, PERIOP or TSU directly. Ethics approval was obtained for this study and is discussed in section 3.9.5.1.

Clinical staff were identified by senior management of each area and an email inviting them to attend a focus group was forwarded by a department representative. Participants recruited included registered nurses (RNs) in the ED, Perioperative Services (PERIOP), High Dependency Unit (HDU), Trauma Services Unit (TSU) and Intensive Care Unit (ICU) and medical officers (MOs) from the ED and TSU. MOs in surgical, intensive care, neurosurgical and orthopaedic services were invited to take part in the study via their administrative assistants, but no participants were recruited from this group.

A total of five group interviews were conducted across the five departments for Phase 1. Group size ranged from three to ten participants. This group size was chosen to increase
the ability of scheduling the sessions to occur, as one concern identified by the researcher was the ability to ensure that group members had an opportunity for meaningful input (Denscombe, 2007; Happell, 2007). This group size was also supported by Denscombe (2007) who recommended an ideal group size of between six to nine people. One participant from the TSU was interviewed alone using the same questions as the focus group due to an inability to attend the group time.

3.6.1.2 Data collection

Trigger questions for the group interviews were formulated and refined by the researcher and supervisory team and were modified to the two contexts of giving the handover and transferring the patient (for the ED group) and receiving the handover and patient (all other areas) (see Appendix 1). Each group had the same facilitator and a stenographer who transposed the conversation in real time into a Word document.

Group dynamics were noted by the facilitator (primary researcher) and notes were written down immediately after each group. The group facilitator wrote short notes during the group’s discussion of the main ideas and verbally recapped the main points for the group to discuss or agree to after each trigger question had been thoroughly discussed. This directed the discussion to allow everyone who wished to speak to do so. Group members became very involved in seeking consensus and validation of the main points in discussion for particular topics. Transcripts were sent out to the group participants to validate the content of the conversations; however, perhaps due to the vigorous discussion within the focus group, no group members indicated any difference or amendment be made to the transcript.

Focus groups were used for a number of reasons. Primarily this method was chosen as it enabled access to a number of participants at once and all ideas and data gathered could be explored, confirmed, reinforced or contradicted within the group at the same time (Denscombe, 2007; Happell, 2007; Webb & Kevern, 2001). These participants also provided historical information about the context of emergency care presentations. As identified in the literature, communication of patient information is affected by a number of factors and these should be best described by the people involved, so that hidden factors affecting this communication can be uncovered or clarified. Advantages
of focus groups include these reasons, while still allowing the researcher to be in control of the line of questioning (Creswell, 2003).

Trigger questions for the groups to respond to included how different disciplines felt about the issue of information transfer and what processes were in place to facilitate information transfer. The researcher was able to identify processes around information transfer and associated issues from various perspectives amongst group members, an effect praised by one critique of using focus groups as a data collection method (Webb & Kevern, 2001). A clear focus and outline for the group to follow during the discussion avoided the discussion being dominated by one person (Denscombe, 2007; Happell, 2007; Webb & Kevern, 2001).

3.6.1.3 Data analysis

The data analysis process mirrored the ‘Qualitative Data Analysis Process’ described by Norwood (2010). This is an interactive process where stages of data analysis often overlap. The process stages include in-field reflection, data preparation, data familiarisation, searching for themes and patterns and interpreting and attaching meaning (Norwood, 2010).

In-field reflection is described as a stage which overlaps between data collection and data analysis (Norwood, 2010). In this stage the researcher reflects on the meaning and content of the data while collection continues. Preliminary insights gained from this may be used to guide future decisions regarding sampling, observation and interview questions. It is common for researchers to make field notes, reflective notes and observations about data collected and the context of other aspects of information gathering (Norwood, 2010). In this study the researcher made field notes that were considered alongside the data in the next stage of data analysis that is data preparation. Concepts and ideas identified in the first focus group were clarified and discussed in subsequent focus groups.

The next stage of data analysis was data preparation, where the data were organised and formatted in a way that assisted the process of analysis (Norwood, 2010). In this stage the data underwent a process called ‘cleaning the data’ (checking for errors, validating the data to check for completeness, formatting into wide spaced documents that
facilitated note taking, de-identifying participant names in the transcripts). This stage prepared the researcher for the next stage of data familiarisation (Norwood, 2010). In this study raw data from each group were sent as Word files to the participants within two weeks of each focus group for validation of content. Participants were de-identified in the transcript and referred to as P1, P2 etc.

The third stage of data analysis, data familiarisation, is described as an ‘immersion experience’ because the researcher reads and re-reads the data a number of times with a primary question to ask about the data of ‘What was going on here?’ (Norwood, 2010, p. 345). During this time the researcher made notes in the margins of the data to facilitate understanding of the data, relationships and other observations and highlighted data that seem relevant (Norwood, 2010). The data were read over a number of times by the researcher to become familiar with the content before coding and analysis of concepts and themes commenced (Denscombe, 2007; Graneheim & Lundman, 2004).

The fourth stage of data analysis was searching for themes and patterns which Norwood (2010) considered the core activity of the data analysis process and involved coding the raw data systematically in a way that separated the data into categories, noting regularities and variations to the coding of the data. Norwood (2010) described a code as “a symbol or abbreviation, such as a number, that is used to classify a word or phrase to represent a theme” (p. 345). A theme was described as “a recurring regularity that emerges from the analysis of qualitative data; it summarizes discrete words and phrases and creates a word picture” (Norwood, 2010, p. 345). Coding was validated within the research team and refined until agreement was reached about themes and subthemes.

The final stage of data analysis was interpreting and attaching meaning where the researcher moved away from describing the data themes and moved to discussing their meaning (Norwood, 2010). In this way descriptive and discrete themes were re-woven together to create a conceptual pattern. In this study the data were then analysed further into categories of factors that affected patient care and the way in which health professional’s work. Data from the focus groups were used to:

- inform the development of the strategy,
- guide the development of the patient chart audit tool, and
• guide the development of the staff survey.

### 3.6.2 Survey of staff that provide trauma care

The content of the staff survey was not planned *a priori*, but was developed in response to focus group information in an effort to validate these findings with a wider audience base from all ward areas. As such it has not been described in this chapter on the planned methods, but has been described within the results chapter (section 4.3.2) as it was developed after these results were obtained.

#### 3.6.2.1 Sample

Questionnaires were used to gather information from a wider sample (Denscombe, 2007) and identify whether staff agreed with the issues identified in the focus groups, while verifying the rich detail elicited in the focus groups. This form of data triangulation was used to measure the validity of the collected information and invited participants to expand on the issues identified.

Questionnaires were distributed to all five ward areas. The target population included all nursing and medical staff that provided trauma care for patients in the areas of ED, and nursing staff in PERIOP, HDU, TSU and ICU at the time of data collection. Each ward area was given enough copies of the questionnaire to cover all staff who worked with trauma patients.

#### 3.6.2.2 Data collection

Questionnaires were anonymous and contained multiple choice, fixed response (Likert Scale) questions and areas for comments and short answer questions (Elliott & Schneider, 2007). The fixed response questions used a four point scale that forced a positive or negative response, this was used to reduce social desirability bias often associated with using mid-point categories in Likert Scales (Garland, 1991). The survey questions were piloted within the research team and with two nurses from the clinical area and refined using this feedback before wider dissemination. In this way the researcher was able to identify content and face validity of the questions, which except
for five questions was 100% agreement. The questions that required refinement were all in regard to framing the question to meet all contexts’ understanding and interpretation. Once reframed agreement on all questions was reached. Reliability was not measured for this tool as the staff survey was primarily in place to confirm the themes identified from the focus group data. The researcher was specifically conducting the staff survey to triangulate the data collected and ensure that the themes identified in the focus groups were valid for a wider audience than could be accommodated in using the focus group method. The questionnaire was administered pre and post strategy implementation.

Questionnaires were chosen for two reasons:

1. The advantage of being able to access large numbers of staff working rotational shifts.
2. Staff from different ward areas may hold significantly varied opinions about issues related to information transfer for multi-trauma patients.

Questionnaires and an introduction letter were administered either directly by the contact person in the ward area (ED, PERIOP, HDU, TSU) or by internal mail (ICU). A sealed collection box was placed in the ward area’s staff room where staff who wished to participate placed their anonymous forms. Email and telephone reminders and ward visits were conducted two weeks after the questionnaires were delivered to the ward to remind staff about the study. Following this, one further week was allowed for final questionnaires to be filled in.

3.6.2.3 Data analysis

Data collated from the questionnaire were analysed according to a number of methods. Likert Scale questions were measured using ordinal measurement to show the relative ranking of the staff agreement (Fisher & Schneider, 2007). IBM SPSS Statistics for Windows, Version 21.0, Armonk New York (IBM Corporation, 2012) was used in the data analysis of the staff surveys and for all other statistical analysis. Significance was determined via an alpha level of 0.05 or less for all statistical tests. Open ended questions that allowed for short responses were analysed to identify if new or corroborating information was uncovered compared to the themes identified in the focus group data. Content analysis approaches were used to make sense of and collate the data.
gathered in the open ended questions. This analysis was undertaken by the student, then discussed and refined in consultation with the two supervisors.

### 3.6.3 National and international practices

#### 3.6.3.1 Scope

To gain a wider understanding of communication practices and tools/forms used to convey patient information at discharge from the ED transition point, a survey of national and international practices, forms, and tools designed to aid communication was conducted. The hospitals approached for this information were selected on the basis of comparable multi-trauma presentations to the study site and/or shared similar characteristics as an Australian tertiary referral trauma centre.

#### 3.6.3.2 Data collection

Three international and six Australian trauma coordinators were identified and sent an introductory email and request for information regarding communication of patient information practices on discharge from the ED. Copies of any forms/resources used to support written information transfer were requested. Telephone follow up for Australian contacts and email follow up for international contacts was attempted two weeks after the initial email to encourage resource sharing.

#### 3.6.3.3 Data analysis

Collected forms and resources from these contacts were compared and this information tabulated and presented to the strategy development group.

### 3.6.4 Patient chart audit

#### 3.6.4.1 Design and purpose

Due to the nature of shift work and the constant changes in staffing, a chart audit was an important measure of written communication, as this was the only existing record of patient information after verbal communication was completed. A patient chart audit was completed to establish a baseline assessment of documentation practices for post-
implementation comparison. This source of information may be seen as impartial, therefore improving credibility of the data and can form the basis of statistical data analysis (Denscombe, 2007). More importantly written communication is a professional expectation and a legal requirement in providing health care, and as such forms an important resource in the transfer of patient information between clinicians.

3.6.4.2 Sample

Charts to be audited were identified using the following patient characteristics:

a) Trauma to multiple body regions where 1 of the body regions had an AIS ≥3 and a second body region had an AIS ≥ 2 (regardless of body region)

b) Age ≥ 18yrs

c) Any injury type

d) Those who were discharged from the ED to any of the following ward areas- PERIOP, ICU, HDU

Patients were identified via a report from the Queensland Trauma Registry, based on these inclusion criteria. All charts from eligible patients who presented at the hospital site over a six month period pre strategy intervention (July-December 2009) and post implementation (August 2011-January 2012) were included. The inclusion and exclusion criteria were used to populate a list of patient care records that the researcher then accessed via the data custodian as per organisational requirements. All identified charts were targeted for auditing in both pre and post strategy intervention periods; however, due to a number of factors not all charts were accessible (for example, missing records, with coroner or off campus).

This sample size was a convenience sample. Six months of presentations was chosen as it was anticipated that the number of presentations would be sufficient to provide a representative sample of usual trauma patients. The same half of the year was chosen to collect data after the strategies had been implemented so that seasonal influence was not a factor to consider. In 2008 when this study was being planned for a 12 month period the trauma service in this hospital registered 365 patients who had trauma to multiple body regions, where at least one region had an Abbreviated Injury Scale (AIS) score of
≥3 and a second region had an AIS score ≥2 in 2006 (data obtained from the Queensland Trauma Registry, 2008).

3.6.4.3 Data collection

To undertake the patient chart audit, the researcher utilised a tool specifically developed to capture indicators of patient care information (see Appendix 2). The audit tool topic areas were created based on the topics previously identified as important in the literature as well as those that had been anecdotally noted as important during local Trauma Service meetings and review forums and included:

- trauma notes easily located
- legible (were the written words and numbers able to be read?)
- trauma notes were inclusive of both nursing and medical notes
- patient demographics
- patient condition/status at time of handover
- injury details
- investigations already undertaken
- treatment received for injury/injuries
- immediate treatment plan to be undertaken upon discharge from the ED
- associated orders (medication, investigations, surgery review/booking)
- past health history
- allergies
- co-morbidities identified, along with current treatments for same and medications
- social information (for example; next of kin, living arrangements)
- primary language spoken

This list was then refined and the audit tool was finalised after the focus groups were conducted. The last item on this list (primary language spoken) was not included on the
audit tool as many patients whose charts were audited were more likely to be unconscious or this information was unlikely to have been available at this time point in the documentation.

The audit tool was reviewed by the researcher and supervisory team and two other registered nurses with patient record auditing experience and refined before piloting. The audit tool was piloted using four patient records and concordance of data collected by the researcher and another registered nurse experienced in conducting chart audits but with minimal experience in trauma care. Agreement was reached for 96% of data collected, which led to the refinement of two questions as these two questions had caused alteration in concordance.

### 3.6.4.4 Data analysis

Descriptive statistical analysis was undertaken using nominal (yes/no answers within the tool) measurement (Fisher & Schneider, 2007). A limitation of the chart audit method is the reported mismatch in the literature between documented information and information verbally handed over. However, documented information is the only lasting record of information and was considered to be an important indicator of information transfer to aid ongoing care after the handover point. A generally accepted maxim within the health care profession is ‘if it was not written then it can be assumed that it was not done’ or perhaps handed over. Data were analysed using the Chi square test, Fisher’s exact test (where cell counts were 0 or where more than 20% of cells had a count <5) and the Mann-Whitney U test in the IBM SPSS data analysis software package (version 21) where distributions were not normal. The Mann-Whitney U test was the most appropriate test to use in the case of two non-parametric data sets (indicated in table 4.10).

### 3.7 Phase 2 - Strategy Development

A working group of staff drawn as volunteers from the focus groups and management of the ward areas was presented with the data from the questionnaires, literature review, and strategies and tools collected from other trauma services. A brainstorming session was held with representatives, predominantly nursing staff, from three of the identified
ward areas and medical staff from the ED, to develop strategies to be implemented to improve information transfer for multi-trauma patients upon discharge from the ED. The areas of PERIOP and ICU were unable to attend this meeting but were given the opportunity to contribute at another time. Management representatives from the ED and TSU were formally provided with these results, as there was a requirement for support and culture or behaviour change ratified by organisational management to enable the change to occur (Robbins et al., 1998). After considerable negotiation with ED management the strategies were trialled with small numbers of ED staff and then refined to a whole of department approach. A number of strategies made up the overall strategy and will be presented in the results chapter (Chapter 4). The implementation strategy was not planned a priori, but was developed in response to focus group themes identified, staff survey results, patient chart audit results, and national and international forms content analysis, and as such it has not been described in this chapter on the planned methods, but has been described within the results chapter (section 4.6) as it was developed after these results were obtained. However, the principles behind the intervention implementation are presented here.

3.8 PHASE 3 - STRATEGY IMPLEMENTATION

3.8.1 Design and purpose

In Phase 3 the developed tool and strategies were implemented over a period of six months. Change and the commitment to continue change according to a plan can be problematic. To assist with this, change agents or change champions were recruited to act as catalysts and assume some level of responsibility for the change (Robbins et al., 1998). In health care, change that requires process and culture changes like that of documentation and communication practices can be very challenging to maintain (Bjorvell et al., 2002). Bjorvell et al., (2002) implemented a six part intervention to improve nursing documentation for care plans in patient records. They postulated the use of change agents as being instrumental in achieving long term change in nursing documentation and stressed the importance of recruiting volunteers who were passionate about the issue. They found that without the combination of continued support for staff in the form of change agents, standardised forms and education sessions, change was difficult to maintain (Bjorvell et al., 2002).
Change agents have been attributed to being able to change structure, technology, physical settings and people (Robbins et al., 1998). Change agents can employ six general tactics for overcoming resistance to change if resistance is encountered. These include education and communication, participation, facilitation and support, negotiation, manipulation and cooperation and coercion (Robbins et al., 1998). In this study the use of change agents was employed in each area (ED, ICU, PERIOP, HDU), as change agents were seen to reduce barriers associated with change (Kotter, 1995).

Practice development in health care is a growing trend (Manley & McCormack, 2003). Manley and McCormack (2003, p. 22) promoted practice development as “all the activities necessary to achieve quality patient services, and this includes nursing innovation in practice settings”. They also argued that practice developers needed to be aware of and accountable for the evidence base underpinning decisions and actions as well as the assumptions, explicit values and beliefs that the practitioner held (Manley & McCormack, 2003). Manley and McCormack (2003) stated that in order to increase the effectiveness of patient centred care, health professionals must employ the following means:

- development of individual skills and knowledge,
- transform the culture and context of care,
- skilled facilitation of change,
- employ a systematic, rigorous and continuous change process.

The practice development framework utilised in this study was developed by the Royal College of Nursing Institute (the Promoting Action on Research Implementation in Health Services [PARIHS] framework). It is a multidimensional framework for implementing research into practice and summarised in the following equation:

\[ \text{SI} = f (E,C,F) \]

Where SI = successful implementation

\[ E = \text{evidence, C = context, F = facilitation and } f = \text{function of} \]

(Kitson, Harvey, & McCormack, 1998, p. 150)
This equation is made up of the dimensions of evidence, context and facilitation. The three dimensions are considered equally important and measured simultaneously, as there is no evidence as to which dimension best fits different problems and environments (Kitson et al., 1998). Evidence strength and its potential to be implemented needs to be considered from three perspectives – research, clinical experience and patient preferences. Context refers to the setting in which the practice development is proposed and facilitation is the technique used to make transition, change or learning easier for others (Kitson et al., 1998). Kitson et al., (1998) believed that for research implementation into practice to occur evidence, context and facilitation must all be ‘high’ or ‘positive’. This means that evidence must be relevant, specific and grounded in the clinical environment, and facilitated appropriately with the people involved. In this way staff engagement into the practice change is more likely, and can be referred to as ‘motivation to change’ when staff believe that ‘business as usual’ is no longer acceptable (Kotter, 1995).

Using evidence as a foundation to build changes to practice was a complex matter and involved an understanding of the terms used in Kitson et al.’s, (1998) framework for practice development. Context as one of these factors was complex enough to warrant further discussion for this study as there has been a significant body of work around communication in the health care setting but problems and issues pertaining to communication still persist.

Context in the health care setting can be described as having specific characteristics. In its simplistic form, context means the environment where care takes place (McCormack et al., 2002). However, the environment that makes up context is ever changing and made up of characteristics that are specific to an environment. Culture, leadership and evaluation are three characteristics that need to be explicit in a context for the possibility of successful practice change interventions to occur (McCormack et al., 2002). Building on Kitson et al.’s (1998) framework, McCormack et al., (2002) believed that for research evidence to be utilised as the basis for successful practice change, the characteristics of context had to be on the stronger side of the scale. Further argument is made that the characteristics and elements within the framework of understanding context may combine as a conduit or a barrier to change occurring in research
implementation. Therefore, research implementation should not go ahead without an explicit exploration of the context where change is proposed and implemented.

This reasoning was the basis for exploring factors specific to the problem of information transfer at the setting of this current study, through the use of a variety of methods as previously discussed. This was also the motivator for choosing the implementation method that involved representatives of staff and management from all of the ward areas affected by the changes implemented. The researcher felt that even though strategies implemented at this site had either been piloted and refined in other research projects or based on findings in other research projects (for example see Catchpole et al., 2007; McFetridge et al., 2007; O'Connell et al., 2008) their implementation should not go ahead without understanding the issues specific to the context at the site hospital.

The detailed revised PARIHS framework (Rycroft-Malone et al., 2002) with the three elements of evidence, context and facilitation placed on the continuum of effectiveness was used in planning and implementing the changes to practice articulated in the strategy development phase (see Appendix 3 for the framework). The actual strategies identified and trialled in this study form part of the study outcomes and as such are detailed in the results section of this thesis (Chapter 4).

3.8.2 Sample

The agreed strategies to improve information transfer were implemented at the transition point of discharge from the ED. This required active involvement from both the discharging and receiving teams. The target group was all staff caring for multi-trauma patients in the areas of ED, ICU, HDU and PERIOP.

Change agents in each area were chosen according to specific characteristics of leadership, communication skills and interest in the study topic. These were RNs who had volunteered to be involved after the researcher had presented the strategy to leadership groups in the nursing team (clinical nurses, clinical nurse consultants and executive management). One staff member (who was the department nurse educator) became the on-site contact and supervisor of the strategies implemented by the change agents and researcher. Regular planned communication between the change agents and researcher occurred to manage the implementation of strategies and any issues that
arose. The researcher became an official visiting scholar in the department to assist this process and was present in the department on a weekly basis. The change agent group was educated on their role before the implementation of strategies occurred and was debriefed at the end of the implementation period. The researcher also kept field notes to monitor issues and progress.

3.9 PHASE 4 - POST-IMPLEMENTATION DATA COLLECTION

3.9.1 Design and purpose

Patient care information transfer after the strategies had been implemented was measured in Phase 4. Staff perceptions of the effectiveness of the strategies and any other measurable changes were assessed by administering the same questionnaire used in Phase 1. In addition, informal verbal feedback from staff was encouraged and received. Participants were reminded of the results from the Phase 1 focus groups and invited to comment on any changes (positive and negative) to information transfer in this data collection time period. A post strategy intervention chart audit was undertaken in this phase using the same tool used in Phase 1.

3.9.2 Scope

3.9.2.1 Focus group interviews with staff

Staff involved from the beginning of the study (including change agents) were invited to join a focus group to give their perceptions of the strategy implementation and issues that arose.

3.9.2.2 Survey of staff who provide trauma care

In order for the staff survey to measure perceptions of information transfer, the population used was the same as that of Phase 1’s wider staff survey.

3.9.2.3 Chart audit

The chart audit targeted charts for 100% of multi-trauma patients presenting to the study site in the six-month post strategy intervention period (August 2011 – January 2012) using the process previously described (Section 3.5.4).
3.9.3 Data collection

3.9.3.1 Focus group interviews with staff

Focus group members were reminded of the issues identified in Phase 1 of the study and discussed these to give opinions on any changes to these issues. Staff were asked:

- to discuss their perceptions of whether the strategies implemented were responsible for any change,
- if there were any changes or new issues or strategies that could exist in relation to information transfer for multi-trauma patients that were previously not identified,
- to outline how they enacted the change agent role in implementing the strategies of the intervention.

Focus groups discussions were recorded by a stenographer in the same way as in Phase 1 and all other processes for data validation with group members remained the same as in Phase 1. Staff who were unable to attend the focus group time (due to shift work and the busyness of the unit on the days the meetings were held) were emailed the same triggers and invited to respond.

3.9.3.2 Survey of staff that provide trauma care

Questionnaires were administered using the same method as in Phase 1 (section 3.5.2).

3.9.3.3 Chart audit

The same tool used in Phase 2 was used to collect chart information in this phase (Appendix 2).

3.9.4 Data analysis

The analysis of data collected in the focus groups, staff survey and chart audit was conducted using the same method as that outlined for Phase 1 (section 3.5).
3.9.5 Ethical considerations

All researchers must consider ethical responsibilities involved in planning and conducting research studies. Generic principles as outlined in the Australian Code for the Responsible Conduct of Research (NHMRC, ARC, & Universities Australia, 2007) and the National Statement on Ethical Conduct in Human Research (NHMRC, ARC, & AVCC, 2007) must be applied to research conducted with human participants in Australia. Researchers have the responsibility to adhere to the values set of “respect for human beings, research merit and integrity, justice and beneficence” (NHMRC, ARC, & Universities Australia, 2007).

In this study this specifically included confidentiality; storage; management of research data and primary materials; consent of direct participants (RNs and MOs) and indirect participants (multi-trauma patient information); the ability of participants to withdraw from the study; and a possible power imbalance in the recruitment of participants (identifying participants through department gatekeepers). Ethics approval was granted by Metro South Human Research Ethics Committee (HREC/09/QPAH/081), Public Health Act approval from the Office of Health and Medical Research to access information in patient charts (in lieu of individual patient consent), and Griffith University Human Research Ethics Committee (NRS/20/09/HREC) [see Appendix 3].

3.9.5.1 Consent

Consent for all direct participants (medical and nursing staff for focus groups, working group and change agents) was voluntary and informed, and consent was able to be withdrawn by participants at any time without reprisal. This was an essential form of showing respect for autonomy and individual responsibility (Coup & Schneider, 2007). All processes used in obtaining informed consent for each group of participants adhered to the Griffith University guidelines on informed consent set out in the Research Ethics Manual Booklet 22: Informed consent in human research (Griffith University Human Research Ethics Committee & Office for Research, 2003).
3.9.5.1.1 Focus groups

As potential participants were identified by management, there may have been a perception of reduced choice in participation. Therefore, to help reduce this perception, a general notice was sent to all nursing staff and medical employees in the area informing them about the study and specifying that if they were invited to participate in focus groups, working groups or surveys that their participation was entirely voluntary. This document (Appendix 4) also explained that as part of this study changes to documents, processes and policies in regard to the issue of information transfer for multi-trauma patients might occur and staff participation in informing, managing and constructing these changes would be appreciated. This was to inform staff about the project and incite interest in being instrumental in performance improvement. It also allowed possible participants to be prepared to either accept or reject the invitation of involvement from the researcher. Focus group participants were invited to participate by email with an RSVP date of five working days from the invitation being issued to the department contact. An attachment included an informed consent form (Appendix 5) that detailed the requirements of their participation and the ability of the participant to withdraw from involvement at any time during the study. A follow up email was sent six days after the first invitation was sent asking for an immediate acceptance or refusal to participate.

3.9.5.1.2 Survey of staff

As the staff questionnaires (Appendix 6) were mailed (through hospital internal mail) or able to be picked up from a central point in the wards, consent to participate was implied upon return of the questionnaire. Questionnaires were not traceable to individual staff members.

3.9.5.1.3 Working group for strategy development

Participants from the focus groups and the wider departments were invited to extend their participation into the working party. Participation in focus groups did not require participation in the working group for strategy development. Invitations were sent by email with an RSVP date of no more than five days as done previously for the focus
groups and many participants were asked to volunteer at staff meetings, following presentations about the study by the researcher.

3.9.5.1.4 Change agents

Change agents were recruited as volunteers from the working group, and by open invitation following the presentation of the strategy and project at a leadership meeting organised through the ED executive management team. Informed written consent was required to become a change agent in the unit area.

3.9.5.2 Data storage

All transcripts, tapes and information gathered will be stored in a secure location for a minimum of five years upon completion of the study and will then be destroyed. These requirements were in line with hospital ethics guidelines as well as the National Health and Medical Research Council (NHMRC) guidelines.

3.9.5.3 Anonymity, confidentiality, beneficence and non-maleficence

Anonymity was assured for the staff survey, as no identifiers were present on the questionnaires. Focus group data were de-identified for reporting and analysis. The working party and change agents were visible and formed part of the staff and department ownership of strategy development and implementation and as such the participants were unable to be anonymous in these two areas of the study. Beneficence in this study related to the researcher’s responsibility to maximise the potential benefits of the study for the participants. In this case, the researcher was extremely observant about the transparency of decisions in regard to the strategy development and that choices made by participants were upheld, as the research was impacting on their clinical environment and clinical practice. Clarity of opinions expressed were transparent to the strategy development group members without undue bias from the researcher and to guard confidentiality of participant opinions, especially where they were non-favourable toward current situations that the research team were seeking to change as a means of ensuring non-maleficence – to do no harm.
3.10 CONCLUSION

A mixed method, four phase study was used to answer research questions relating to a range of issues identified about communication processes that occur during the transition of multi-trauma patients upon discharge from the ED. This chapter has presented an explanation of the methods employed during this study, the frameworks that guided the study and the ethical considerations employed in the implementation of this research.
Chapter 4: Results

4.1 INTRODUCTION

The results of this study, grouped by the methods used to collect data in the study (focus groups, staff survey, chart audit, intervention), are presented in this chapter. Where methods include both qualitative and quantitative data, results are presented according to the dominant emphasis of the data collection method. The aims of the study were to identify best practice and current practice, using focus groups, surveys and chart audits, formulate strategies to facilitate optimal information transfer using a strategy development group, and then to measure the impact of this intervention on staff perception of information transfer and documented patient data. Where data were collected both pre and post-intervention, results are presented so that pre and post-intervention data can be compared. Since the intervention was considered part of the results it is included within this chapter.

4.2 FOCUS GROUPS

Focus groups served a dual purpose in this study. They were designed to:

1. Explore barriers and conduits to information transfer and, by identifying themes in these data, also inform the development of the intervention. This information was then used as the basis for the staff survey, to validate the data from a wider sample.

2. Explore elements for a minimum data set of information required for multi-trauma patients to enable planning for the intervention, as well as developing an audit tool for the patients’ chart audit.

A total of five focus groups were conducted across five ward areas. Group membership was as follows:

- The Emergency Department (ED) comprised of one group with ten members; nine registered nurses and one medical officer.
• The High Dependency Unit (HDU) comprised of one group with three registered nurses.

• The Trauma Service Unit (TSU) comprised of one group of three registered nurses and a separate interview with the senior medical officer of the unit.

• The Perioperative unit (PERIOP) comprised of one group of five registered nurses from the areas of anaesthetics, operating theatres and post-operative care unit.

• The Intensive Care Unit (ICU) comprised of one group of six registered nurses.

The Medical Officer from the TSU group could not attend the focus group due to clinical workload but wished to give their opinion. This person was interviewed using the same questions as those used in the other focus groups.

The ideas explored in the focus groups included asking staff to recall two different multi-trauma patient transfers, one which was ideal and the other less than ideal. Staff were asked to identify the aspects, factors and processes of the transfer which made it go well or poorly. Staff were also asked to identify what specific information was important at handover for any multi-trauma patient, and if they thought documented information from treatment in the ED was important, useful and used to inform care.

As a result of using a stenographer in the groups to record the discussion, each group was informed that only one person could speak at a time, and they could not change seats during the session (as the stenographer would give each person an identifier so that speech threads could be located together, identifiers [e.g. P1, P2 etc.] were not matched with names of group members). However, even with this request agreed upon by group members in all of the groups interviewed, group members had to be reminded a number of times to allow someone else to finish speaking, often with two or three people trying to talk at once. This usually occurred over contention about a particular point that seemed important to the group (for example, what was important to handover for each patient). Group members interrupted each other often in order to clarify, or refute a particular point of view if they had an opposite point to present, often with an example of their experience as evidence. The ED group in particular became very involved in coming to a consensus about the main points of issue for this topic.
Results from the analysis of the data were first coded group by group, and the researcher then compared and contrasted data between groups to identify themes and sub themes. This process mirrored the analysis process described by Norwood (2010) outlined in Chapter 3. Four themes emerged from the data. The first three were variability, continuity and putting the pieces together. These three themes were all influenced by the fourth theme of values/context, which seemed to form the basis for identification of issues and good practices and was perceived to moderate how each theme influenced quality of information transfer (Figure 4.1).

![Diagram showing themes](image)

Figure 4.1 Themes from focus group data

### 4.2.1 Variability

In regards to different expectations among staff between wards and between disciplines variability was the first theme that emerged. Variation was related to skills, knowledge and the application of handing over information, documenting information and even deciding what needed to be documented or passed on. Within the theme of variability there were five subthemes including:

- expectations,
- skills or knowledge,
- information staff chose to hand over or document,
- quality of the information handover, and
- processes used
Each of these subthemes will now be discussed. Examples of how the subtheme was related to variability will also be presented.

4.2.1.1 Expectations

Expectations of handover and documentation were different between units because there was no standard in place for handover. Staff wanted to receive information relevant to the receiving ward and care focus, although priorities of care were different between areas. As Participant 4 from the Trauma Service Unit stated:

*I don't think the expectations are the same. They are two completely different environments. What the ED nurse hands over, she thinks it is useful from her environment. There is that lack of understanding from both departments. You don't know what that other person wants to get out of the handover process.*

TSU4

This was supported by Participant 1 from the Perioperative area:

*In a lot of ways, they (expectations of handover) are similar. Sometimes they are going into extra information in that acute part that we really don't care about. I have had times where they are trying to tell me where the patient's belongings have gone and that is not anything we care about at the time, especially with the big traumas. We are thinking of what we need to do to keep the patient alive, rather than where their bag is. I understand the ED nurses are trying to hand over the patient completely. At theatre we are trying to focus on the procedures we need to get done now and things like that.*

PERIOP1

Priorities affecting the focus of handover and expectations of handover were again pointed out by a participant from the Intensive Care Unit:

*Priorities of ED nurses are different. We are trying to get the patient stabilised. We would rather get them into the bed, connected to a ventilator or monitor and then talk about what's happening. They are wanting to give the report and you are trying to move the patient. Figure out what's important first and then talk about it later. Their priorities are completely different.*

ICU2
The culture between each ward area was also different and this could influence expectations of handover specific to their particular care area. This was hinted at earlier by Perioperative staff and was specifically stated below in an ICU nurse’s statement:

*A majority of it is cultural. Everybody has their own focus. ED do send patients all over the hospital. If they are sending someone to intensive care, then that patient is significantly sicker than the patient they send elsewhere and it is fair to ask for a little more thorough, a little more serious, even if it took outreach to go down there. It is for the betterment of the patient. It would be fair to ask that, to expect. I understand what their priorities are but the patient is the bottom line and, if they want continued care for someone they just spent four hours on, they should come up here knowing something. ICU2*

ED staff in particular reported that the different expectations between wards was challenging at handover of the patient. It was clear that different areas believed they should be able to have just the information they wanted/needed, whereas ED staff approached handover from the perspective of reporting what was done in ED rather than a looking forward perspective. Participant 8 illustrated this initially:

*Usually you are handing over and the two nurses are there to take the patient, move them across, change the transfusion, while they are listening to what you tell them. They have only taken in 30 percent of what you have told them. ED8*

Staff from different areas also reported that at times it was understandable and acceptable if some information was missing due to time element/high patient acuity and patient condition.

*If the information is skimpy, it is because they don't have it. If they say, "We don't know allergies." it is not because they have not bothered to look on the chart. They don't know. The patient was not conscious to be asked. With those handover cases, the handover is as good as it could be. PERIOP1*

Staff felt the variability in expectations of information required and handed over may be due to the influence of their work area, but may also be due to having no list to check off of expected information needed at handover. Staff agreed that clear expectations
were needed for all departments/staff to enable them to reduce fragmentation of information at handover, as serious outcomes can be attributed to poor information transfer.

Every institution I have worked at, there is the general animosity between nursing staff, especially in critical care areas... There is always animosity between ED, ICU and theatre... We are specialised in our little nook and our way is the right thing to do from our point of view. We want to hear handover, head to toe, chronological, covering everything, including the last time they wiped their bottom. ED and theatre don't care. I don't think we are going to find a perfect match. If we had a tick and flick, that would be so much easier. ICU3

It is the importance of the information. Some things I find it important; P8 might not. She might not find it appropriate to hand over but for me it is a big piece of the puzzle. ED9

A tick and flick form would make it a lot easier. “Tick, we have got the X-ray. Is the spine clear?” Their injuries are listed. That is something - if you were doing the transfer, you could go “I don't know the patient but...” - the belongings.... ICU6

4.2.1.2 Skills and knowledge

Variability in skills or knowledge was evident in staff perceptions about what was important to handover about patient care, how well different staff were able to give handover and cope with the variables that were not in their control (e.g. busyness of the ward, ensuring they had particular information before taking the patient out of the unit).

I think it depends on the person who is handing over. We have some people who hand over very well and some who don’t hand over very well. We have the complication of the bed management team in ICU. They get their initial handover from the bed management so they read off the triage screen. The problem is the handovers themselves are quite varied. There are some great handovers you would like to keep with the senior nurses looking after the patients all the time but that doesn't always happen. It is hard to pick something that is done all the time because so many different people are doing it. TSU1
4.2.1.3 Information staff chose to handover or document

The comprehensiveness and quality of the information that was handed over and documented was seen to be related to the previous subtheme of skills or knowledge of staff. If inexperienced staff were providing care then there could be more variation in what was seen as important to document or handover.

*What things go well and what things don't go well? I think it depends on the person who is handing over. We have some people who hand over very well and some who don't hand over very well.* TSU1

Variability existed in receiving enough information in enough time to provide appropriate patient care, as this could impact on resourcing and efficiency in the wards.

*The implication of not receiving a holistic handover from whoever it may be is that the person hits the ward. The nurse spends that time reading through the documents to find out from - what was missing out of the verbal handover that is found in the documents. It could be there and it couldn't be there. There is that time lag. Instead of saying, "I have received handover and I can plan what is happening."*, you need to re-read and revisit all the notes again. That would impact on the initial patient care. TSU2

Another factor that impacted on this was that patient care notes/charts were not always with the patient. Often the patient notes were with the doctor in another area, but due to the issues surrounding patient flow the patient needed to be transferred while that doctor was still writing or consulting with another team.

*We have a problem with paper notes not always coming up with the patient so we don't always have a plan. The nurse may not know that because the doctor has not told her. You will get the patient and you will say, "Are they nil by mouth?" The nurse may not know. You can't check the plan. The notes are not always present with the patient.* TSU1
The quality of information documented or handed over differed, and availability of information was widely variable, with staff reporting that it was common for the patient case notes to be delayed. In these cases only basic information accompanied the patient (e.g. medication orders, nursing notes with plans of care not present). The quality of information handed over could also impact on the acceptance of the handover, with culture of staff a factor in this, as illustrated by one Intensive Care staff member saying:

*A lot of times the nursing handover is not worth listening to. ED nurses are so rushed and so busy to get down and then back to the next one. Them saying to me - it is such a superficial handover. I just go, "Whatever", and insist on the medical one.* ICU4

The quality of the information issue was then compounded if the patient was transferred by a nurse from the ED who had not been caring for the patient. When this occurred trust in the handover was impacted on and a frustrated and dismissive attitude was displayed by receiving staff and a greater emphasis on documented information results (and also overlaps into the subtheme of continuity of multiple clinicians). This was evidenced below with a Trauma Service staff member describing trust issues, then an ICU staff member displaying a frustrated and dismissive approach, and thirdly a HDU staff member describing the impact on their handovers.

*That is a problem for not only the nurse leaving ED because she does not know the patient. It is also a problem for the nurse receiving the patient. It is hard to know how much to believe from a nurse who has not looked after them. You can't question them about anything.* TSU1

*If you don't know the patient, you are just the escort. If you don't know the patient, then shut up. Stand over to the side, help us move them over and let us listen to someone who does. Don't stand there and go, "I don't know anything about them." I don't care if you don't know. That's okay but shut up so I can listen to someone that does.* ICU3
If we got the nurse looking after the patient in emergency to escort the patient up and hand over, it would make a world of difference. HDU3

As noted previously by Perioperative staff, variability in the information documented could be impacted by the acuity of the patient, for example, when the life or limb of the patient was threatened; staff were often ‘doing’ rather than ‘writing’. This was supported further by TSU staff:

What was being done was not being recorded. It was acknowledged that documentation, because of the unwellness of the patient and the urgency to get procedures done, documentation got left...It is not because we sat around and did nothing. It was because we had other activities that were life or limb threatening procedures to be achieved and then documentation at the end. TSU2

Some ED staff also attributed poor documentation to the template that was in place at the time of the study being very difficult to use.

A big deal of the problem is our nursing form is exceedingly user unfriendly. I think that really compounds our handovers as well, the issues of missing things. I think it could be improved dramatically to reduce some of those issues. ED6

Communication and information varied and was affected by seniority of staff, emergency or acuity status of the patient and treating medical team/s. One important unanimous issue identified in each focus group was that no common or agreed upon data set for handover existed for multi-trauma patients. Each group agreed that a minimum data set was necessary to define and be the basis for handover and documentation. The agreed goal of documentation of patient care was that it be relevant, of high quality but essentially simple and straightforward.

Basically, every day is the same. You need same basic information. When you look at this documentation you must have a firm understanding to take adequate action and adequate knowledge about this patient. TSU-S1
4.2.1.4 Quality of information transfer

Variability also existed in what constituted good information transfer. Good information transfer consisted of three main elements. The first element was that comprehensive information about the patient and care given was handed over and written down. Second, that the person who provided nursing care for the patient during the resuscitation period was the one who handed the patient over. Finally, that information was accurate and systematic.

The goal of such documentation, it must be as simple as it can be but the quality as high as it could be. This is not to get too much information in this document... if you collect too much, you are asking for too much documentation...then nothing happens. Someone is writing something in there without making much sense. TSU-S1

It means you have got a good handover regarding the physical condition of the patient, the socioeconomic and emotional sections of what is happening with the patient. The management plan on top of all of that - that would be comprehensive. TSU3

It needs to be the person looking after the patient, not just somebody who walked on a shift and comes upstairs. TSU1

4.2.1.5 Processes used

Variability was reported to exist in processes used to transfer patient information, both for information at handover and information that was documented. Participants noted the need to have a standard set of information required at handover that mirrored the documentation required. Processes should also be short and simple to improve and maintain compliance rates with templates.

I don't know how you get round it. It doesn't matter how much paperwork it is, it is never completed. Whatever you do is going to have to be simple and easy because nobody complies. ED9

Handover was noted to have poor or no structure and was unsystematic. Participants felt this could be improved by having a systematic approach and focus on reporting trends...
in patient condition and response to treatment. Some staff suggested a form that could guide handover to improve performance and equalise expectations between different wards.

*I don't think there is a system in place for them to follow. Everybody tells you what they know and it is not always right.* HDU1

*Yes. A systems approach in handover would be great because it is clear and concise. You know what is happening in the system.* HDU2

Documentation processes were seen to need streamlining with an agreed protocol so that information that may be important later down the track was not missed, this protocol could also decrease duplication and missed information.

*What I see at the moment that we don't have, common documentation for the multi-trauma patients from ED all the way through to rehab. It is always separated. The vision would be that we have one agreed data set or documentation folder for those patients, starting in ED, which is then added with information from the trauma service, which is added to from the other specialties. This is more or less one running sheet from the beginning all the way through.* TSU-S1

Variability existed in regard to the detail within each sub-theme. Variability mostly related to staff performance, skills, knowledge and the culture of the unit they belonged to, as this affected the priorities of care, and was the basis for their handover focus.

### 4.2.2 Continuity

The next theme uncovered was labelled *continuity*, which was a term participants used to refer to people and relational discontinuity; evidence or impact of broken links in information transfer; having enough time and patient acuity and time of day; how information was transferred, and discrepancy or discontinuity of information.
Continuity or issues of discontinuity, was specifically seen in instances where links were maintained or broken in communication cycles, between disciplines, at transfer of the patient between wards and was argued by participants to directly affect patient care. Where continuity links were maintained, staff felt better patient outcomes were achieved. Where discontinuity occurred or links were broken, then this adversely affected the staff’s ability to care appropriately for the patient, thus impacting negatively on the patient’s outcomes.

4.2.2.1 Continuity of multiple clinicians

People and relational discontinuity was usually exacerbated if the nurse who provided care for the patient in the trauma area was not the person who transferred and handed over that patient. This has already been discussed briefly in a previous sub-theme (information staff chose to handover or document). This is highlighted in the following statement:

>You try to, for consistency, but if you have that swap of shift, the more swaps, the more links are broken in the communication. You try to keep the same person with the person who spent the time. But... (Participant shrugs) ED3

Another factor was the number of people involved in the care of these patients and the increased complexity in knowing who was responsible for what when multiple teams were involved in managing patient care. This was a common theme in all ward areas and was referred to multiple times. Below are selected comments from three of the ward areas to indicate the varying issues and impacts identified:

>Someone who just came on duty and the nurse was late getting off and she says, "I don't know this patient. I am just coming on, just transferring", that's quite a bit of a worry. ICU1

>This happens so often - we give the okay for the patient to be brought up via the phone. Quite often the nurse handing the patient over is the one that is taking over and is reading the patient's notes in the lift, trying to get some answers, because they know we are going to ask them - quite often when we ask that nurse questions about the patient, they will say "I don't know." If the nurse that
looked after the patient that whole shift brought the patient upstairs, it would be better. HDU3

One of the main targets for us is to get a good understanding which consultants are involved in the patient's care. We have a multidisciplinary team approach. We see between one to ... eight consultants from various groups involved in the care of the single patient... and you list all those different players as much as you know right from the beginning, which makes it much easier to follow up the patient within the system. This is just one example which is extremely important for the on-going management of a patient. You don't want to put them aside. You want to engage them appropriately. Every nurse, every medical staff still has to search for this information. TSU-S1

4.2.2.2 Broken links

Evidence or impact of these broken links was the next subtheme identified and related to the impact or effect that broken links in information transfer had on patients and their care, and on staff planning and managing care. Impact can take the form of duplication of patient information, inaccurate or missed information being perpetuated for a number of days, or patient information in multiple places within the chart making looking for information difficult and time consuming.

*I see duplication in information from the front door all the way through. We should rather streamline this to have more quality in the documentation. TSU-S1*

*We don't get a comprehensive list of injuries. TSU3*

*It is not always accurate. "The person was at 40km/hr but at 80km/hr somewhere else." That makes a big difference. TSU1*

*The next day on the ward round, the handover sheet will say it was the 4th rib and somebody else will say it was the 8th rib... That often happens on the ward round. We have a laugh and get out the X-ray to show which rib it was. TSU4*

*That missed communication can go on for days. That is a problem. TSU2*
Broken links also referred to documentation not showing an accurate picture of the patient care given, often due to the acuity of the patient and this links to the next subtheme of having enough time to follow through, as outlined by the following statements by Trauma Service Unit participants:

*I can only say from experience that it wasn't documented because it was too busy, not because I didn't do it. There would be other staff like that as well. I can't ask or say why other people wouldn't do it. I can only say why it happened for me.* TSU2

*It can have an impact on a patient, which is perhaps more important. At the end of the day, we may feed a patient who is supposedly going to theatre and we may cancel it. If we don't feed a patient when we could have, you have got inadequate nutrition so it has implications for the patient. It is most important for the patient.* TSU1

### 4.2.2.3 Time imperatives

Having enough time and patient acuity and time of day were all seen to be factors affecting broken links for information transfer. In relation to having enough time one ED nurse illustrated this well:

*It depends on time. You are scooping for time; you are writing as you are going up the lift.* ED3

Staff also discussed people rushing back to their work areas if they were busy, and so not taking enough time to comprehensively handover the patient.

*I think people are too quick to get back to their own area. It happens from ICU sometimes as well. People rush in, give you the patient. "Okay, well, I have got another patient to get back to" - so quick, quick, quick... People are too rushed, it seems, to give adequate handover and make sure we know everything that is going on.* HDU2
Patient acuity impacted on how much time was also spent at the handover, sometimes if the patient was deteriorating, or their condition had changed during transfer, then the handover would be cut short to attend to the patient’s needs.

_"I think time is one of the main factors...Any time I have experienced problems with transfers is when we are so rushed for time, we don't have time to stop and say, "Wait a minute. Start at the beginning, finish at the end." We just go in the middle._ ICU3

Time of day was an issue in some areas such as the perioperative area, the intensive care unit and the high dependency unit. For the perioperative area, night time was seen as easier to manage handover, however, in ICU this was the most difficult time of day for them to receive handover.

_... at night-time it is easier because the team is smaller...You know what each person is trying to get out of that handover. During the day-times, you have got a lot of people talking and nobody is getting all the information._ PERIOP1

_If it is the middle of the night, there are a lot less hands around so getting...handover...is difficult because you are putting them on to the bed and handover is going on while you are distracted and the pumps are beeping...handover continues while we are moving and we are missing data._ ICU6

### 4.2.2.4 Processes of information transfer

This description of this sub-theme illustrates findings about how various processes exacerbated the ‘broken links’ in information transfer. This included information often being received by the ward before the patient arrived (multiple times before patient arrival with updated information from various sources, e.g. bed manager, ED shift coordinator etc.), with varying levels of accuracy and specificity. Staff also discussed how the process of information transfer started at the time they were advised they were receiving a patient from the ED (which may have been be hours before they actually arrived). Handovers were usually single discipline and conducted by nursing staff, as medical handover was often given over the telephone and at varying points in the patient journey from the ED to the ward area.
The doctors do a handover to the other doctor and the nurses do a handover to the other nurse…it is a bit silly. Medical handover can occur at any place. It can happen in ED. If ICU come down, that's where it occurs. There is a smaller handover in the ICU. The nursing handover occurs at delivery. ED7

Multiple factors were identified by participants that affected how effectively information was transferred and these included:

- the actual process of handover includes both talking and listening and these need to be separate,
- most handovers occur while the patient is physically being transferred from one bed to another,
- the act of ‘doing’ while listening decreases information uptake and results in missing information.

There is talking and listening. It has got to be separate. The person giving the handover talks and the other one has to listen. When it has gone badly is because they are not listening. There has got to be a defined role. ED7

It was also very clear that staff felt it was always the ‘other party/they’ who were at fault with these issues. This can be seen in their choice of language such as:

- they are not listening
- they don’t know the relevant information about the patient
- they are too rushed.

The only staff who felt that both parties were responsible were from the TSU.

It may be the nurse in HDU or ICU who is not asking the right questions, isn't receiving. The ED nurse is trying to tell her information and she is kind of turned off.
It is a two way street. It is not purely ED not giving good information. Sometimes the nurses are not receiving it or not listening or are not aware of which questions to ask.

TSU1

4.2.2.5 Discrepancy of information

Discrepancy of information refers to the differences between the information handed over and what was documented, and also having access to that documentation as these discrepancies may impact on the continuity of trauma patient care (as has been previously discussed in section 4.2.1.2). A common occurrence reported by ward staff was that the patient may arrive at the ward without case notes and only have minimal documentation with them due to notes being with the physician who was in another physical location. Often these patients were due to go to operating theatres for a procedure and the case notes were in this area. Nurses in these instances said they must then trust the verbal information to provide care for the patient in the interim, but this was difficult to trust when there were discrepancies in the information at handover and what nurses were observing about the patient who had arrived on the ward.

However, having the chart arrive with the patient did not solve issues of what to do when there were discrepancies in the information. When documentation had arrived with the patient staff then had to go through a (sometimes) complicated problem solving process due to contradictions in the documented information or the patient looking differently to how they were depicted in the documentation (see below for spinal orders example quote), staff then had to try to determine which parts of the information documented could be trusted or should be followed.

In relation to unclear orders or discrepancies in information:

*It happens a lot with spines. We get spinal fractures in and the spinal orders would be so unclear. We would be told patient can mobilise and the patient would come up on an Engrit (spinal) bed. We get worried. We don't know if we can touch the patient - an unstable C-spine especially.*  

HDU3

*Small things get missed. In a handover perspective - things like are they on antibiotics. That gets handed over to one person but not necessarily to the*
bedside nurse or the junior doctor who then writes up the antibiotics and they are given again, which has happened. ICU5

Sometimes we get two subspecialties, a surgeon and orthopaedic. They are slightly different. One will say, "Nil by mouth.", and the other will say, "Light diet." TSU1

If they say we have given this and later we check to see if they have written it up somewhere, if they have not written it on the fluid chart, then we are going to assume that they have not had it. With the blood products, we can chase it. You assume if it has been taken out of the blood bank and they say it has been given - you make a lot of assumptions that it has been given. PERIOP1

4.2.3 Putting the pieces together

A range of sub themes including putting together a picture, patient transition, planning safe patient care and missing pieces were brought together in the theme of putting the pieces together. In this theme, issues surrounded clinicians being able to weave together multiple pieces of information about a patient and their care to make decisions about future care were evident from the data.

4.2.3.1 Putting together a picture

The sub theme of putting together a picture describes the process of bringing together information to build a picture of the patient, and in order to do this the staff handing over the patient needed to know the patient to be able to pass on the required information.

If you are dealing with patients, you need to know what is going on with them, what infusions they have, what their medical history is, how they are neurologically, just to be safe. HDU2

In being able to give a comprehensive picture of the patient at handover ED staff discussed needing to collaborate with the medical officer.

I think maybe when they (the patient) are all packed up, ready to go ... that maybe the registrar who is the primary carer of the resus to give a handover to
the nurse who has been allocated... Highlight what the plan is and that he has given the same sort of plan to the HDU or registrar. Sometimes there are subtleties. There has always got to be a plan of what we are doing or expecting to do. Maybe sometimes the handover (before leaving ED) would help. ED3

Receiving staff identified having to search for information once they established it was missing and often could not find out what they needed to know (for many reasons):

It (the patient chart) is loose papers, no order... HDU3

Sometimes you are drawing information from one area in one particular case and you draw it from another area. It might be the registrar's note from ED. That is where you are getting information. It might be ED, other paperwork that they have got. You are never getting the same information from the same spot; it's from varying areas. PERIOP2

4.2.3.2 Patient transition

Patient transition related to how easily the patient was admitted and settled into the ward as a result of information transfer. Poor handover, missing information, or inaccurate information can impact on the ability of staff to effectively put together a picture of what care is required to address patient needs. Accurate information conveyed to the ward staff before the patient arrives can ease transition and admission to the ward and allow staff to focus on patient issues at handover. Ward staff receiving patients from the ED believed that good handover equated to clarity of information and resulted in smooth patient transitions into the ward.

When I was on night duty a couple of weeks ago, we got a patient up who was involved in a motor vehicle accident... He came up from emergency, in the middle of the night... Everything was smooth as. It was a very good transfer. HDU3

FACILITATOR: What was there that worked?

Everything was done. Everything was done that emergency stated in the handover was done. You get an accurate handover on the phone, before they
bring the patient up, and face-to-face after the patient is in bed. There was no discrepancies between what was said over the phone and what I physically saw when the patient came up: Drips, catheter, IDC, talking, alert, orientated. We feel much better knowing what we are getting is what has been handed over to us. We don't like surprises. HDU3

If a patient is going to a ward, the first handover comes in bed management. The first patient details come from the bed manager who has never seen the patient. You get follow-up details with the nurse who may or may not be looking after them. If they are going somewhere else in the ward, sometimes it is two or three different people, maybe two of whom have never seen the patient. ED5

If we get a good referral to the medical staff and they communicate that well to us, we can help facilitate that easier. They can give us the majority of information because they have had that in-depth handover. That can help us prepare and maybe the handover from the ED staff doesn't need to be as in depth because we have got all the information available to us. ICU6

4.2.3.3 Planning safe patient care

The subtheme of planning safe patient care focuses on issues that arose from poor handovers and poor documentation. When handovers were not comprehensive and documentation was poor, participants reported that decision making for immediate care planning was difficult. When handovers were of adequate comprehensiveness this helped alleviate stress on staff who were already busy planning and carrying out care.

It can be so busy and, even though you have got handover from the nurse previously, you don't have time to go through the forms. There should be enough information for you to care for that patient properly. Until you have time to read go through the forms, it shouldn't be relied on that you can read the notes. HDU2
I infer from that handover, whether it has been given comprehensively... going back to and trying to get that picture on where this person came from and where he is up to and then start planning, rather than saying, "I have received handover. Just give me a while.", and that time delay. TSU2

In relation to documented information, staff felt it was useful at the start of their care for the patient and handing on relevant information to oncoming care givers. Staff also discussed using documented information as a way of measuring patient progress or condition changes, which were essential to future care decisions.

The initial period is where it helps you make the decisions. ICU3

We get the information from that paperwork to hand on. ICU6

This is the basic story. This is what has changed from there until now. ICU3

4.2.3.4 Missing pieces

The final sub theme of missing pieces related to the difficulty in finding information that may or may not have been documented or handed over, the need to see when a patient’s condition changed, diagnoses made (or missed) for purposes of tertiary survey and patient quality review processes.

They should hand over the correct information to the next person so they can come and talk to us and tell us the correct information. A little bit gets missed. We find out things later on, that he has got a broken toe or elbow is broken, that is not recorded. HDU1

Something simple like what is under that dressing. We don't know. HDU3

There is not much to look at in the paperwork. It is usually not filed in any (order) - the chart is a big pile of medical notes that - the paperwork is so disorganised and so there is no point. You are just wasting time. Often it is not until it gets filed by our ward staff that you can make sense of it or find things.
The medical notes are often written on separate pages. The multi-trauma team will all grab a new piece of paper and chuck it on the chart. There is a loss of communication there. ICU6

Many of the factors identified in the above themes have been described as conduits or barriers to information transfer. Conduits were usually mirror images of barriers in this context.

4.2.4 Values/context

Values about good communication and documentation were commonly espoused by staff across the different ward areas. The context of being in different ward areas did not affect the value of documentation and communication, but it did influence the application of those values. For example, while documentation was seen to be important everywhere, in PERIOP, ED and TSU staff accepted that sometimes documentation would fall away if the life or a limb of the patient was threatened, whereas in the ICU and HDU this was not accepted (quotes as seen previously in section 4.2.1.3).

Documentation was seen as medico-legally important and was a source of the ‘real’ story, as it was acknowledged that verbal communication can become ‘Chinese whispers’ and therefore inaccurate. One person described documentation as a safety mechanism in legal processes. Basic assumptions were also made in regard to care given as a result of documentation, and the role and value of communication for ongoing patient care and making care decisions.

The handovers are in a certain way important but the turnover of staff, the amount of staff that would look at the document, the written document, is extremely important. TSU-S1

You can’t really do anything on hearsay. It has to be documented. Regardless of what you hear, it can be Chinese whispers, what the actual documentation is - it is probably as important, if not more important, than what your communication handover is. ED3

Unless they document it somewhere, we don’t know what has been given to the patient. PERIOP1
If it is not documented, it wasn't done. TSU3

Where there were discrepancies between the information handed over and documented participants described documentation as being more valuable than verbal information, and saw documented information as a way of protecting themselves legally and making the best decisions they could in a situation.

If you get verbally told, for example, that a C-spine is cleared and it is all good but they have still got a collar on and the last documentation is “C-spine not cleared” do you go by verbal nurse handover or what is documented in the notes? Legally, I would go on what is in the notes. TSU1

Legally, you can't stand up in a court of law and say "Well, she said...". It is all hearsay. If it is not documented, it hasn't happened. The valued communication - it is more valuable, written. We all make mistakes. "Did she say 100 or 10?" It is written here... ED3

Specific information relevant to ongoing care was particularly valued, more so than broad or general information.

The aspects that are mentioned from a nursing handover to a medical handover are very different. Sometimes nurses will say, "The wrist is broken." A doctor will say, "This bone is broken in the wrist." ICU4

Participants identified that the information required generally linked to all aspects of the patient’s care up to the point of transition.

When you see a patient whose information transfer goes well, what are the factors in that? FACILITATOR

It means you have got a good handover regarding the physical condition of the patient, the socioeconomic and emotional sections of what is happening with the patient. The management plan on top of all of that - that would be comprehensive. TSU3
Participants equated the quality of communication to the quality of patient care. Comprehensive information and good communication was very important to staff decision making and impacted on patient care.

*We need to be doing the best we can for the patient. At the moment, our communication does not always mean that the patient gets the best possible care.*  
TSU1

*ED can be full of patients and their workload can be really busy so they are not giving an effective handover.*  
ICU5

*When we get a correct handover, it is so smooth. It is better for the patient.*  
HDU1

Variability in practice and of behaviours/performance emerged from data that identified where participants enacted values (e.g. that comprehensive documentation was important etc.). Values were what participants from different ward and discipline areas described as the ideal practices in information transfer and this was what they used to compare other staff’s practice to (from other areas, not staff within their own stream). There were many comments about staff practices (usually from areas other than their own) that did not meet these ideals in regard to information transfer.

Where behaviour and performance aligned with the values held, the behaviour/performance were described as ‘good or efficient’ and then were described to have had positive impacts on care planning and delivery. Positive impacts were reported by staff to make their care decisions ‘easy’. However, with behaviours/performance that did not align with these values (e.g. ‘documentation is not always 100%’) then these practices were described as ‘poor and inefficient’, with negative impacts on care planning and delivery. These impacts were often described as making it ‘hard’ for staff to efficiently and effectively plan care and make decisions.

In summary the four themes that emerged from the focus group data were variability, continuity and putting the pieces together and values/context. The first three themes were all influenced by the fourth theme of values/context, which appeared to form the basis for identification of issues and good practices and tempered how each theme
influenced quality of information transfer. Focus group results influenced the development of the patient chart audit form and staff survey questions. The data from these collective methods then influenced the intervention development via the clinician working group.

4.3 SURVEY OF STAFF THAT PROVIDE TRAUMA CARE

Staff were surveyed to determine if the issues identified in the focus groups were consistent with the opinions of a larger group, as well as to provide a base measurement point to compare with staff opinion post-intervention. Questionnaires were distributed to all five clinical areas involved in trauma care. The target population included all nursing and medical staff that provided trauma care for patients in the areas of ED, PERIOP, HDU, TSU and ICU. Sample numbers from each clinical area are presented in Table 4.1.

4.3.1 Response rates

Pre-intervention response rates varied considerably between clinical areas. HDU returned the most surveys overall. ED staff were approached in two ways, initially surveys were left for staff to collect in the staff room and very few were returned, so the ED contact person handed out surveys to staff who worked in the resuscitation area and this improved the response rate considerably. ICU staff had received many questionnaires for different projects previous to this study but were still able to achieve an 18% response rate. The PERIOP area targeted specific staff who worked in the emergency theatre and even though three responses represented a 20% response rate, staff feedback was that they did not really believe the issues identified related to them as they did not see themselves as a care area like the other wards. TSU had a 0% response rate, possibly due to all of their staff being present in the focus groups and therefore feeling they had already contributed their opinion regarding these issues. post-intervention distribution methods mirrored pre-intervention methods and while TSU, PERIOP and ICU returned the same percentage rate, ED returns increased and HDU decreased. It is worth noting that in the time lapse between pre and post-intervention HDU staffing remained constant, while ED and ICU had increased staff numbers.

Table 4.1 Staff surveys returned pre and post-intervention
4.3.2 Survey results

The survey contained 22 statements scored on a Likert scale where 1 = strongly agree, 2 = agree, 3 = disagree, 4 = strongly disagree. The choice to have no neutral ground was made in an attempt to collect either a positive or negative response from participants. Despite this, some participants (three pre-intervention and one post-intervention) still circled both agree and disagree due to the variation in practice they had experienced and noted this with comments next to the question, these responses were excluded from the results and treated as though they were not answered (see Table 4.2 footnotes for the specific statements involved). If someone answered midway between agree and strongly agree, or alternatively between disagree and strongly disagree, their answer was included in the combined categories. Unanswered statements were treated as missing data. Survey statements were compared using the Pearson Chi squared test as many of the distributions were skewed. In addition, many of the categories had less than five in a response field; therefore, where it was logical, categories were combined. The original categories of ‘Strongly Agree’ and ‘Agree’ were collapsed into ‘Agree’, and ‘Disagree’ and ‘Strongly Disagree’ were collapsed into ‘Disagree’. Once categories were collapsed there were only ‘Agree’ or ‘Disagree’ as possible responses.

Information about the practitioner’s discipline, as well as the clinical area they worked in, was also collected in the survey. Some statements were specifically marked as meant for nursing only or ED only as they were set to measure specific statements about practice that were made in the focus groups. There were few significant differences between responses pre and post-intervention, as can be seen in Table 4.2.
validated the major themes identified in the focus groups with no new information identified. The difference in groups (ED vs ICU) continued to show variation in opinion and expectations among clinical areas.
Table 4.2 Survey results

<table>
<thead>
<tr>
<th>Statements</th>
<th>Pre-intervention *N=58</th>
<th>Post-intervention *N=65</th>
<th>Pearson Chi-Square</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Agree n(%)</td>
<td>Disagree n(%)</td>
<td>Agree n(%)</td>
<td>Disagree n(%)</td>
</tr>
<tr>
<td>Handover for multi-trauma patients is complex</td>
<td>49 (84.5)</td>
<td>9 (15.5)</td>
<td>61 (93.8)</td>
<td>4 (6.2)</td>
</tr>
<tr>
<td>Expectations of handover upon discharge from the ED to other departments are clear</td>
<td>27 (46.6)</td>
<td>31 (53.4)</td>
<td>32 (50.8)</td>
<td>32 (50.8)</td>
</tr>
<tr>
<td>Staff from different departments (ED, ICU, HDU, OT) agree and understand what should be handed over when the patient leaves the ED</td>
<td>31 (53.4)</td>
<td>27 (46.6)</td>
<td>32 (50.8)</td>
<td>31 (49.2)</td>
</tr>
<tr>
<td>The information that is handed over is consistent and in the same order for most patients discharged from the ED</td>
<td>13 (22.4)</td>
<td>45 (77.6)</td>
<td>14 (21.9)</td>
<td>50 (78.1)</td>
</tr>
<tr>
<td>(Nursing only) If the patient is transferred to the ward by a nurse that has not been caring for the patient in the ED a comprehensive handover is still provided</td>
<td>11 (20.8)</td>
<td>42 (79.2)</td>
<td>8 (12.9)</td>
<td>54 (87.1)</td>
</tr>
<tr>
<td>Documented information from the ED is comprehensive enough to assist in providing ongoing care for the patient on transfer to the ward</td>
<td>27 (50.9)</td>
<td>26 (49.1)</td>
<td>39 (61.9)</td>
<td>24 (38.1)</td>
</tr>
<tr>
<td>Documentation in the trauma notes is systematic</td>
<td>35 (62.5)</td>
<td>21 (37.5)</td>
<td>48 (77.4)</td>
<td>14 (22.6)</td>
</tr>
<tr>
<td>ED nursing notes are user-friendly and easy to navigate</td>
<td>17 (30.4)</td>
<td>39 (69.6)</td>
<td>27 (42.9)</td>
<td>75 (57.1)</td>
</tr>
<tr>
<td>There is enough data usually available in the resuscitation notes to identify trends in patient status (e.g. observations, monitoring)</td>
<td>37 (63.8)</td>
<td>21 (36.2)</td>
<td>44 (71)</td>
<td>18 (29)</td>
</tr>
<tr>
<td>. When the patient has been unstable during the resuscitation (e.g. life or limb threatened), documentation of interventions and treatment remains comprehensive in the ED notes ~</td>
<td>26 (46.4)</td>
<td>30 (53.6)</td>
<td>33 (51.6)</td>
<td>31 (48.4)</td>
</tr>
<tr>
<td>. Documented information for most trauma resuscitations could be considered detailed enough to be a comprehensive record of patient care ~</td>
<td>23 (41.8)</td>
<td>32 (58.2)</td>
<td>33 (52.4)</td>
<td>30 (47.6)</td>
</tr>
<tr>
<td>. Most boxes/prompt on the trauma resuscitation form are filled in for most patients (that is relevant to their care) ~</td>
<td>31 (55.4)</td>
<td>25 (44.6)</td>
<td>32 (52.5)</td>
<td>29 (47.5)</td>
</tr>
<tr>
<td>Statements</td>
<td>Pre-intervention *N=58</td>
<td>Post-intervention N=65</td>
<td>Pearson Chi-Square</td>
<td>p-value</td>
</tr>
<tr>
<td>----------------------------------------------------------------------------</td>
<td>-------------------------</td>
<td>-------------------------</td>
<td>--------------------</td>
<td>---------</td>
</tr>
<tr>
<td>. All monitoring/observation recording areas of the trauma resuscitation form are relevant for every patient group</td>
<td>49.1 (28)</td>
<td>50.9 (29)</td>
<td>54.8 (34)</td>
<td>45.2 (28)</td>
</tr>
<tr>
<td>. Most patients only have two or three full sets of observations recorded</td>
<td>42.1 (24)</td>
<td>57.9 (33)</td>
<td>37.7 (23)</td>
<td>62.3 (38)</td>
</tr>
<tr>
<td>. On discharge from the ED, handover is comprehensive enough to undertake immediate care of the patient, without looking for further details +</td>
<td>31.6 (18)</td>
<td>68.4 (39)</td>
<td>48.3 (29)</td>
<td>51.7 (31)</td>
</tr>
<tr>
<td>. On discharge from the ED, documented care orders are clear enough to undertake immediate care of the patient, without further clarification needed</td>
<td>28.1 (16)</td>
<td>71.9 (41)</td>
<td>42.6 (26)</td>
<td>57.4 (35)</td>
</tr>
<tr>
<td>. When handing over/receiving patients staff peruse patient charts and direct attention to relevant sections of documented care and treatment plans</td>
<td>56.1 (32)</td>
<td>43.9 (25)</td>
<td>47.5 (29)</td>
<td>52.5 (32)</td>
</tr>
<tr>
<td>. Social work consultation/intervention is included in handover</td>
<td>21.4 (12)</td>
<td>78.6 (44)</td>
<td>37.7 (23)</td>
<td>62.3 (38)</td>
</tr>
<tr>
<td>. At handover all staff stop ‘doing’ and give/listen to handover before we physically transfer the patient</td>
<td>10.9 (6)</td>
<td>89.1 (49)</td>
<td>7.9 (5)</td>
<td>92.1 (58)</td>
</tr>
<tr>
<td>. Information given/received at handover is valuable to patient care</td>
<td>91.1 (51)</td>
<td>8.9 (5)</td>
<td>93.7 (59)</td>
<td>6.3 (4)</td>
</tr>
<tr>
<td>. Staff/units who are receiving patients from ED are notified when to expect the patient</td>
<td>69.1 (38)</td>
<td>30.9 (17)</td>
<td>90.3 (56)</td>
<td>9.7 (6)</td>
</tr>
<tr>
<td>. [for ED staff only] Processes are in place during resuscitations that enable staff to communicate about patient condition and treatment</td>
<td>68.8 (11)</td>
<td>31.3 (5)</td>
<td>88.2 (15)</td>
<td>11.8 (2)</td>
</tr>
</tbody>
</table>

*Not all participants answered all statements

~ one participant answered both agree and disagree in pre-intervention surveys

+ one participant answered both agree and disagree in post-intervention surveys
4.4 NATIONAL AND INTERNATIONAL FORMS

To gain a wider understanding of communication practices and tools/forms used to convey patient information at discharge from the ED transition point, a survey of national and international forms designed to aid communication was conducted. The hospitals approached for this information were selected on the basis of receiving multi-trauma presentations and were also considered tertiary referral trauma centres. A request for copies of any trauma specific charts used in Australia was sent via a trauma network email group. Five hospitals were followed up with telephone calls but almost all stated they used no specific trauma form for documentation at the time (2009). Four international trauma forms and one Australian trauma form were sourced.

4.4.1 Review of documentation summary

Examination of the international and national forms (Table 4.3) revealed that there was widespread variability in how patient care was documented, suggesting that there was little standardisation. Table 4.3 summarises the differences between the forms, a more in depth description of each form can be found in Appendix 7.

Table 4.3 Review of International and National trauma forms

<table>
<thead>
<tr>
<th>Origin</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edinburgh Royal Infirmary,</td>
<td>This form was for medical and nursing notes together. Included nursing specific data such as the nursing care plan, intra/inter hospital transfer document, progress notes for medical recording (free form). It was easy to follow, has abnormal and normal reporting parameters, can be added to for long stays in the ED. Issues include the form not being fully integrated (still divided nursing and medical care) with no room for nursing to write free form notes. While discharge information is collected in the ED, after the patient leaves there is no evidence of this, as the discharge information is recorded on a transfer sheet that is detached from the notes and sent with the patient.</td>
</tr>
<tr>
<td>Edinburgh, Scotland</td>
<td></td>
</tr>
<tr>
<td>Waitemata District Health Board, Auckland, New Zealand</td>
<td>One complete template form - but was for medical only. Used best practice principles according to local/New Zealand specific guidelines to trigger assessment and documentation of trauma care. Form was 16 pages long and covered primary and secondary survey, summary of injuries and free form</td>
</tr>
</tbody>
</table>
notes. While there were multiple prompts that could improve consistency of care, it was very involved and not flexible. It is likely it would take some time to become efficient in using this form. Site representative verbally reported that nursing used various ‘normal’ forms (used in general nursing practice not specific for trauma or resuscitation care) for charting observations, fluid balances, medication given etc.

Charite, Berlin, Germany
Medical notes section was one complete template form. Used best practice principles according to local/German specific guidelines to trigger assessment and documentation of trauma care. Form covered primary and secondary survey, summary of injuries and free form notes. While there were multiple prompts that could improve consistency of care, it was involved and did not seem flexible. Many resources were embedded into the document to prompt use of best practice principles. This form had nursing and medical integrated (sectioned out for each discipline), but was reflective of the context, i.e. one consultant cared for the patient from presentation to discharge. Nursing section had visible triggers for new orders (physical pull out flags for new orders that were reset when orders were completed), and status of ongoing interventions.

Johannesburg hospital, Johannesburg, South Africa
Combined medical and nursing notes. Not as long as the previous two forms, but still prompted primary and secondary survey findings. Form could be separated in the trauma room to allow for two people to simultaneously document discipline specific data collection. These then fit back together as one chart. Graphic charting of observations seemed difficult to follow; medication form was separate and added as a generic medication record. Comprehensive integrated chart that seemed easy to follow and use.

Royal Children’s Hospital, Brisbane, Australia
Medical notes chart only, and it was verbally reported that nursing used generic forms for their documentation. Template (brief compared to previous templates) prompted primary and secondary survey. Easy to follow, no embedded resources so users would need to have a higher level of experience to have consistent assessment depth and documentation. No links to discharge information or nursing.

Princess Two separate forms:
Alexandria Hospital, Brisbane, Australia (study site)  

Nursing form - used for past 10+ years, included primary survey prompts, then graphic charting of observations, associated interventions, fluid balance, property, discharge and next of kin information, trauma team composition, no space for free form notes. Many of the spaces are too small for hand writing the appropriate information in. Medication forms separate - generic form used for this. 

Medical notes used to be free form notes only. New form introduced at time of study was a four page template style form prompting primary and secondary survey, some space for free form notes, no embedded resources, but all basic triggers for comprehensive assessment were present. List of injuries, prioritisation of problems, care plan and consultations requested. Would need a higher level of experience to have consistent depth in documentation. No links to nursing notes.

The documentation review revealed common elements in the medical documentation templates, with all of the templates covering primary and secondary survey, reflecting current best practice. Differences related to how in-depth and comprehensive the templates were. The more in-depth templates linked the documentation to embedded resources (e.g. Ottawa ankle scale rules were embedded into limb assessment). While some charts integrated nursing and medical notes, others did not and some hospitals did not use a specialised trauma documentation template for nursing documentation. The study site had a change of practice for medical documentation captured within the pre-intervention phase of the study.

The collated information detailing the results of the trauma form review was presented to the strategy development working party to consider when developing possible interventions. The results of changes in the documentation at the study site can be identified within the next section, 4.5 Patient Chart Audit.

4.5 PATIENT CHART AUDIT

Patient care records (patient charts) were audited for two reasons. First as a baseline to discover information that was present and/or missing in documentation. This information was then used by the strategy development team to develop an intervention designed to improve completeness in documented information for these patients. Second, audits were conducted to measure changes in recorded information after the
intervention. Documented information was considered a legal requirement of providing care and as having a real impact on the ability of clinicians to care for patients. After the verbal handover had been given, when a patient was transferred between staff, teams, shifts or locations in the hospital, the documented detail was the only way to verify information, decisions and interventions for patient care.

In the pre-intervention period, the Queensland Trauma Registry search facilities were used to identify 103 multi-trauma patients admitted to the ED at the study site during the six month period from July to December 2009. One chart was excluded as the patient did not receive care in the ED, but was admitted directly to the HDU. Of the remaining 102 charts, 92 (90%) were able to be obtained and audited.

In the post-intervention period, 134 multi-trauma patients admitted to the ED at the study site during the six month period from August 2011 to January 2012 were identified through a Queensland Trauma Registry search for trauma patients. On further inspection of these charts, 17 were excluded as the patients did not meet one or more of the inclusion criteria of not being a new trauma case, not receiving treatment in the ED, already being inpatients of the hospital or their complete records could not be located. Of the remaining 117 charts, 106 (90%) charts were able to be obtained and audited.

A description of the two patient groups (pre and post strategy implementation), including the discharge details from the ED is provided below. This is followed by a summary of the completeness of the data contained within the health care record, factors affecting patient flow (for example: records of communication with others involved in the care of the patient, perceived impact of injures on physical transfer of the patient) and then the ease and efficiency of accessing data in the health care record.

4.5.1 Group descriptions

Patients were discharged from the ED on similar days of the week and with similar admission and discharge times for the two groups (Table 4.4). In the pre-intervention period the majority of patient discharges from the ED occurred over Sunday, Saturday and Thursday respectively. In the post-intervention period the distributions of discharges were equally highest for Sunday and Thursday, then Saturday and Wednesday. In the pre-intervention period, 10.9% of discharge dates were unable to be
determined due to missing information. In the post-intervention period, this was reduced to 0.9%. This difference was not found to be statistically significant, although it does represent a valuable clinical improvement.

Overall, patients were most often discharged from the ED to the HDU. In the pre-intervention period the next highest discharge destination was to the ICU, then PERIOP, with a further 3.3% of discharge destinations unable to be determined. This was different in the post-intervention period with the second highest discharge destination being PERIOP and then ICU. All patient discharge destinations were able to be accounted for in the post-intervention period (Table 4.4). Patient admission and discharge times were recorded as being within standard working hours or outside those hours. Results showed a significant improvement between pre and post-intervention groups in being able to determine admission time to the ED (Table 4.4).

### 4.5.2 Discipline specific progress notes

Discipline specific progress notes were used to report paramedic, medical and nursing specific activities. Points of interest in relation to each of these notes include:

- paramedic notes were printed directly from a template,
- nursing notes were in the form of a template,
- medical notes had recently undergone a transformation from free form notes to a template (Trauma Assessment Form [TAF]), implemented approximately four weeks prior to the commencement of data collection.

In the pre-intervention period the TAF had been used for roughly half of the patients in the pre-intervention phase, with a significantly better usage in the post-intervention phase (Table 4.5). Of additional significance was that more paramedic notes were missing from the patient chart post-intervention. In the pre-intervention group the researcher was unable to locate paramedic notes in 2.2% of charts, in the post-intervention group this grew to 9.4% (Table 4.5).
<table>
<thead>
<tr>
<th>Day of discharge from ED</th>
<th>Pre-intervention n=92, n (%)</th>
<th>Post-intervention n= 106, n (%)</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>10 (10.9)</td>
<td>8 (7.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>13 (14.1)</td>
<td>14 (13.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>8 (8.7)</td>
<td>15 (14.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>15 (16.3)</td>
<td>19 (17.9)</td>
<td>$\chi^2$</td>
<td>0.080</td>
</tr>
<tr>
<td>Friday</td>
<td>5 (5.4)</td>
<td>12 (11.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>15 (16.3)</td>
<td>18 (17.0)</td>
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</tr>
<tr>
<td>Sunday</td>
<td>16 (17.4)</td>
<td>19 (17.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>10 (10.9)</td>
<td>1 (0.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Discharge destination from</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>ICU</td>
<td>26 (28.3)</td>
<td>23 (21.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>HDU</td>
<td>41 (44.6)</td>
<td>49 (46.2)</td>
<td>$\chi^2$</td>
<td>0.138</td>
</tr>
<tr>
<td>PERIOP</td>
<td>22 (23.9)</td>
<td>34 (32.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>UNKNOWN</td>
<td>3 (3.3)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Admission Time to ED</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-1730</td>
<td>23 (25.0)</td>
<td>33 (31.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1731-0759</td>
<td>52 (56.5)</td>
<td>60 (56.6)</td>
<td>$\chi^2$</td>
<td>0.024</td>
</tr>
<tr>
<td>Unable to determine</td>
<td>6 (6.5)</td>
<td>0 (0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Discharge time from ED</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0800-1730</td>
<td>23 (25.0)</td>
<td>33 (31.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1731-0759</td>
<td>44 (47.8)</td>
<td>58 (54.7)</td>
<td>$\chi^2$</td>
<td>0.073</td>
</tr>
<tr>
<td>Unable to determine</td>
<td>25 (27.2)</td>
<td>15 (14.2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### 4.5.3 Documented patient identifying information and staff involved

The content of progress notes was considered from the perspective of legal and institutional requirements (e.g. date, time, staff name etc.). A significant improvement was found in the nursing documentation for recording times and clinicians’ names in notes in the post-intervention group (Table 4.5). Other elements crucial to documentation included those that decreased the chance of error in information recorded about specific patients. These elements can be found in Table 4.6 and generally did not change between the two groups and time periods, with the exception of property disposition.
Other information required for documentation did not change between the groups, except for improvements in the recording of a patient’s property when they came into the ED. A reduction was found in addresses being recorded in ED notes (Table 4.6). While not specifically collected in the data collection phase, there seemed to be more anonymous patients brought to the ED due to them having no identification and being unconscious. A significant improvement was found in identifying where patient property was disposed to.

### 4.5.4 Content of progress notes

There were no differences in the content of documentation in relation to the level of detail in the documentation of injuries, diagnoses and information about socioeconomic, emotional and family issues (Table 4.7). Significant changes were found in the post-intervention group in being able to identify management plans for patient care after transfer from the ED, in particular pain management plans were significantly more complete and legible, what diet the patient was to be on, and if the patient required surgery and when (Table 4.7).

The frequency of documentation of standard observations did not change significantly between groups, except for temperature and patient level of consciousness (Table 4.8), both previously identified as an issue in focus groups. The difference in the overall Glasgow Coma Scale (GCS) scoring was not significant; however, the recorded level of consciousness upon leaving the ED was significant.

GCS shows global indicators of levels of consciousness; a lower score equals a reduction in the level of consciousness (whether from brain injury or when induced to assist in stabilising the patient). There was a significant difference in being able to identify the overall levels of consciousness of patients between the pre-intervention and post-intervention groups upon leaving the ED. The level of consciousness of more patients’ based on the GCS was more able to be identified in the post-intervention group than in the pre-intervention group. A higher percentage of patients were also identified as being unconscious in the post-intervention group; however, whether this shows a difference in the group or just a difference in the completeness of the documentation was unable to be determined.
Table 4.5 Did patient care notes adhere to legal requirements for documentation in the ED?

<table>
<thead>
<tr>
<th></th>
<th>Pre-intervention n=92, n (%)</th>
<th>Post-intervention n=106, n (%)</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Were progress notes present?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>90 (97.8)</td>
<td>104 (98.1)</td>
<td>Fisher’s exact</td>
<td>1.000</td>
</tr>
<tr>
<td>No</td>
<td>2 (2.2)</td>
<td>2 (1.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trauma assessment form</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>48 (52.2)</td>
<td>98 (92.5)</td>
<td>$\chi^2$</td>
<td>&lt; 0.001</td>
</tr>
<tr>
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<td>44 (47.8)</td>
<td>8 (7.5)</td>
<td>41.263</td>
<td>1.000</td>
</tr>
<tr>
<td>Nursing</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>91 (98.9)</td>
<td>105 (99.1)</td>
<td>Fisher’s exact</td>
<td>1.000</td>
</tr>
<tr>
<td>No</td>
<td>1 (1.1)</td>
<td>1 (0.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ambulance</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
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<td>96 (90.6)</td>
<td>Fisher’s exact</td>
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</tr>
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</table>

<table>
<thead>
<tr>
<th>Legal requirements present in documentation</th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>79 (85.9)</td>
<td>86 (81.1)</td>
</tr>
<tr>
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<td>13 (14.1)</td>
<td>20 (18.9)</td>
</tr>
<tr>
<td>Nursing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>90 (97.8)</td>
<td>102 (97.1)</td>
</tr>
<tr>
<td>No</td>
<td>2 (2.2)</td>
<td>3 (2.9)</td>
</tr>
<tr>
<td>Time</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>33 (35.9)</td>
<td>45 (42.5)</td>
</tr>
<tr>
<td>No</td>
<td>59 (64.1)</td>
<td>61 (57.5)</td>
</tr>
<tr>
<td>Nursing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75 (81.5)</td>
<td>102 (96.2)</td>
</tr>
<tr>
<td>No</td>
<td>17 (18.5)</td>
<td>4 (3.8)</td>
</tr>
<tr>
<td>Staff Name</td>
<td></td>
<td></td>
</tr>
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<td>Medical</td>
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<td></td>
</tr>
<tr>
<td>Yes</td>
<td>83 (90.2)</td>
<td>96 (90.6)</td>
</tr>
<tr>
<td>No</td>
<td>9 (9.8)</td>
<td>10 (9.4)</td>
</tr>
<tr>
<td>Nursing</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>63 (68.5)</td>
<td>93 (87.7)</td>
</tr>
<tr>
<td>No</td>
<td>29 (31.5)</td>
<td>13 (12.3)</td>
</tr>
<tr>
<td>Staff Designation</td>
<td></td>
<td></td>
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<tr>
<td>Medical</td>
<td></td>
<td></td>
</tr>
<tr>
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<td>81 (88)</td>
<td>94 (88.7)</td>
</tr>
<tr>
<td>No</td>
<td>11 (12)</td>
<td>12 (11.3)</td>
</tr>
<tr>
<td>Nursing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>72 (78.3)</td>
<td>87 (82.1)</td>
</tr>
<tr>
<td>No</td>
<td>20 (21.7)</td>
<td>19 (17.9)</td>
</tr>
<tr>
<td>Patient Identifiers</td>
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<tr>
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<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>91 (98.9)</td>
<td>105 (99.1)</td>
</tr>
<tr>
<td>No</td>
<td>1 (1.1)</td>
<td>1 (0.9)</td>
</tr>
<tr>
<td>Nursing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>90 (97.8)</td>
<td>104 (99)</td>
</tr>
<tr>
<td>No</td>
<td>2 (2.2)</td>
<td>1 (1)</td>
</tr>
<tr>
<td>Written in indelible ink</td>
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<td></td>
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</tr>
<tr>
<td>Yes</td>
<td>92 (100)</td>
<td>105 (99.1)</td>
</tr>
<tr>
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<td>0 (0)</td>
<td>1 (0.9)</td>
</tr>
<tr>
<td>Nursing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>91 (98.9)</td>
<td>105 (99.1)</td>
</tr>
<tr>
<td>No</td>
<td>1 (1.1)</td>
<td>1 (0.9)</td>
</tr>
<tr>
<td>Table 4.6 Details recorded to identify specific patient information</td>
<td></td>
<td></td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Were the following details present and complete in the ED notes:</strong></td>
<td><strong>Pre-intervention n=92</strong></td>
<td><strong>Post-intervention n=106</strong></td>
</tr>
<tr>
<td><strong>Patient name</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>4 (4.3)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>88 (95.7)</td>
</tr>
<tr>
<td><strong>Date of Birth</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>2 (2.2)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>90 (97.8)</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>3 (3.3)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>89 (96.7)</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>1 (1.1)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>91 (98.9)</td>
</tr>
<tr>
<td><strong>Address</strong></td>
<td>Not present OR incomplete/ illegible</td>
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</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>77 (83.7)</td>
</tr>
<tr>
<td><strong>Next of Kin details</strong></td>
<td>Not present OR incomplete/ illegible</td>
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</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>54 (58.7)</td>
</tr>
<tr>
<td><strong>Medical History</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>22 (23.9)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>70 (76.1)</td>
</tr>
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<td><strong>Allergies</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>12 (13)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>80 (87)</td>
</tr>
<tr>
<td><strong>Property disposition</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>62 (67.4)</td>
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<td></td>
<td>Complete and legible</td>
<td>30 (32.6)</td>
</tr>
<tr>
<td><strong>Police involvement</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>85 (92.4)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>7 (7.6)</td>
</tr>
<tr>
<td><strong>Health insurance</strong></td>
<td>Not present OR incomplete/ illegible</td>
<td>34 (37)</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>58 (63)</td>
</tr>
</tbody>
</table>
Table 4.7 Content of documentation in patient care record

<table>
<thead>
<tr>
<th>Level of injuries documented</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary injuries-</td>
<td>8 (8.7)</td>
<td>4 (3.8)</td>
<td>Fisher’s exact</td>
<td>0.232</td>
</tr>
<tr>
<td>little detail of MOI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comprehensive information</td>
<td>84 (91.3)</td>
<td>102 (96.2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnoses listed &amp; dated</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>82 (89.1)</td>
<td>98 (92.5)</td>
<td>(\chi^2)</td>
<td>0.417</td>
</tr>
<tr>
<td>No</td>
<td>10 (10.9)</td>
<td>8 (7.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notes about socioeconomic issues &amp; associated assessment</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>5 (5.4)</td>
<td>6 (5.7)</td>
<td>(\chi^2)</td>
<td>0.945</td>
</tr>
<tr>
<td>No</td>
<td>87 (94.6)</td>
<td>100 (94.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notes about emotional issues &amp; associated assessment</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>6 (6.5)</td>
<td>6 (5.7)</td>
<td>(\chi^2)</td>
<td>0.800</td>
</tr>
<tr>
<td>No</td>
<td>86 (93.5)</td>
<td>100 (94.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Notes about family related to patient prognosis, management &amp; issues</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>16 (17.4)</td>
<td>27 (25.5)</td>
<td>1.892</td>
<td>0.169</td>
</tr>
<tr>
<td>No</td>
<td>76 (82.6)</td>
<td>79 (74.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Details of management plans documented for care after transfer</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pain</td>
<td></td>
<td></td>
<td>Fisher’s exact</td>
<td>0.032</td>
</tr>
<tr>
<td>Complete and legible</td>
<td>67 (72.8)</td>
<td>91 (85.8)</td>
<td>Fisher’s exact</td>
<td>0.032</td>
</tr>
<tr>
<td>Not present or incomplete/ illegible</td>
<td>25 (27.2)</td>
<td>15 (14.2)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fluids</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete and legible</td>
<td>75 (81.5)</td>
<td>89 (84)</td>
<td>Fisher’s exact</td>
<td>0.707</td>
</tr>
<tr>
<td>Not present or incomplete/ illegible</td>
<td>17 (18.5)</td>
<td>17 (16)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diet</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete and legible</td>
<td>49 (53.3)</td>
<td>86 (81.1)</td>
<td>Fisher’s exact</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Not present or incomplete/ illegible</td>
<td>43 (46.7)</td>
<td>20 (18.9)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>If requiring surgery &amp; when</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n=106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Complete and legible</td>
<td>34 (37)</td>
<td>55 (51.9)</td>
<td>Fisher’s exact</td>
<td>0.045</td>
</tr>
<tr>
<td>Not present or incomplete/ illegible</td>
<td>58 (63)</td>
<td>51 (48.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Documentation of interventions and procedures generally improved from the pre-intervention period to the post-intervention period. An exception to this was the size and placement of tubes/drains used, although it should be noted this item of information was well documented in the pre-intervention phase and therefore had little room for improvement (Table 4.9).

Table 4.8 Details of observations recorded

<table>
<thead>
<tr>
<th>Observations</th>
<th>Pre-intervention n=92</th>
<th>Post-intervention n= 106</th>
<th>Test</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Glasgow Coma Score</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not recorded at all</td>
<td>1 (1.1)</td>
<td>6 (5.7)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At least once, usually on arrival</td>
<td>23 (25)</td>
<td>25 (23.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular but not before transfer</td>
<td>26 (28.3)</td>
<td>18 (17)</td>
<td>$\chi^2$</td>
<td>7.831</td>
</tr>
<tr>
<td>Two or more times</td>
<td>25 (27.2)</td>
<td>27 (25.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Regular and before transfer</td>
<td>17 (18.5)</td>
<td>30 (28.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Is patient conscious on leaving the ED</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>23 (25)</td>
<td>35 (33)</td>
<td>$\chi^2$</td>
<td>8.176</td>
</tr>
<tr>
<td>Yes</td>
<td>23 (25)</td>
<td>39 (36.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown/unable to determine</td>
<td>46 (50)</td>
<td>32 (30.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Temperature</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not recorded at all or enough to trend</td>
<td>35 (38)</td>
<td>26 (24.5)</td>
<td>$\chi^2$</td>
<td>4.220</td>
</tr>
<tr>
<td>Regularly recorded/ able to trend</td>
<td>57 (62)</td>
<td>80 (75.5)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Pulse</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not recorded at all or enough to trend</td>
<td>5 (5.4)</td>
<td>3 (2.8)</td>
<td>Fisher’s exact</td>
<td>0.476</td>
</tr>
<tr>
<td>Regularly recorded/ able to trend</td>
<td>87 (94.6)</td>
<td>103 (97.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Blood Pressure</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not recorded at all or enough to trend</td>
<td>6 (6.5)</td>
<td>3 (2.8)</td>
<td>Fisher’s exact</td>
<td>0.308</td>
</tr>
<tr>
<td>Regularly recorded/ able to trend</td>
<td>86 (93.5)</td>
<td>103 (97.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Respiration</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not recorded at all or enough to trend</td>
<td>6 (6.5)</td>
<td>3 (2.8)</td>
<td>Fisher’s exact</td>
<td>0.308</td>
</tr>
<tr>
<td>Regularly recorded/ able to trend</td>
<td>86 (93.5)</td>
<td>103 (97.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Oxygen Saturations</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not recorded at all or enough to trend</td>
<td>5 (5.4)</td>
<td>6 (5.7)</td>
<td>$\chi^2$</td>
<td>0.005</td>
</tr>
<tr>
<td>Regularly recorded/ able to trend</td>
<td>87 (94.6)</td>
<td>100 (94.3)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 4.9 Details of interventions and procedures recorded

<table>
<thead>
<tr>
<th>Was documentation of interventions/procedures present and complete?</th>
<th>Pre-intervention n=92, n (%)</th>
<th>Post-intervention n=106, n (%)</th>
<th>Test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Size &amp; placement of tubes/drains used</strong></td>
<td>Not present</td>
<td>3 (3.3)</td>
<td>10 (9.4)</td>
<td>$\chi^2$ 4.587</td>
</tr>
<tr>
<td></td>
<td>Present but incomplete/ illegible</td>
<td>17 (18.5)</td>
<td>12 (11.3)</td>
<td>$\chi^2$ 8.207</td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>72 (78.3)</td>
<td>84 (79.2)</td>
<td></td>
</tr>
<tr>
<td><strong>Fluid orders</strong></td>
<td>Not present</td>
<td>7 (7.6)</td>
<td>11 (10.4)</td>
<td>$\chi^2$ 42.242</td>
</tr>
<tr>
<td></td>
<td>Present but incomplete/ illegible</td>
<td>25 (27.2)</td>
<td>12 (11.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>60 (65.2)</td>
<td>83 (78.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Fluid balance</strong></td>
<td>Not present</td>
<td>62 (67.4)</td>
<td>34 (32.1)</td>
<td>$\chi^2$ 23.347</td>
</tr>
<tr>
<td></td>
<td>Present but incomplete/ illegible</td>
<td>27 (29.3)</td>
<td>29 (27.4)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>3 (3.3)</td>
<td>43 (40.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Medications ordered</strong></td>
<td>Not present</td>
<td>7 (7.6)</td>
<td>9 (8.5)</td>
<td>$\chi^2$ 3.980</td>
</tr>
<tr>
<td></td>
<td>Present but incomplete/ illegible</td>
<td>49 (53.3)</td>
<td>71 (35.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>36 (39.1)</td>
<td>111 (56.1)</td>
<td></td>
</tr>
<tr>
<td><strong>Medications given</strong></td>
<td>Not present</td>
<td>8 (8.7)</td>
<td>8 (7.5)</td>
<td>$\chi^2$ 20.194</td>
</tr>
<tr>
<td></td>
<td>Present but incomplete/ illegible</td>
<td>27 (29.3)</td>
<td>19 (17.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>57 (62)</td>
<td>79 (74.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Pain management</strong></td>
<td>Not present</td>
<td>17 (18.5)</td>
<td>7 (6.6)</td>
<td>$\chi^2$ 24.058</td>
</tr>
<tr>
<td></td>
<td>Present but incomplete/ illegible</td>
<td>12 (13)</td>
<td>1 (0.9)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>63 (68.5)</td>
<td>98 (92.5)</td>
<td></td>
</tr>
<tr>
<td><strong>Spinal Clearance</strong></td>
<td>Not present</td>
<td>31 (33.7)</td>
<td>10 (9.4)</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td></td>
<td>Present but incomplete/ illegible</td>
<td>11 (12)</td>
<td>5 (4.7)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Complete and legible</td>
<td>50 (54.3)</td>
<td>91 (85.8)</td>
<td></td>
</tr>
</tbody>
</table>
4.5.5 Factors affecting flow of information

Three factors that were identified during the focus group interviews as potentially affecting information flow were:

- if a trauma call was activated,
- whether the operating theatre staff were updated on the progress of the trauma call once they had been placed on alert, and
- if the patient’s physical injuries would impact on physical transfer at handover.

Documentation of activation of a trauma call did not significantly improve from the pre to the post-intervention period, however the process of updating operating theatre staff on the progress of the trauma call and if and when they were receiving a patient or not did improve.

4.5.6 Ease and efficiency of accessing information

A number of factors were measured in relation to how difficult it was to access information in the patient’s health record (Table 4.10). These factors included whether there was duplication of information present, how much time it took to read and access notes, how difficult it was to navigate to key data, how easy it was to find details of investigations and diagnoses, and if notes were legible. The difficulty of navigating to key data in the patient health record was a proxy measure of how easy or difficult it would be for clinicians to access information.

The results show a significant improvement in the following areas: finding documented evidence of updates given to operating theatre staff on the progress of the patient; considerably less duplication in presented information in the documentation; written notes were more legible; and the types of investigations completed and their outcomes were easier to find post-intervention. Two proxy measures of how difficult it would be for clinicians to find information included total time spent on the chart audit and the difficulty level nominated by the researcher in navigating to key data. Both of these measures improved post-intervention. One final significant result was more difficult to quantify, whether injuries were likely to affect physical transfer at handover. While the change was significant, it is difficult to identify whether this was a positive change or
one side effect of better documentation. The ‘Yes’ response was similar, but ‘Unable to identify’, and ‘No’ were significantly different. For this question, patients were scored a ‘No’ if their injuries were unlikely to cause physical distress, this included patients who were intubated and sedated and would therefore not be conscious to feel the effects of physical movement. Anecdotal notes showed that while not strictly counted, the number of patients in the post-intervention group that were intubated and sedated was greater than in the pre-intervention group. In general, documentation seemed clearer in the post-intervention group and this may account for why the ‘Unable to identify’ group was significantly less post-intervention.

### 4.5.1 Summary of patient chart audit results

The patient chart audit revealed varied results post-intervention and these have been presented categorised into group descriptions, discipline specific progress notes, documented patient identifying information and staff involved, content of progress notes, and factors affecting flow of information. Targeted aspects of documentation significantly improved in many areas while other areas deteriorated (for example, the presence of paramedic notes in the post-intervention period). Results for the patient chart audit should be considered with the intervention in mind.

### 4.6 INTERVENTION

The intervention was formulated using preliminary results from the focus groups (largest influence), staff survey, national and international forms and the patient chart audit. Quantitative and qualitative data were extracted from the raw data as preliminary descriptive results. Results of the literature review were also collated, along with examples of interventions used in other health settings related to documentation, handover and improving trauma team practices. This information was developed into handouts and resources for the strategy development working group to consider.

These resources were distributed by the researcher to the strategy development working group members and used as the basis for identifying and formulating possible interventions at an ‘ideal’ and an ‘essential or base’ level. The group members identified that while there was an ideal comprehensive set of strategies to be implemented, realities of the various work areas, context and external issues out of control and influence of the group, would likely affect the ability of management to agree to all of
the strategies identified (this will be detailed in section 4.6.3). This prompted the group to identify ‘essential’ aspects of the intervention at a minimum level as a contingency plan to present to management or negotiate down to.

Table 4.10 Factors affecting flow, ease and efficiency of accessing information in the patient health record

<table>
<thead>
<tr>
<th>Factor</th>
<th>Pre-intervention (n=92, n (%))</th>
<th>Post-intervention (n= 106, n (%))</th>
<th>Test</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Trauma Call activated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>43 (46.7)</td>
<td>58 (54.7)</td>
<td>$\chi^2$</td>
<td>4.945</td>
</tr>
<tr>
<td>Unable to identify</td>
<td>44 (47.8)</td>
<td>36 (34.0)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>5 (5.4)</td>
<td>12 (11.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Operating theatre updated</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>13 (14.1)</td>
<td>35 (33.0)</td>
<td>$\chi^2$</td>
<td>10.833</td>
</tr>
<tr>
<td>Unable to identify</td>
<td>1 (1.1)</td>
<td>3 (2.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>78 (84.8)</td>
<td>68 (64.2)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Were injuries likely to affect physical transfer at handover?</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>75 (81.5)</td>
<td>70 (66.0)</td>
<td>$\chi^2$</td>
<td>25.139</td>
</tr>
<tr>
<td>Unable to identify</td>
<td>11 (12.0)</td>
<td>2 (1.9)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>6 (6.5)</td>
<td>34 (32.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Duplication of information present</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>17 (18.5)</td>
<td>5 (4.7)</td>
<td>$\chi^2$</td>
<td>9.444</td>
</tr>
<tr>
<td>No</td>
<td>75 (81.5)</td>
<td>101 (95.3)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total time spent on audit in mins</strong></td>
<td>Median</td>
<td>17.5</td>
<td>13</td>
<td>Mann-Whitney U 2614.500 &lt;0.001</td>
</tr>
<tr>
<td></td>
<td>IQR</td>
<td>13-22</td>
<td>11-15.25</td>
<td>Mann-Whitney U 2008.500 &lt;0.001</td>
</tr>
<tr>
<td><strong>Difficulty in navigating to key data</strong></td>
<td>Median</td>
<td>6</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>IQR</td>
<td>4-8</td>
<td>2-4</td>
<td></td>
</tr>
<tr>
<td><strong>Ease of finding investigations in notes</strong></td>
<td>Easy to find-complete</td>
<td>23 (25)</td>
<td>48 (45.7)</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td></td>
<td>Some difficulty in finding/part</td>
<td>52 (56.5)</td>
<td>51 (48.6)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very difficult to find, confusing</td>
<td>17 (18.5)</td>
<td>6 (5.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Ease of finding diagnoses</strong></td>
<td>Easy to find-complete</td>
<td>65 (42.8)</td>
<td>87 (82.1)</td>
<td>$\chi^2$</td>
</tr>
<tr>
<td></td>
<td>Some difficulty in finding/part</td>
<td>20 (21.7)</td>
<td>12 (11.3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Very difficult to find, confusing</td>
<td>7 (7.6)</td>
<td>7 (6.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Were written notes legible</strong></td>
<td>Overall</td>
<td>80 (87.0)</td>
<td>106 (100.0)</td>
<td>Fisher’s exact</td>
</tr>
<tr>
<td></td>
<td>Many areas illegible</td>
<td>12 (13.0)</td>
<td>0 (0.0)</td>
<td></td>
</tr>
</tbody>
</table>

Difficulty scale - 1 = easy and 10 = very difficult

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4.6.1 Strategy development working group

The strategy development working group were responsible for identifying priorities in the data presented to them to be addressed in the intervention. They were also responsible for engagement or identification of change agents in their work areas. Participants were asked to creatively consider the data presented by the researcher, their current clinical context and best practice initiatives they were aware of, to consider how best to intervene to address practice improvement priorities.

4.6.1.1 Strategy development working group formation and membership

Representation on the strategy development working group was obtained from each clinical area. A total of five ward representatives attended a face-to-face meeting with the researcher and a further two representatives were involved via email due to being unable to attend the meeting. Representation from ward areas included three emergency staff (medical and nursing), and one nursing representative from each other clinical area.

Data, information and resources were sent to participants by email a week before the meeting was convened to form the basis for discussion and ideas. Those participants unable to attend were sent a summary of ideas via email and spoken with individually to allow for further idea generation. Once all of the comments and ideas were collated and taken into account, the researcher emailed the group the final proposed interventions for any further comment. Results were then presented to ED and TSU management, as most of the intervention focus occurred at the ED level and other aspects would be facilitated by the TSU in the receiving wards (ICU, HDU and PERIOP).

4.6.2 Consultation and negotiation with work areas

Consultation with the executive management of the ED and TSU was conducted via a face-to-face meeting. The results were briefly described and the interventions presented in their ‘ideal’ format. As the strategy development group had predicted, there were aspects to the comprehensive ‘ideal’ intervention that could not be supported or endorsed by management for implementation. Much of this was due to other initiatives already going on, the feasibility of some of the proposed changes in the time frame
possible - for example, one suggestion was to rework the nursing documentation template to be more user friendly and contemporaneous - passing a new (even a draft) form through the various hospital committees was predicted to take several months, alongside this the ED management were considering moving to electronic forms and did not want to introduce a new paper form only to change it again in 6-12 months’ time. Due to these issues, essential elements of the interventions suggested by the strategy development group were then negotiated with the executive management.

4.6.3 Strategies for implementation

The agreed strategies included:

- **Use of a modified SBAR structure for handover** (Figure 4.2). Disseminated in the format of an intervention flyer, posters, handover sheet/template, computer screen savers and also made into a laminated resource to fit onto staff identification badge holder/lanyard.

- **Education and awareness raising for documentation.** To encourage engagement and interest in staff to achieve minimum levels of information recorded and handed over with both ED and receiving staff. Specific areas of nursing documentation were highlighted as needing improvement: recording of all observations regularly, such as temperature and GCS, details of fluid balance, police involvement and interventions, patient trends and response to interventions, and being able to identify the staff involved in the trauma care. Specific medical documentation issues highlighted related to c-spine clearance status, pain management plans, updating PERIOP area of status of patient, fluid and medication orders. Education sessions were initially offered by the researcher, while informal opportunistic education and orientation was provided by change agents. TSU staff were responsible for further opportunistic education across all areas and disciplines.

- **Trial change of sequence for patient handover.** Where possible staff were encouraged (due to patient condition at the time) to handover before physically moving the patient off the ED bed onto the receiving ward bed.

- **Where possible, consistency of the RN caring for the patient providing the handover.** To try to improve information transfer by encouraging the RN
caring for the patient in the resuscitation room to accompany the patient to the ward and to provide handover to ward staff. Where this was not possible the RN was to handover to the ward via telephone before the patient left the ED.

- **Use of change agents within each ward area.** To promote these interventions, change agents were to provide education, spark conversations about issues identified, and champion changes at the bedside and when supporting new or junior staff from March 2011- January 2012.

- **More experienced/senior staff to undertake documentation of the resuscitation where possible.**

- **Identify and communicate gold standard minimum data set.** Advertised to staff that the current nursing Resuscitation Form paired with the medical Trauma Assessment Form actually gave the gold standard of information needed to provide safe trauma patient care.

- **Identify current aspects of documentation and practice that were positive and necessary to continue.**

- **Implement an interdisciplinary handover for staff involved in the resuscitation before leaving.** Medical officers and nursing staff who left the resuscitation room were to handover to the nurse left caring for the patient once resuscitation efforts in the ED setting were completed. This was to ensure care plans were clear, orders were present and patient history was clear to facilitate better transition handover when the patient left the ED.

The agreed minimum data set (MDS) for information transfer for multi-trauma patients was focussed on the patient, mechanism of injury, past history, clinical stability and any advance directives, their vital signs, how they responded to interventions, what interventions were conducted, as well as the treating teams involved, the future care plan, pre-hospital care given, tasks still left to complete or investigations still pending, upcoming risks, relevant orders for care, relevant family and social information and miscellaneous other information, such as property disposition and police involvement. Aligning the MDS into the SBAR acronym as a structure for handover was important to ensuring acceptance of the MDS in the hospital’s context. The specific aspect of staff signing for accepting change of care responsibility from another clinician was important also to align with incoming policy and recommendations for clinical handover at the
study site. This was imperative due to issues of clinicians not engaging with being responsible at handover to give or receive enough information to adequately care for the patient, as raised by participants in most focus groups.

Implementation of these strategies commenced in March 2011 and continued to be reinforced and championed by the ward change agents and researcher until the end of January 2012. Lanyard resource cards for staff identification badges were well received by ED staff. Posters with the handover sequence and content (Figure 4.2) were present in numerous places in the ED, in each resuscitation area and in each receiving ward. While a screen saver for hospital computers was considered, it was difficult to only place this in the ED and receiving wards and so it was unable to be put into place by the Information Technology technicians. The SBAR handover sequence was also adapted into a handover template resource for clinicians use as a handover summary (Figure 4.3), staff were able to use this template from the start of the resuscitation, adding pieces of information to it to assist in handover and documentation. An example of a completed template was provided to staff using fictitious patient information to accompany this resource (Figure 4.4).

Change agents were initially recruited from those involved in the focus groups and the strategy development group, and then via management suggestion. To achieve as much engagement as possible with the interventions change agents in the ED continued to be added to as staff expressed interest to management. The nurse educator supported ED change agents and along with the TSU change agent they were considered leaders and onsite support for all change agents for the life of the intervention.
Are you handing over or receiving this patient?
This is what should be included...

S
Stats - identify patient, admitting team, receiving staff

Stability/status – clinical stability, advance directives

Situation – e.g. for T/F to theatre, for discharge after test results, to medical imaging soon/via medical imaging?

Background & History
Include: Mechanism of injury, Pre-hospital management, pt past history

A
Assessment & Actions
Include: Observations, trends in vital signs/impact in response to treatment, plan of care so far, tasks to complete, abnormal or pending results, investigations and results

Responsibility - acceptance of change of care responsibility, communication line if deteriorates/teams to contact, immediate patient needs for care/orders to complete, documented information/orders/pathways

R
Risk Management - read back/clarification of critical information, locating relevant orders (fluids, medications etc), specific risk alerts (allergies, infection control, skin integrity, mobility/falls)

Relatives - Family & Social - Family present? Contacted?
Any social or other information that may impact, do we know what family has been told about situation?

Relevant Other – Police involvement, Social work involved, other allied health involvement , property

Adapted from Australian Commission on Safety & Quality in Health Care. (2010). The OSSIE guide to clinical handover improvement. Sydney: ACSQHC.

Figure 4-2 Intervention poster for modified SBAR handover format- Minimum Data Set
**SBAR Template**

<table>
<thead>
<tr>
<th>S</th>
<th>B</th>
<th>A</th>
<th>R</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stats - identify patient, admitting team, receiving staff</td>
<td>Stability/status - clinical stability, advance directives, injury, diagnosis</td>
<td>Situation - e.g. for T/F to theatre, for discharge after test results, to medical imaging soon/via medical imaging?</td>
<td>Background &amp; History - E.g. Mechanism of injury, Pre-hospital management, pt past history</td>
</tr>
<tr>
<td>Assessment &amp; Actions - Observations</td>
<td>Assessment &amp; Actions - Trends in vital signs/impact in response to treatment</td>
<td>Assessment &amp; Actions - Investigations and results</td>
<td>Assessment &amp; Actions - Abnormal or pending results</td>
</tr>
<tr>
<td>Assessment &amp; Actions - Plan of care so far</td>
<td>Assessment &amp; Actions - Tasks to complete</td>
<td>Responsibility - Acceptance of change of care responsibility</td>
<td>Responsibility - Communication line if patient deteriorates/teams to contact</td>
</tr>
<tr>
<td>Responsibility - Immediate patient needs for care</td>
<td>Responsibility - Specific risk alerts (allergies, infection control, skin integrity, mobility/fails)</td>
<td>Risk Management - Read back/clarify critical information</td>
<td>Risk Management - Relevant orders present (fluids, medications etc.)</td>
</tr>
<tr>
<td>Relatives - Family &amp; Social - Family present? Contacted?</td>
<td>Relatives - Any social or other information?</td>
<td>Relatives - What family has been told about situation?</td>
<td>Relatives - Relevant Other - Police involvement, Social work involved, Other allied health involvement</td>
</tr>
<tr>
<td>Relevant Other - Property</td>
<td>Relevant Other - Handover given by:</td>
<td>Relevant Other - Handover received by:</td>
<td></td>
</tr>
</tbody>
</table>

**Figure 4-3 SBAR handover template**
Figure 4.4 Example of completed SBAR handover template

**SBAR Template**

**Stats** - identify patient, admitting team, receiving staff
**Stability/status** - clinical stability, advance directives/injury/diagnosis
**Situation** - e.g. for T/T to theatre, for discharge after test results, to medical imaging soon/na medical imaging?

**Background & History**
E.g. Mechanism of injury, pre-hospital management, pt past history

**Assessment & Actions**
- Observations
- Trends in vital signs/impact in response to treatment
- Plan of care so far
- Tasks to complete
- Abnormal or pending results
- Investigations and results

**Responsibility** -
- Acceptance of change of care responsibility
- Communication line if patient deteriorates/teams to contact
- Immediate patient needs for care

**Risk Management** -
- Readback/clarify critical information
- Relevant orders present (fluids, medications etc.)
- Specific risk alerts (allergies, infection control, skin integrity, mobility/falls)

**Relatives** -
- Family & Social - Family present? Contacted?
- Any social or other information?
- What family has been told about situation?

**Relevant Other** -
- Police involvement
- Social work involved
- Other allied health involvement
- Property

---

Daniel JONES 24y to ICU.
Neurosurgery.
Unstable, Nil in D, Direction to Pt.
For OT when called 02-1245
# Pelvis, # Femur. C/O Head injury.

misc - ejected from vehicle, hit tree (or pt?)
@ 7.55h. Single vehicle, no passenger.
Approx 02.30pm
The hospital - Pelvis broader, splinting @ leg, C-spine immobile, fluids + monitoring.
HX Asthma, BPD, T&E from Bside to ED 0830
- VP 0830. Why ECS + N. + No known hx of Ed, abs.
- Unstable BP - responds to fluid boluses.
  - CVP: Fixed + Dilated
  - Redomethemol + Fentanyl (on board), fluid resusc, 2 LTOH measures.
  - C-SPINE precautions.

DR. HEAD x A+ Haem from Trauma Service.
A& E line unstable, may need resusc.

Police report -
- Unilateral TOT - SDM.
- Needs blood 2.5 US Pk.

Allergy = Sulphur.

Dear lady, this patient has a history of (as mentioned).
Was not spoken to p/c aware of any
but details.

- Police not yet visited.
- Social work not visited.
- Property logged in property book.

Handover given by: [Signature]
Date: [Date]
Handover received by: [Signature]
Date: [Date]

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Formal education sessions given by the researcher occurred weekly during the initial six month period, and after this education was only delivered opportunistically by change agents. All new staff commencing work in resuscitation in the ED were oriented by a change agent to embed the intervention strategies in their practice. These change agents also acted as a mentor for staff adopting the new framework. Random quality checks about documentation quality and being able to identify information in the minimum data set were also conducted by the change agents and fed back to staff to close the feedback loop for staff implementing the framework. At the request of ED senior management and the TSU team, formal presentations of the study and the interventions were presented to keep key stakeholders informed of progress.

Weekly informal support meetings were held with change agents (different ones each week due to shift work) in the ED and monthly with the TSU, and twice during the first six month period in each receiving clinical area. At times meetings with change agents were held via telephone due to shift work and accessibility to clinical areas on days the researcher was not present at the study site.

The above process was designed to be a continuous feedback cycle so that the researcher could act on feedback in a timely manner, refine resources and support the change agents to continue embedding the intervention strategies into practice. In this way the implementation of the intervention was constantly being embedded into the department context, supported by evidence of what was happening in the local area relevant to that department to improve uptake and change practice. As a result the intervention implementation was driven at a local level by change agents rather than only by the researcher.

4.6.4 Strategy implementation challenges

Due to some resistance from staff to accept the shortfalls in practice, strategy implementation had to be modified during the intervention period of this study to overcome these issues. Initially the researcher, supported by the nurse educator and an ED and TSU change agent, presented issues identified in the process of handover and what information was actually documented in patient notes. This was not well received by ED nursing staff, with many nurses (specifically those who had not been involved in focus groups or other aspects of this study) unable to accept the deficiencies identified,
specifically in documentation practices. In order to raise awareness of the issues that were targeted in the intervention, more change agents were recruited who were clinicians on the floor, and therefore colleagues of most of the ED staff. The purpose of this role was specifically to disseminate findings using specific examples as identified above.

Alongside this process, instead of presenting all positive and constructive findings (as it was felt the amount of findings presented may have been overwhelming for staff), findings were prioritised by the researcher, change agents and supervisory team and only the four most important issues and positive documentation findings were extrapolated on in further discussions with ED staff. The strategy development group felt that evidence of positive aspects and shortfalls of practices must be presented together and in multiple formats with time allowed for people to discuss before they would be accepted as a descriptor of that practice. This also allowed for change agents to have more opportunistic discussions with staff in the clinical environment without change agents having to carry in-depth details with them to present to staff. This change in strategy seemed appropriate as ED staff were more accepting of findings and changes to practice, as well as the reasons behind changes.

One possible reason why ED staff felt unwilling to accept research findings may have been because the researcher was not part of their department. To facilitate better access to the researcher and enhance credibility and team building, the researcher was appointed as a visiting scholar to the ED via the research development division of the study site. This gave the researcher access to ward areas, space in the ward offices to provide a weekly physical presence in the ED, and a title/role with which staff were familiar. The researcher applied for this role through the study site’s normal processes and was approved to this status based on meeting criteria and on work already done in the department. This role was a visiting role that was not remunerated, but gave staff access to the researcher, and the researcher was given access to the workplace to conduct research, opportunistically develop staff through interaction and discussion with staff about research, evidence based practice and the role clinical staff could play in this. On appointment the researcher and unit enter into an agreement of goals to be achieved and deliverables for both parties. In return the researcher was given parking validation support, a hospital identification and title, access to a computer, internet and
intranet systems, and the researcher shared publications acknowledgement with the unit and staff involved.

4.7 CONCLUSION

The pre and post-intervention findings, and the description of the intervention have been included with these results as they were considered to be a product of the pre-intervention results and consultation. A number of areas of significant change were identified in the post-intervention results and were primarily focussed on identifying the conduits and barriers to effective and efficient information transfer, along with the principles of information transfer for multi-trauma patients. Results also included improved processes and an agreed structure for handover, identifying roles for team members to take that would improve information transfer, improved overall documentation completeness, legibility, care management plans, trends in patient response to intervention, record of care given, reduced duplication, improved ease of navigating to key data and communication between the ED and other stakeholders (e.g. PERIOP for patient progress, receiving units for when to expect the patient and what they needed to prepare for the patient’s transition into their unit). Other relevant outputs included the identification of a minimum data set required for ongoing multi-trauma patient care upon leaving the ED.

A number of challenges and limitations impacted on these results and will be discussed in the next chapter. These include inherent limitations due to the methods chosen, limitations placed on the intervention by external controls and influences, and limitations due to the size and scope of the study. Despite these limitations the results of this study indicate a positive change in practice in most aspects. The wider implications of these results, as well as local changes identified in this study’s outcomes, will be discussed in the next chapter.
Chapter 5: Discussion

5.1 INTRODUCTION

Information transfer for multi-trauma patients upon discharge from the ED is considered a transition point, one of many in a patient’s journey from pre-hospital care to discharge home and community follow-up. Information transfer is not a new term, and has previously been used to describe “clinician’s activities to achieve and share a common understanding with others such as fellow clinicians and patient families” (Gurses, Xiao, & Hu, 2009, p. 667). Improving information transfer for multi-trauma patients on discharge from the ED was examined in this study and the results are discussed and critiqued in this chapter.

Professional expectations require clinical handover (also known as handoff, sign off, sign out) to occur at transition points to transfer responsibility for the patient (Snow et al., 2009), reduce errors, injury or delay of care and improve continuity of care (Abraham, Kannampallil, & Patel, 2012). It is essential to ensure that handovers supply valid and useful shared understanding of the patient’s condition (Cheung et al., 2010). To achieve these aspects of transition, information crucial to patient care is exchanged between clinicians (Braun, 2012). Information transfer is crucial for giving seamless care and upholding patient safety (Borowitz et al., 2008; Cheung et al., 2010).

The goal for creating seamless transition points is to enable interdependent clinicians and technologies to perform as one (Jacobsson, Hargestam, Hultin, & Brulin, 2012). Cheung et al., (2010) reported that safety often failed first through inadequate handovers. The transition point between clinical areas is considered a higher risk for problems with information transfer than when a patient stays in one department and the transition is between caregivers of the same discipline at the change of shift (Wong et al., 2008). Transition points of care are an important place to implement processes for reducing errors that can impact on patient outcomes (Benham-Hutchins & Effken, 2010). Transition out of the ED is considered even more complex than transitions from other hospital departments, especially when patients leave the ED for the operating theatre or high dependency and intensive care units (Catchpole et al., 2013). Trauma patients are often the sickest patients and need to be transferred rapidly to other care
areas. This makes them the most at risk for errors or omissions during or at transfer (Catchpole et al., 2013) as communication in trauma teams is a complicated process and takes more than just being able to get messages to team members in short time frames (Jacobsson et al., 2012). Teamwork and comprehensive communication between team members is the key to advancing the patient’s care in trauma situations (Joseph et al., 2013).

According to the literature, the quality of a patient’s transition, either between care givers or between departments, is reliant on a number of variables and all of these variables influence the quality of information transfer at the patient’s transition (Calleja et al., 2011). Variables include patient acuity and stability, trauma team factors, level of experience of clinicians, context of where the transition is taking place, time pressures, organisational requirements and norms, handover practices and the number of people involved in the patient’s care (Calleja et al., 2011). The results identified in this study echo those found in the literature, although with slight differences in the emphasis that was placed on factors. Overall, the quality of information transfer was affected by variability in practice, continuity of staff, and being able to put together a picture of the patient from the information provided. These three factors were all affected by the values and context of the staff involved. These findings will be discussed in light of the current literature where it exists or is comparable, in relation to this study’s aims of uncovering best practice for communication, strategies, tools and processes to enhance communication and identifying barriers to implementing best practice and strategies. Lessons learnt in completing the research, the limitations and strengths of the study, along with implications of the strategies in relation to the outcomes will be presented and discussed.

5.2 THEORETICAL FRAMEWORKS USED IN THIS INVESTIGATION

The theoretical frameworks used for this study were based on continuity of care, handover, documented information and staff expectations. Methods to enact practice change, specifically the PARIHS framework also underpinned the strategy development and implementation phase. The use of multiple frameworks was enabled by employing a mixed methods pragmatic approach to answer the research questions in context of the study. In reflecting on the results of this study and how the frameworks assisted or impeded understanding of the practice related issues it appears that the factors of staff
culture and expectations were more complex variables to deal with when working across departments than when dealing with a single context. Also factors associated with a higher number of people involved in patient care increased the complexity of creating successful practice change in a high pressure environment such as trauma care.

Staff expectations, while a subset of responsibility and accountability within Jeffcott et al.’s (2009) model of defining handover, actually appeared to be the largest variable across all areas. The implication of this is that it was of vital importance for enacting practice change in communication structures and outcomes. The influence of all other aspects of documentation, handover, verbal communication and use of information communication technology was contingent upon expectations held by staff.

An interesting factor was that while there were already various handover models in the study context, there was not one model that was universally used; this was the case within single wards as well as between wards. Participants reported discussing information transfer issues and the associated factors for some time, but had not come to mutual agreement about what expectations should be held regarding information needed to provide care to multi-trauma patients.

Given the above, the model identified by Jeffcott et al., (2009) could be modified to incorporate the strong presence and impact that staff expectations and context or specialty bias has on interdepartmental handover. Jeffcott et al.’s current model would likely serve very well for handover within a single discipline in a single work area, but the importance and wide-reaching effects of staff expectations, context and speciality between different disciplines and ward areas is not adequately identified.

Applied understanding of the continuity of care model outlined by Haggerty et al., (2003) has also been obtained through the results of this study. In particular, participants identified that informational continuity (as discussed by Haggerty et al., 2003) was not able to be achieved easily without relational continuity of clinicians. An example of this was to ensure that the nurse who had been caring for the patient in the ED be the one who transported or hand over the patient to the next ward/environment so that information was not further distorted or missed due to discontinuity of clinicians. Nurses in the receiving wards (ICU and HDU) also noted that management continuity was a factor in being able to manage patient ongoing care safely especially when the
patient had multiple medical teams involved in their care. Nurses reported that at times conflicting orders would impact on the patient’s care and this was a factor of fragmentation of communication and management.

In relation to the practice change model used for introducing research findings into practice (the PARIHS model), the use of change agents was invaluable. On reflection any issues with being able to implement changes were dependent upon having sufficient change agents in place and also choosing the right people to be change agents (in as far as credibility and influence). In the dynamic environment of the ED in this study, the formula proposed by the Royal College of Nursing Institute (outlined by Kitson et al., 1998) worked almost exactly in practice as was described in the literature. Culture, leadership and evaluation appeared to be the important factors involved in ensuring that practice change was implemented in the ED context. The researcher concurs with McCormack et al., (2002) that without an in depth knowledge of context, practice change cannot succeed fully or have the desired impact.

5.3 COMMON EXPECTATIONS, PROCESSES, TOOLS, SKILLS AND KNOWLEDGE

A need for common processes, skills and knowledge, as well as communication tools used in clinical practice for communicating about trauma care was a recurring theme in the literature (see Calleja et al., 2011). This theme was echoed in the results of this study, with specific emphasis on the need to develop common expectations for information sharing between clinicians at transition points. To develop common expectations there must be agreement amongst clinicians and an uptake of tools and processes by the whole of a clinical area, especially when clinicians are communicating with others in different clinical practice areas (e.g. communication between staff from the ICU and ED). With a lack of clarity around expectations for handover and patient transition at this study site, it was unsurprising that variability in expectations and the subsequent practice was identified. Expectations of handover and roles that clinicians should undertake preceding, during and after handover should be agreed upon and clear for all parties. In the current study, one major strategy was to align expectations for information transfer and associated processes between clinical areas.
One of the most important communication strategies identified was having a common goal to achieve or a common set of expectations. This common expectation must first be fostered in the pre-intervention phase of any study where researchers implement or expect to implement clinical change. Participants in this study identified that expectations for communication of patient information were different in each clinical area because care goals were different, and while every area felt this was challenging to them, no action was taken to improve this issue. Participants either saw handover as good or poor and felt that improving the quality of handovers in general was someone else’s responsibility, and this meant there was no coordinated approach to the patient's care transition. For example, in the ICU, one participant complained that some nurses’ handover was not worth listening to and so he would just wait to listen to the medical handover. In HDU participants stated that some nurses would deliver patients to them and not handover, just say they were transporting the patient and did not know anything about them. This lack of ownership of the handover process or feedback of expectations allowed these concerns to perpetuate, and remain unseen in the organisation and unacknowledged as being an issue to be addressed. Clinicians working in this type of culture can become “accustomed to poor or incomplete access to information” (Benham-Hutchins & Effken, 2010, p. 264) and as a result have low expectations for information transfer, usually developing their own methods (or workarounds) of gathering the information they need to undertake their work (Chassin & Becher, 2002; Gurses et al., 2009).

Participants from the TSU, who had interactions with all clinical areas, identified that expectations were different from area to area, with a lack of mutual understanding of what was important to handover resulting in no common goal nor how that process should best take place. This has also been identified in studies researching trauma teams in teamwork training simulation events, where prior to the study’s intervention phase a mutual understanding of expectations was not present; however, having a mutual understanding of other people’s roles and being able to communicate effectively through that understanding were imperative to team member satisfaction levels (Kilner & Sheppard, 2010). This situation is similar to the current study; therefore, this finding was one of the issues the strategy development group felt could be remedied. This drove the development of a minimum data set, along with other tools for handing over the multi-trauma patient upon discharge from the ED.
Part of creating common expectations was raising awareness of expectations and needs that receiving clinical staff had identified as being important (to be able to provide better patient care). One issue receiving staff identified was being pre-warned about the patient, and what to expect upon arrival of the patient (especially equipment needed). Staff in receiving clinical areas saw this as beneficial in helping them to ensure that patient transition to the new clinical area was as smooth as possible and thus reduce flow disruptions. Flow disruptions are discussed by Catchpole et al., (2013, p. 587) as “deviations from the natural progression” of an event or procedure which may impact negatively on safety and efficiency. Post-intervention results showed a significant improvement in being notified of when to expect the patient. Removing this uncertainty and being prepared for accepting the patient may have increased the ability of receiving staff in the post-intervention period to have their environment ready and be able to focus on the patient and subsequent handover, hence, improving transition and continuity of care for the patient. Acknowledgement is broad in the literature that while handover or handoff may be a specific care-related activity, it cannot be considered in isolation of clinical workflow both before and after the handover occurs (Abraham et al., 2012).

5.4 COMMUNICATION ISSUES AFFECTING INFORMATION TRANSFER

Communication can be affected by many variables that are different for each person, and this is widely discussed in the literature (for example see Benham-Hutchins & Effken, 2010; Botti et al., 2009; Glass, 2010; O’Toole, 2008; Stein-Parbury, 2009) and one of the reasons why there existed such wide variability in staff practice, expectations and perceptions at this study site. This may be due to the very nature of how people communicate, the lens through which they see themselves (professional identity and role identity), hold expectations of others, previous experiences, the culture of the clinical area they belong to, the role they take/work within and how much individual ownership they take in interacting with others. All of these themes resonated within how study participants discussed handover, expectations, communication with others and how all of these things combined together to create a complex communication environment for those working with multi-trauma patients being discharged from the ED. Communication is affected by:

- the person you are communicating with,
- attitudes to and judgements about the person,
• feelings, thoughts, attitudes to and judgments about the subject and about self,
• cultural, moral, spiritual and religious values and beliefs and socio-political positioning and hierarchy,
• health status, age, gender, sex and sexual orientation,
• personality traits such as confidence, self-esteem, self-concept, introversion or extroversion,
• balance of verbal and non-verbal contributions from the sender(s),
• pressure, stress and other demands at the time of the communication,
• team instability, and
• power relationships between different professional groups.

(Botti et al., 2009; Glass, 2010).

All of these key factors were identified in some way as impacting on communication between clinicians at patient transitions in this study, particularly between clinicians from different clinical areas.

When considering improving or managing advanced communication within a clinical environment two separate aspects need to be considered, the knowledge and skills of the individual clinician and how they are applied in the context, including the processes, tools and organisational policy present in the context. Both of these factors are then impacted on by the culture of the environment. An example of the impact of context is how interruptions affect communication and errors in the trauma setting. While interruptions during care occur in most clinical areas one study found that in the ED this is much higher in number and impact than in other clinical settings (Alvarez & Coiera, 2006). This becomes more of an issue for communication in the trauma setting due to the complexity of the patient (which is often high in trauma), and interruptions for clinicians is even higher for trauma care than other ED patients. High patient complexity and number of interruptions are both known factors that increase chances for errors to occur during communication events such as handover or care planning (Alvarez & Coiera, 2006). The current study found that an essential aspect of supporting information transfer was having an understanding of what good communication was, as well as associated barriers that may exist in that context.
One of the most emphasised aspects of variability in practice identified by participants was in relation to communication: how, why, when, content of, effects of and reactions to other’s communication. Communication is the basis of all human interaction. In every level of life, work, and play, communication is how we interact with the environment and others (Glass, 2010). As such, it is understandable that effective communication is considered one of the major underpinning factors to safe, effective and reliable patient care. Communication is “the activity of conveying and receiving information” and “the impetus for communication to occur and be sustained depends on individual needs, wants, experiences and expectations” (Glass, 2010, p. 4). This is relevant to findings in this study as the surrounding factors of individual needs, wants, experiences and expectations support participant’s reported experiences with communication at handover time. The quality of the interactions was influenced significantly by each of these factors and the context from which each participant came (e.g. clinical area, level of knowledge of the patient, level of broader knowledge and skills). What was challenging was that many of these factors were unseen, not acknowledged or considered by participants in dealing with experiences of communication at handover before they were uncovered in the focus groups. There seemed to be an acceptance that there were so many factors involved in poor communication that it would be too difficult for clinicians to overcome these on their own.

Issues were identified by clinicians who were multi-tasking during handover. Continuing to ‘do’ while listening, often left the impression for staff who were handing over that they were not taking in much of the information that was trying to be delivered. This was observed by ED and TSU staff as being an issue. Multi-tasking is not uncommon in health care, in fact many try to develop this skill to improve efficiency; however, research has shown that multi-tasking in the emergency environment is not without its issues, as it is complex and cognitively taxing for clinicians (Laxmisan et al., 2007). Another study concluded that interruptions and multi-tasking in the ED led to errors due to disruption to memory processes (Coiera, Jayasuriya, Hardy, Bannan, & Thorpe, 2002). There seems to be an impact on information transfer if steps are not taken to safeguard processes to manage risks that arise for communication from multi-tasking (Laxmisan et al., 2007).
5.4.1 Communication that builds a picture

Participants in this study linked ‘good’ or high quality communication to positive handovers and ‘good’ patient transitions, therefore linking those elements of best practice in communication, handover and patient transition as affecting patient outcomes in the trauma context. This is consistent with the literature, as most health care professionals link high quality interpersonal communication with being able to provide high quality patient focussed care (Glass, 2010). However, one major challenge with interpersonal communication is its transactional nature, as communication is neither linear nor predictable (Glass, 2010), and all parts of a communication event are interrelated and effect each other (Arnold & Boggs, 2007). Certainly participants in this study concurred that communication could be the most important factor in patient transitions, and while communication of patient information was often occurring, the nature of it had to be useful to the receiver so that they could put together a picture of the patient, which served as the basis for further care decisions.

Information that is useful to create shared understandings was a feature of another study in regard to improving handoffs in the ED (Cheung et al., 2010). It is clear that all participants in the current study held similar views of the broad principles of communication, but variability in how this was practised or how specific clinical areas developed expectations of communication was evident in participants’ comments. This variability is not just an issue for individuals to improve practice but also for managers to develop systems with appropriate processes to reduce associated risks, for example, standardised processes to reduce variable approaches to handover (Chassin & Becher, 2002). Hargestam, Lindkvist, Brulin, Jacobsson and Hultin (2013) also found a gap between clinicians’ theoretical knowledge and actual practice in relation to communication models during trauma team training. The gap found in the current study between knowledge and practice, as supported in the literature above, may also explain why variation in practice for individual practitioners over time was present for staff providing trauma care.

Participants believed that variability in practice affected all aspects of care given and included factors such as information shared and documented; how teams worked together; expectations of staff; processes that were used and applied, and thus affected the quality of information transfer that occurred. These were all affected by the values
and context of the staff involved. In this study ‘best practice’ occurred if the clinician handing over the patient was in the following situation, as then the quality of information transferred was generally good:

- the clinician had been involved in the trauma resuscitation, where the team communicated well within the resuscitation,
- information was comprehensively documented,
- the clinician was experienced in giving structured handovers,
- the patient was stable,
- the receiving ward was expecting the patient and had been given accurate pre-arrival information,
- the clinicians involved in the handover were listening to each other to collectively identify past treatment and future needs.

However, if any or all of these factors varied, this was likely to negatively affect the information transfer for that patient, and subsequently the transition of the patient.

Best practice in communication has not been well documented in the literature, with many studies calling for ‘better’ or ‘good’ communication but not defining what this means (Alvarez & Coiera, 2006). Participants in this study also had difficulty defining what ‘good’ communication was and found it easier to define what it was not; however, in analysing the data it was found that for trauma patients on discharge from the ED ‘good’ communication was concise, clear, and included relevant information based on a recent knowledge of the patient, the care and treatments provided and how the patient responded. Some of these aspects are supported in the literature, with a number of studies stating that clinical handover must be comprehensive, time efficient and specific (Botti et al., 2009; Braun, 2012) and use a common language and communication pattern (Benham-Hutchins & Effken, 2010).

A study that considered barriers and facilitators of communication at nursing handover (Welsh, Flanagan, & Ebright, 2010) found facilitators to be relevant content, notes and space to write notes, face-to-face handover, and a structured form/checklist for handover. In this current study, ‘good’ communication also meant that both parties
(givers and receivers of handover) interacted appropriately, together with a team focus on the patient and transitioning them from one care focus to another. Other features included that documentation was comprehensive, legible and present, and verbal handover was structured and met the expectations of providing complex care in a high acuity situation. All of these aspects of ‘good’ communication fostered information transfer and subsequent positive outcomes for a smooth patient transition between care areas. This definition of ‘good’ communication formed the basis for the minimum data set, along with what was the ongoing care plan for the patient, specific knowledge about fluid balance, c-spine stability and clearance, if and when the patient needed to have an operation, diet, family involvement and advice given on prognosis, along with other specific patient information.

For communication to be effective, participants in this study also discussed the need for the receiver to actively listen and interact, ‘asking the right questions’, and that the more complex the patient, the more chances there were for issues to occur that would negatively affect the interaction. This is supported in the literature with interpersonal communication being identified as a complex and multi-layered process between at least two people (Borowitz et al., 2008). The aspect of ‘asking the right questions’ as identified by one participant is a form of feedback between the receiver and sender of the message and is essential if the sender is to know if their message is being followed and understood (Arnold & Boggs, 2007).

Being able to put the pieces together related to clinicians being able to build a picture of the patient situation from the information received at handover, and this also included being able to navigate the patient care record. Both of these aspects impacted on how easily and well the patient transitioned to the receiving ward, given the importance of providing care in a timely manner. Clinicians reported this difficulty was mostly due to having to deal with missing pieces of the patient picture. Nurses identified that when vital aspects of the care plan were unclear, missing or unable to be found (i.e. incomplete chart arriving with the patient to their care area) then this directly impacted on them being able to provide appropriate care for the trauma patient. Furthermore, not having a complete chart at handover was detrimental to staff feeling they could safely care for the patient, because it did not let them build a full picture of the patient or validate information handed over. In the pre-intervention period missing, inadequate,
incorrect or irrelevant information were common issues for staff caring for trauma patients. Benham-Hutchins and Effken (2010) have also described this practice of putting together a picture and the issues associated with only part information as was described by the current study’s focus group participants. In their study staff discussed trying to piece information together from multiple sources as channel switching. Channel switching is where clinicians use a number of information sources, supplementing each other, to attempt to piece together and understand the complex history, as well as current and future needs of the patient (Benham-Hutchins & Effken, 2010).

One outcome of staff valuing written information over verbal information was that staff believed that the patient’s ‘real story’ could only be found in documented information. There was a dichotomy here however, as many receiving staff discussed not having time to read the documented information, especially if it was either in a messy sequence of notes/orders/results rather than filed orderly and appropriately, or if it was incomplete on arrival to their clinical area. It is possible that staff who engaged in handover did so with the frame of mind that verbal information was only a temporary measure until it could be validated by the care record. This may also be why the process of going through documentation with receiving staff was seen as best practice by clinicians in this study. Staff attributed this belief to the premise that documented information was more trustworthy than verbal information. Benham-Hutchins and Effken (2010) found that verbal communication was preferred by clinicians when exchanging patient information. While participants in the current study preferred having a verbal handover, they still valued documented information more. Cheung et al., (2010) also identified that where the receiving clinician could not build an adequate picture of the patient from handover, the post-handover period was used to further evaluate the patient and documentation in an attempt to complete the picture of the patient. This may support why clinicians in the current study valued written information more than verbal information, as in their experience it was more useful during the post-handover period as an available resource to assist in building a picture of the patient.

Change agents anecdotally identified an improvement in being able to build a picture of the patient’s needs post-intervention. In conducting the chart audits the researcher used both subjective and objective measures of how difficult it was to navigate the patient
chart. There was a significant improvement in being able to navigate to key information, as well as a significant reduction in time to find information normally required to plan and provide care. Legibility improved overall and duplication of information decreased, perhaps because key information was clearer and able to be found much faster. The utilisation of the trauma assessment form significantly improved being able to find patient assessment and interventions undertaken due to standardisation in the patient record.

One aspect that became clear to this study’s research team was that a commonly held belief that patient outcomes are affected by the quality of communication is not enough to ensure best practice on its own. In fact there seemed to be a separation between what staff believed and what they did in regard to documentation and communication, and as all patients leave the ED after short periods of time, it was extremely difficult for staff to self-identify shortfalls in documentation and communication that were not immediately apparent during the resuscitation or at handover. Unless staff were able to have enough time before the patient was transferred to examine the documentation, which was often difficult due emergency care models and patient acuity, then it was unlikely that anyone other than receiving clinical staff, ED based researchers, or clinicians undertaking a quality audit would actually be in a position to consider this. Perhaps this lack of ability to look back at patient care notes, because the patient was always transferred elsewhere, contributed to staff who were not intimately involved in the study not being receptive to issues identified in their practice. In most other departments there is usually time after the fact to look back through patient notes and consider what is and is not documented.

5.4.1.1 Poor communication and communication breakdown

In relation to communication breakdowns within trauma care and resuscitation, Sarcevic et al., (2011) indicated that these usually occurred due to a lack of team leadership, ineffective communication practices, and poor team performance, which could negatively affect patient care. The perception of leadership held by the trauma team has also been found to be closely related to positive clinical efficiency (Sakran et al., 2012). In the current study participants also felt this to be true and noted communication breakdowns were likely to have a flow on effect. The breakdown would impact on information transfer for the patient upon discharge from the ED, as well as subsequent
handovers and patient transition processes. Cheung et al.’s (2010) study focussed on improving handoffs in the ED and noted a number of transition errors related to sub-optimal handover. Most of these errors would likely have a significant effect on the ongoing care of the patient. What is alarming is that there is a further likelihood of patient information degrading in the first twenty-four hour period that a patient is in a trauma unit. This is due to the high number of speciality teams who often see the patient asynchronously, and therefore plan care (often) in isolation of each other, as well as the other factors affecting communication breakdown already discussed (Effken et al., 2011). Best practice was therefore seen as an adherence to processes and communication tools that had been agreed upon by all clinicians involved in transitioning patients from one clinical area to another and not merely imposed by the preferences of clinicians working in one specific area. In order to achieve best practice, strong team leadership needed to be exhibited in relation to cultural, behavioural and environment factors in how the team performed. Patient safety outcomes can be negatively affected if strong team leadership and adherence to processes and tools is not achieved (Botti et al., 2009).

Staff skills and abilities, as well as the number of people involved in the care team, were also identified as important by study participants and this is consistent with previous literature. While staff may possess the skills or knowledge needed, inconsistent application of these skills can lead to communication breakdown in stressful situations (Miller et al., 2009) and this may be linked to breaches in patient safety protocols and procedures to maintain best practice in communication. Previous studies also found that communication during trauma care was problematic, with regular failures to communicate clearly with other team members identified (Sugrue et al., 1995). This communication difficulty was compounded by how unstable or combative a patient was (Mackenzie et al., 2004) and by the large numbers of people involved in a team, or multiple teams. This is especially relevant to the study site, as the patients targeted for study in this research were often extremely unwell, some so unstable that they needed to be rushed almost directly to theatre to increase their chance of survival as their wounds were immediately life threatening.

Group dynamics also increase in complexity as team numbers grow. One study (Bergs et al., 2005) suggested that the consequences of any mistakes made were likely to be
more severe as patient acuity and team numbers grew. Curtis (2001) noted that team communication expectations affected individuals’ communication in the situation, a factor that increases variability in how individual communication skills are applied.

Participants found conflicting orders confusing and frustrating, and at times they were reported to impact on immediate and longer term patient outcomes. For example, one participant described conflicting orders from two different medical teams involved in one patient’s care around being nil by mouth or on a light diet. Nurses did not find the nil by mouth order until after the patient had been fed and this delayed his surgery until the next day. However, if patients are not given correct nutrition as soon as possible, the high caloric needs of patients who are subjected to trauma are not met and this can also impact on their health progress. This example showed a lack of care coordination by care leaders, as different medical teams were involved in the care. The blurring of who is leading patient care where multiple teams are involved has been identified as a cause of frustration in other studies (Sarcevic et al., 2011) and has been reported to impact on patient outcomes. As such, communication across and within multiple teams where the focus was on different aspects of the patient and their recovery became more complex. This is especially true in trauma situations where not all teams see the patients at the same time. Patients may be assessed asynchronously as different team members become available from other aspects of their roles, for example, the general surgeon may already be in operating theatre and not see the patient at the same time as the emergency physician and orthopaedic surgeon.

### 5.4.2 Advanced knowledge and skills for complex communication management

In this study one finding was that for clinicians to be able to use tools and processes effectively they needed to have the knowledge and skills to do this. In the trauma context they are required to manage complex communication in an often problematic and changing clinical environment, where complex care is given through “short encounters with multiple providers, a situation fraught with opportunities for communication breakdown” (Benham-Hutchins & Effken, 2010, p. 253). In this study the skills clinicians applied were variable and this was further impacted on by factors both internal and external to each person. Consensus in the literature showed that the complexity and opportunity for error through communication breakdown was compounded when dealing with trauma patients due to patient care and transfers being
carried out under time and resource pressures (Catchpole et al., 2013; Joseph et al., 2013), the changing ED environment (Cheung et al., 2010), patient acuity and neurological status, individual performance of trauma team members, and access to information (Calleja et al., 2011). The advanced communication skills needed to navigate this environment and type of patient care were seen to be beyond that of base grade communication competencies for clinicians due to the contextual factors of the trauma patient (Hargestam et al., 2013). Communication in trauma environments became more challenging due to multiple handovers between staff, frequent changing and substitution of team members (Sarcevic et al., 2011), uncontrolled workloads, high risk diagnoses, which were often made from positions of uncertainty with incomplete patient histories, and the time pressure of needing to make difficult decisions before all data could be accumulated (Kilner & Sheppard, 2010; Laxmisan et al., 2007).

In this study, variability in the skills or knowledge of the individual was seen to impact on what staff felt was important information for receiving staff to know. It also impacted on how they communicated information in stressful situations, as well as what they chose to document or how they interacted in a team. Variability in this regard was not an expected finding, as communication is a core competency, and expectations of high quality communication are the norm for health care professionals. This is reflected in the law and regulations by which health care professionals are bound. An important professional expectation for clinicians is to provide therapeutic communication that is not superficial and generates meaning and understanding (Glass, 2010; Johnstone, 2009; O'Toole, 2008; Stein-Parbury, 2009). However, trauma care is considered a specialised type of health care as a result of having many more clinicians involved in the patient’s care which often needs to be provided more rapidly than in other areas of the health care environment, with decisions often made with incomplete information. It must be noted that processes that may work in less stressful, less acute situations do not always translate to trauma care situations (Mackenzie et al., 2004) due to the increased patient and team complexity, patient acuity and focus of care, which are time pressured.

Even though the principles of communication and best practice are espoused in health care settings, a number of barriers exist to being able to implement or sometimes even identify best practice for communication. In addition to fundamental communication
principles, other aspects of best practice for communication identified in this study include being aware of the following factors:

- Communication can be affected by many variables that will be different for each person - so while processes will assist overall communication, quality uptake of standardised processes may still not address all issues involved in poor communication quality.

- The quality of communication and number and types of errors may also be affected by the roles and relationships of team members, especially multidisciplinary teams. A lack of credibility and trust can impact on communication and information transfer.

- Communication errors beget further communication errors, and may cause inaccurate information to be perpetuated for days, especially if documented information is not comprehensive.

- Communication quality, while linked to the quality of patient care, is also impacted on by how many people are involved in providing the care. An increased acuity of the patient can often mean more complexity in providing care, more people involved and a subsequent higher risk for communication errors.

In considering these factors as a result of this study, the way in which standardised processes are implemented in the complex, and high stakes environment of trauma care need careful consideration.

Clear links have been drawn in the literature between the quality of written and verbal communication between clinicians affecting patient outcomes (Australian Commission on Safety and Quality in Health Care, 2011b). Participants in this study reiterated this message and identified immediate issues for being able to plan and carry out safe and reliable care for patients based on the information that had been made available to them, how acute the patient’s condition was, and how many clinicians were involved in their care. The higher acuity and more people involved, the more complex and higher risk for communication errors (Maughan et al., 2011). Safe patient transition has been linked to
effective communication processes by multiple sources (for example Australian Commission on Safety and Quality in Health Care, 2007, 2011b; Australian Council for Safety and Quality in Health Care, 2005; Snow et al., 2009). Communication errors have also been shown to be a leading cause of inpatient deaths in Australian hospitals (Kilner & Sheppard, 2010). As a result, barriers exist to the communication process becoming a reliable, effective factor for healthcare teams in ensuring safe patient transition after a multi-trauma presentation (Bergs et al., 2005; Mackenzie et al., 2004; Xiao et al., 2007). Therefore, another barrier to clear, concise communication and associated processes includes the number of staff involved in the care and the level of patient acuity.

5.4.3 Information transfer principles

Principles that enhance information transfer in this current study were all dependant on how well the clinician enacted the roles undertaken in patient transition. Principles included: relational continuity of the nurse having cared for the patient be the one to transfer and handover the patient; understanding and enacting advanced communication principles; having the complete patient ‘story’ (or minimum data set) before going to handover; accurate information verbalised during handover that is congruent with documented information and a systematic communication structure.

Continuity is a major factor in information transfer. This includes both positive and negative factors of continuity such as continuity of multiple clinicians, broken links in information sharing, processes used for information transfer and discrepancy between information that was verbally handed over and that which was documented. Any problems with continuity creates a mismatch between the patient situation and the clinician’s perception or picture of the patient’s situation. All interventions and strategies developed by the strategy development group aimed to improve communication in order to improve information transfer and with this, continuity of care.

Information transfer principles must be built on understanding communication principles and inherent issues associated with professional communication as previously identified. As trauma patients present with quite complex and acute care needs, often with injuries competing for priority, the positive experiences receiving staff described
were when continuity of the caregiver continued out of the ED and into the patient transition at handover. This is also referred to as relational continuity, which is “an ongoing therapeutic relationship between a patient and one or more providers” (Haggerty et al., 2003, p. 1220). Participants in this study felt that relational continuity at handover then facilitated informational continuity, “the use of information on past events and personal circumstances to make current care appropriate for each individual” (Haggerty et al., 2003, p. 1220). Participants valued this type of continuity as it allowed them to build a more complete, relevant picture of the patient and their care needs in less time, and with less effort.

The roles and relationships of team members can also affect the quality of communication that impacts on patient care for hours to days. If the nurse handing over the patient had provided care for the patient in the ED, the receiving clinical areas identified this as a precursor for a positive handover and effective patient transition. Where the nurse bringing the patient to the clinical area from the ED had not been involved and saw themselves as only transporting the patient, they were not seen to take an active role in the patient transition or communicating patient information. This was identified as a factor in poor handover, which often negatively affected patient transition. It has been well established in the literature that nursing roles in relation to leadership, communication and detecting patient deterioration significantly contribute to patient outcomes (Clements & Curtis, 2012). Taking a leadership role and assuming responsibility for care documentation, and communicating information was seen as contributing to positive patient outcomes in the literature concerning roles in resuscitation teams (Clements & Curtis, 2012). How staff take on roles (particularly in relation to communication and knowledge sharing) in their workplace is in large part due to expectations, those of self, peers and the organisation (de Vries, van den Hooff, & de Ridder, 2006).

Staff from the ED concurred that relational continuity as a principle would improve information transfer, but identified this was often difficult to ensure due to the nature of ED work, turnover of patients, being required to leave their shift on time, and skill mix allocation for trauma patients. More specifically, ED nurses identified that it may not necessarily be the case that the nurse from the trauma team had the full picture of the patient to provide at handover.
One ED nurse described being part of the trauma team, but only having part of the story as she was the airway nurse, so was focussed on the intubation of the patient, suctioning their airway often to keep it clear, and managing the cervical spine of the patient, all parts of care that prevented her from being able to hear (due to noise and use of equipment) other aspects of patient care that would make up the full patient story. Other studies (for example see Cheung et al., 2010) also discussed the signal-to-noise ratio in the ED as a factor that impacted on the ability to communicate clear messages. This is important, as ED nurses described an essential principle of being able to provide informational continuity was having comprehensive knowledge of the patient, or being able to access this information in documented notes. One way they suggested this could improve was receiving a handover from the medical and nursing team leader before the trauma team dispersed. This would improve familiarity with the patient’s often competing needs and reduce any distortions in information as it was passed through numerous people. One study regarding medical officer handover of care identified information transfer as the primary objective of handover, but there are “substantial risks of failing to be told, forgetting or misunderstanding information” during the handover process (Borowitz et al., 2008). Therefore, if team leaders handed over to the nurse staying with the patient before the resuscitation team disbanded, there would likely be less forgotten information or misinterpretation of information, and any anomalies or gaps in information could be identified and rectified before the patient left the ED.

Nurses who had comprehensive knowledge of the patient then needed to be able to present the information in an accurate and systematic way. Therefore, the next principle is that information transfer should be structured and follow the minimum data set requirements. One study that introduced a standardised structure to trauma handovers increased their information transfer from 73% to 93% (Ferran et al., 2008). These two outcomes of this study, minimum data set and a communication structure, are discussed later in section 5.6 Strategy Development.

5.5 HANDOVER FOCUS, PROCESSES AND RESPONSIBILITIES OF PARTICIPANTS

When the strategy development group considered the issue of verbal handover, they not only had to consider the models to use, but also the processes involved. Handover is
often seen as routine and is performed many times in the course of one patient’s care journey (Botti et al., 2009). Many hospitals have tried to refocus staff attention on handover as the essential avenue to transfer pertinent patient information, as well as care responsibility of the patient, in an attempt to reduce fragmentation of care. Other impacts on how effective and efficient handover is can depend on the clinician’s activities and workflow at the time (Abraham et al., 2012, p. 242). As such, barriers and facilitators to handover need to be identified as specific to the unit. Welsh et al.’s (2010) study found that a number of barriers existed to nursing handover. These barriers included too little or too much information, inconsistent quality of information, no time or opportunity to ask questions, equipment malfunction that usually supported handover, and interruptions.

Participants described the ideal positive handover as one where information received was comprehensive, the nurse looking after the patient was the one providing handover, notes were with the patient and staff in the receiving clinical area were expecting them. These factors were felt to result in ‘good’ transition and higher levels of comfort for clinicians taking over complex care, with clinicians expressing a sense of effective and complete handover of patient responsibility. Conciseness versus completeness as a balance to handover content is also a concept discussed in the literature, as the balance of these is often difficult for clinicians to achieve (Cheung et al., 2010).

Many of the above factors were also affected by the values staff held and the clinical context. Some values were commonly held by all clinical staff, including that documented information was more important than the verbal information received. Even though verbal information was needed and valued, documented information had a medico-legal imperative that made it more important. Other values were not commonly held across all staff or clinical areas. An example of a divergent view was that staff from all clinical areas felt that a standardised approach to information was needed and its implementation would be valuable to them. The divergence occurred when staff felt that their ‘approach’ to how this should occur should take precedence over the preferences of staff from another clinical areas. This aspect was where context was applied, as staff from each clinical area had variations, some minor, others diametrically opposed, as to how they agreed on the values held in regard to information transfer and all the aspects related to this (e.g. communication, documentation, handover, trusting
others and information, credibility and care focus). An example of this was in how handover was structured. ED and PERIOP nurses felt that structure should be problem focussed, with the highest priority issues taking precedence. ICU and HDU nurses usually hand over to each other using a body systems or head to toe approach and felt this should take precedence as they always cared for the highest acuity patients in the hospital. This difference seemed to be linked to the difference in care focus that each area had. Emergency and Perioperative staff often focussed on immediate problems that were imminently life threatening or caused immediate high risk to the patient and ameliorating these issues as best they could. Usually these concerns were being treated by the time the patient arrived at the ICU and HDU and staff in these receiving areas therefore felt they had a wider focus of the patient’s problems and needs. This was considered specialty bias.

Specialty bias (e.g. ED, ICU, PERIOP, HDU) formed a large part of expectations and wants, and formed the basis of staff concerns and perspectives. As such, some staff expressed resistance to adopting new frameworks to improve consistency in their area because they were firmly attached to their way as being the most effective way to achieve best practice and questioned why they needed to change as they valued their own practices over others. This type of opposition to change has been noted in other intervention studies in emergency departments, and resistance was particularly noted amongst senior or experienced staff (Kilner & Sheppard, 2010).

Creating structure for handover was an essential aspect of the intervention developed. For verbal information exchange to be successful, there must be common expectations and communication processes used by staff (Benham-Hutchins & Effken, 2010). Focus group results showed that staff often felt forced into handovers when they had not had enough time to adequately prepare, with some staff frantically reading or writing patient care notes in the lift, while others delivered the patient without making an effort to prepare, stating ‘I’m just transferring the patient’. Nurses in the ED identified needing time to gather information that they may not have heard due to being focussed on one aspect of care during the trauma resuscitation, being able to clarify care plans, orders and also know that the ward was ready for them to arrive, as well as considering if the patient was stable enough to be transferred.
During the physical handover, communication needed to be focussed on specific information identified in the minimum data set, as well as active listening processes that ensured information was received. Receiving staff identified they needed to be able to build a picture of the patient to enable them to plan safe and appropriate care and if this was not achieved then patient transition to the new care area was jeopardised. This exact finding was present in Welsh et al.’s (2010) study where over half of the nurses felt that effective handover helped them plan their ongoing work. This is very similar to the process of handover identified in a study that tried to bridge the gaps in resident handoffs in a medical ICU to improve continuity of care (Abraham et al., 2012). Abraham et al., (2012) identified three stages to resident handoff as being the pre-turnover phase, hand off and the post-turnover phase. The pre-turnover phase was associated with activities that coordinated efforts to provide a comprehensive, concise and relevant handoff. These activities included examination of the patient, gathering of information from different sources, updating information on the patient chart, reviewing and reasoning of available information, and preparation of progress notes for handoff communication. The handoff phase related to the information exchanged between outgoing and incoming residents to enable information transfer for safe ongoing care. The post-turnover phase was comprised of patient care delivery activities, planning ongoing care and “review of patient care information to fully understand the patient care and completion of pending and newly assigned tasks” (Abraham et al., 2012, p. 248). Interestingly, the success of information transferred was directly linked to the resident being able to achieve the coordination activities of the pre-turnover phase.

The issue of the listener being engaged in interacting with the person giving handover was a common area of concern held by ED and TSU nursing staff. This engagement could be seen as how well the receiving clinician was accepting information given to them. One study noted that for each communication event in their study, clinicians decided to accept, reject or request further information before deciding to accept or reject information given to them (Abraham et al., 2012). ED nurses in the current study reported feeling constrained, intimidated, or ignored by receiving staff at handover and felt this impacted on the quality of their handovers and communication with receiving staff. For communication to be effective all parties need to respond and interact together, using balanced verbal, nonverbal and written communication to allow the meaning of the communication to be understood in the manner it was intended (Glass,
However, receiving staff in this current study discussed credibility and usefulness of the ED nurses handover and often felt their time was wasted, particularly when staff handed over with poor structure, there were gaps in information, and suspected inaccuracy of the information. Another study that considered preferred information sources for clinical decision making noted that “nurses valued information they considered to be useful, accessible, accurate and of high quality” (Marshall, West, & Aitken, 2011, p. 225). Structure and clarity of handover was very important to information transfer, in particular credibility and acceptance of the information handed over. Therefore, the strategy development group felt the need to emphasise structure for handover processes.

One approach explored by the strategy development group was that patient handover should occur with the patient still on the ED bed, transferring the patient to the ward bed only when the handover was completed. From the personal experience of the researcher and statements made by clinicians during the focus groups it can be difficult to focus on verbal handover if the patient needs attention, is uncomfortable or in pain. Over 84% of patients in the pre-intervention group and 64% in the post-intervention group had injuries that were likely to affect physical transfer at handover. This meant that in a large proportion of patients, moving them off the ED trolley would need extra assistance, focus and care, and would likely cause the patient pain. Therefore, the strategy development group hypothesised that the sequencing of the handover and transferring the patient to the ward bed might affect the ability of staff to engage in the handover. This change in sequencing was difficult for many nursing staff to accept, as they felt pressured to get the patient onto the new bed because the operational support staff were waiting and the nurses felt they may lose their chance for assistance and couldn’t ask them to wait.

Some receiving staff did not agree that it was difficult to listen and fully engage with handover while trying to settle the patient, hook them up to monitors and complete other activities. This was a point of contention with ED staff noting that it was problematic when receiving staff undertook actions such as changing monitors and pumps over and moving the patient across to the ward bed, while listening to the handover. One ED nurse stated “they have only taken in 30 percent of what you have told them” (ED8). The process of multi-tasking and interruptions during communication (including
handover) was of particular note in one study (Coiera et al., 2002) that found this placed a high load on staff in affecting memory and leading to errors.

Staff receiving the patient were also less trusting of information received from a nurse who had not been directly caring for the patient in the ED, whether or not that person was giving a comprehensive handover. Receiving staff immediately ‘had alarm bells ringing’ if the nurse handing over admitted ‘I’m not sure, I’m just transporting the patient’. Staff did discuss this issue being offset if the nurse who had been caring for the patient had called ahead and given a phone handover; however, the inability to validate or clarify information once the patient had arrived, given it was usually very difficult to track down that staff member after the handover had been completed, was a problem.

The difference in values may also account for some levels of staff engagement in the processes. For example, the issue of some nurses not taking responsibility for providing quality information at handover if they had not been the carer for that patient (stating ‘I’m just transporting the patient’) was broadly discussed by ICU, HDU and TSU staff and may be linked back to care focus. If ED nurses were tasked with the transport of the patient and did not see themselves as needing to provide more of a service than this, along with there not being a general expectation of what was required at handover, then this could explain why this practice had been occurring.

5.6 DOCUMENTATION

Although documentation is one form of communication in relation to information transfer, it is discussed separately to handover and verbal communication due to how participants in this study regarded it. All participants regarded documentation quality as integral to information transfer, particularly after the verbal handover had been completed. Careful, accurate documentation of assessments, care given and how the patient had responded to interventions are considered responsibilities of care givers (Arnold & Boggs, 2007). If these aspects of care are not documented then legally they are not considered to have occurred (Arnold & Boggs, 2007). This sentiment was expressed by most participants and was one value that was universally held across all clinical areas. This factor also made documented information more important to clinicians in the long term than verbal information. However, while participants felt that verbal information was not as valuable as documented information long term, at
handover verbal information was considered more important when staff were busy and did not have time to sort through the documentation, and especially if patient notes did not arrive with the patient. Participants also discussed that where documented information was inaccurate this became a persistent problem for the patient’s care for significant periods of time. Staff identified that communication errors created further communication errors, especially if the wrong information was documented, which could be attributed to staff valuing and trusting written information over verbal information. Participants gave multiple examples of inaccuracies and how this impacted on the care given, or made decision making difficult and confusing, thereby putting the patient at a higher risk of adverse incidents. Communication errors that lead to further errors and poor patient outcomes for trauma affected patients are one type of error that can have a cascading effect when they occur during trauma resuscitation and often lead to poor patient outcomes (Sarcevic, Marsic, & Burd, 2012).

When considering strategies to adopt to improve information transfer, international tools and forms were examined to assist the strategy development group in choosing the strategies. Variability existed internationally in tools used to assist with the documentation of trauma care; however, what was consistent was the use of triggers to prompt the clinician to document (or enact) specific aspects of assessment and ensure that care for the trauma patient was consistent. Some forms contained explicit instructions and triggers for clinicians to follow. While comprehensive, these forms were very difficult to work through in high pressure situations and were likely to be too prescriptive. Other forms had very little in the way of triggers and structure and these may be too open to interpretation to be useful in standardising care. Some forms integrated medical and nursing information, for example, when a form was divided to include sections where nurses would document information such as vital signs, fluid balance, details of tubes and other interventions, as well as having areas for medical documentation such as diagnoses and investigations. Other forms were specifically separated forms that had some overlap of information or were only medically focussed so nursing documentation was not included. Based on this examination of forms, and the focus group discussion it was decided that documentation forms and templates that provided a balance of triggers and information for clinicians, and integrated nursing,
medical and allied health areas, consistently provided the best outcomes for documenting patient care for trauma patients.

Nursing staff in this current study seemed to universally believe that there were issues with documentation, but that their own documentation was as good as the current template and situation allowed. Very few ED nurses were in a position to look at their own documentation as patients were usually transferred quickly to another clinical area and as reported in the focus groups few nurses referred to documentation during handover in the pre-intervention period. This created an inconsistency between staff beliefs about documented information and the reality of documentation as measured by the researcher in the patient chart audit results. This is likely the reason so many nurses felt unable to accept the results of the chart audit as identified areas of improvement.

The dichotomy between what clinicians felt they did and what they actually did was also noted in another study on improving nursing documentation using a standardised process (Bjorvell et al., 2003), with a similar gap noted between believed levels of documentation compared to audit outcomes. Hargestam et al., (2013) identified a gap between the underpinning knowledge and applied practice of staff using an interdisciplinary communication model that indicated a need for validated training models combined with implementation studies in trauma team training.

One measure of improvement used by the researcher was how easy it was to navigate to key data, and how much time it took to navigate through the patient notes. There was a significant improvement in the post-intervention period, which may be attributed to a number of factors. First, that writing was more legible, second, documentation was more complete, and third, that a standardised form was implemented and in common use during the post-intervention period (medical notes - Trauma Assessment Form). While these would seem to be the most important reasons for why improvement was noted, the researcher’s familiarity with finding information was also a possible reason. However, when reviewing the field notes made towards the end of pre-intervention period, most of the time spent looking for information pre-intervention seemed to be due to no set place to look for it, requiring the reading of every scrap of information. This was very frustrating as the writing was often not legible, even if the information was present. Therefore, having more complete data and a standardised form that was
well taken up by clinicians saved a lot of time and frustration in finding information. As the researcher audited patient charts in a quiet room with all parts of the chart present and filed, it is easy to understand how difficult it would be to find information in a noisy, busy ward, in a chart that was in a messy state, with notes not filed, as was reported by the participants.

Ease of use of forms and templates was a major concern of participants in this study. A previous study (Benham-Hutchins & Effken, 2010) was conducted to identify how clinicians exchanged patient information in acute settings to consider how health information technology could support communication. They found that communication structures were closely linked to context and how staff transferred information was an essential consideration when developing forms and technology to support communication. Staff felt that the ease of use of forms affected how nurses communicated or used formats for communication (e.g. SBAR), and indeed this could be a factor in favour of developing a user-designed form (Gurses et al., 2009). Ease of use and access to information has been linked to how nurses make clinical decisions and how information is perceived by clinical staff (Marshall et al., 2011).

Forms that were relevant and easy to use were reported by staff to have a higher compliance rate of documentation in the ED environment. Staff in the current study discussed in detail why some parts of the nursing form were no longer completed. For example, some staff reported that over two years before the study commencement they had been advised by management that all fluid balance was no longer able to be recorded on the nursing resuscitation form, but must be documented on an approved hospital wide form. Although fluid balance and the property aspect of the form were the only parts of the form that management had asked staff not to use, clinical staff believed this also included identifying staff involved in patient care, patient discharge information (from the ED), the fluid balance section and parts of the form that indicated how the patient arrived in the ED. This is considered documentation degradation, and is an important argument for ensuring all aspects of standardised forms are relevant and useful. While some studies have noted no difference in the overall survival outcome of trauma patients based on the quality of documentation, there are other important aspects that documentation quality does impact on including audit, research and medico-legal outcomes (Hamill, Paice, & Civil, 2000). The link between documented care and
defensible care in the legal sense is well established in most health related professions (Williams, Templeton, & Smith, 1997).

There was good agreement between participants on the core elements that should be included in the forms or templates, but some disagreement about the detail. This is consistent with what was found in the international forms, where the core information of primary and secondary surveys was contained in all of them and variability existed in the details included in the forms. This is also consistent with debates regarding standardisation. Apart from two studies (Ash, Berg, & Coiera, 2004; Benham-Hutchins & Effken, 2010) most studies report standardising processes in relation to communication improved outcomes (Braun, 2012; Ferran et al., 2008). Detractors from the standardisation approach outlined concerns about standardised processes interrupting rather than assisting the information gathering processes used by clinicians. One study considered the effect of a standardised trauma form on medical documentation of trauma care (Hamill et al., 2000) and found a positive effect on the amount of care documented. They also noted that some level of duplication in documentation was acceptable and even best practice, and mainly included vital sign documentation as a signpost for underpinning clinical decision making. Interestingly, most studies considered in the literature only dealt with either nursing or medical documentation, investigating and reporting on one discipline’s performance and responsibility. There seems to be a lack of research that considers the whole team approach to trauma care, which is problematic as the patient experiences all disciplines in their care experience, not just medicine, nursing or allied health.

Patient records may hold a clue as to the acuteness of a patient’s needs. Patient acuity may also be considered by their injury type, interventions needed and if interventions were not at hand. However, documentation for very unwell patients was often not as comprehensive compared to other patients in both pre and post-intervention chart audits.

In this study, when a patient was in a situation that was considered life or limb threatening, documentation became poorer as staff focused efforts on interventions, and these patients were usually not in the ED for long periods. Interestingly, this was seen as acceptable by most staff receiving these patients. Often these patients spent very little time in the ED, some as little as fifteen minutes and were very quickly transferred through to the operating theatre, as this was the environment that they most needed to be
in to receive their definitive care. Regardless of acuity, some aspects of documentation improved significantly post-intervention. This included being able to determine the staff who were involved in the care and times care was given, where patient property was, and if police were involved. Other aspects of documentation that improved regardless of patient acuity included the content and detail of the patient progress notes. ED staff anecdotally discussed being more aware of where gaps in documentation had been identified and had changed their practice of having the least experienced nurse document information and nominated an experienced nurse or team leader to document trauma cases. This resulted in significant improvements in being able to identify the patient’s level of consciousness upon leaving the ED, recording the temperature of the patient and fluid balance information. Medical staff using the trauma assessment form were able to improve on spinal clearance status, being able to identify a clear plan of care, which consultations were requested, and if the patient needed to go to surgery and when. In highlighting the lack of clarity regarding diet, pain management, and ordering of medications and fluids, medical staff were also able to improve on documenting these aspects of vital care. All of these aspects of improvement assisted with being able to find the information needed to deliver care and reduce information gaps in the post-intervention phase.

5.7 STRATEGY DEVELOPMENT

When considering interventions to improve the practice of information transfer, the strategy development group considered that variability in practice existed not just due to individual staff knowledge and skills, but also by how a team used processes to ensure good communication, the expectations of team members, the patient’s acuity and their presenting situation. These factors were important to identify and plan for, as when attempting to improve outcomes that are focussed on patient safety, the culture and ward climate needed to be accounted for as well (Botti et al., 2009). The group considered a multifaceted approach and simple solutions wherever possible, an important factor in planning communication interventions, as previous attempts to improve clinical handover had often failed due to only focusing on one factor or because tools used to improve practice were not customised to the setting and context (Botti et al., 2009). This was a particular focus in the documentation of patient care, with a strong feeling that the current nursing template (pre-intervention) was too
difficult to use and needed major changes to improve documentation of care and provide a structure for handover.

There is evidence to suggest that user-designed templates increase compliance of communication tools and to date has been an underutilised approach in developing communication support tools (Gurses et al., 2009). However, as management at the time planned to implement an electronic record in the near future and given the complexities of doing this, any changes to the nursing template were vetoed at an executive level. Given this, the group needed to improve the knowledge and the capacity of staff to better utilise the form they had to use. This was concerning for the strategy development group because while simple answers to solve problems were considered ideal, at times simple solutions cannot be relied upon to solve complex issues, as “communication is complex and simple models might not solve the multifaceted problems faced by interdisciplinary teams” (Hargestam et al., 2013, p. 6). However, this aspect of change was out of the group’s control

As a result, the approach to raise awareness of current deficiencies by local change agents was implemented. While this did not completely improve all aspects of documented care, there were significant improvements across many areas of documentation post-intervention. For further improvement it could be argued that a more complex change is needed to solve this multi-dimensional issue of communicating patient care needs via documentation. Changes in documentation were only measured over a six month period; therefore, the sustainability of improvements beyond that time is not known.

The researchers also utilised the practice of recruiting change agents to be consistently involved in implementing the standardised approach to information transfer. This was done for a number of reasons; however, the primary reason was because asking staff (particularly some senior nursing staff) to change processes was difficult. This challenge has been identified in other intervention studies where the focus has been improving communication strategies (Kilner & Sheppard, 2010). Changing clinical processes without engaging clinicians puts the sustainability of changes at risk (Botti et al., 2009); however, in the current study it was difficult in such a large ED to engage all staff in this type of change process. When initially discussing possible interventions with
nursing staff in the ED, much more opposition and disquiet was present than when interventions were brought into the work environment by the change champions recruited from the ED and TSU and who held roles where staff expected assistance and support (for example, the nurse educator, clinical facilitators, TSU staff and clinical mentors in the ED). This may not just be an issue of personal credibility or comfort with the researcher, but also that staff expected to receive new information and requests for different practices from those involved in knowledge sharing roles known to staff, such as the local change champions. Knowledge sharing as a distinct focus of roles and how staff respond to suggestions for change has been identified in previous team communication research studies with knowledge of and trust in the communicator asking for change or sharing new knowledge linked to increased cooperation (de Vries et al., 2006).

5.7.1 Standardisation

Along with agreed processes, participants also discussed the need for advanced communication skills and knowledge, and that an agreed minimum data set was required to ensure that all of the information needed to safely transition the patient was handed over and documented in the patient care record. The minimum data set (MDS) for information needed to safely transfer a multi-trauma patient was developed as an outcome of this study and is a form of standardisation. A minimum data set for what information was needed by clinicians was unable to be located either in the literature, or by examining trauma specific documentation forms from local, national and international sources alone. An outcome of this study was the development and trial of a minimum data set for multi-trauma patients as one element of best practice for communication in this context.

Participants felt that if everyone agreed on what information was important in a minimum data set, then some of the guess work and angst involved in handing over to staff in other clinical areas where expectations were unknown would be alleviated. Indeed, in the literature, standardisation of information received was seen to be a common goal in being able to achieve optimal communication and safe care (Braun, 2012; Klee, Latta, Davis-Kirsch, & Pecchia, 2012). Another study showed a positive impact of standardisation when clinicians followed a standardised trauma care pathway, which improved continuity of care and reduced treatment variations (Bernhard et al.,
However, not all literature is positive toward all standardisation processes. In fact, while standardisation is a common goal and widely implemented in many organisations, some groups question the value of standardisation and the impact that context has on improving handover communications. This concern is raised due to issues created when standardising to improve quality and patient outcomes without fully understanding the nature of handoff communication in various contexts and the challenges faced (Abraham et al., 2012; Benham-Hutchins & Effken, 2010).

Interestingly, standardisation for handover communication in North America was mandated in the Joint Commission’s Safety Goals in 2006 as a top priority particular to EDs (Joint Commission, 2006). In relation to standardisation of information expected at handover in the context of the study site, multiple references were made by participants about not knowing what was expected, and a pervasive feeling of dissatisfaction with the status quo pre-intervention. Participants found it easier to give examples of poor practice, rather than define exactly what best practice was, even when prompted by the researcher. For many clinicians the quality of the handover and documentation made all the difference to whether receiving staff felt able to help the patient transition smoothly into the new care area. Given this major concern with variations in practice, the strategy development group felt it imperative to develop some standardisation of the information required at handover and processes to help balance the poor experiences of staff in patient transition.

In this study it was identified that staff believed patient outcomes, both short and long term, could be affected by the quality, organisation and acceptance/delivery of information at handover. Therefore, the strategy development group wanted to have better processes around manipulating the quality, organisation and process of the handover itself. This was one of the reasons a standardised approach to handover was considered by the group. Standardised approaches to communication have been studied and varied outcomes identified (Bjorvell et al., 2002; Catchpole et al., 2007; Griffiths & Hutchings, 1999; Saranto & Kinnunen, 2009). The results of this current study show no improvement in staff perception of agreed expectations of information documented or handed over; however, chart audit results showed significant improvement in some aspects of documented information.
The commonly held belief that well-constructed, standardised templates can improve the documentation of trauma care was supported by the improvement in the quality of medical documentation in the ED. Standardised tools, while important to reducing variation, still need to be used in a standard manner to achieve best outcomes (Braun, 2012). In the pre-intervention phase a new template was implemented for medical officers in the ED to write up the primary and secondary assessment of the trauma patient. The researcher was able to see a vast improvement in the quality and consistency of the information present, in particular c-spine clearance status, working diagnoses, types of investigations ordered and results acted on. Some of these changes accounted for significant improvements in being able to navigate the documentation.

The minimum data set was adapted into a handover acronym already in place in the environment, as management felt too many specific acronyms in the larger hospital environment might be confusing to staff and not be upheld in the long term, and defeat the purpose of standardisation. SBAR was the acronym in use and so all aspects of information needed by staff to document or handover were adapted into this (see Figure 4.2, page 137). There were no studies found in the literature that outlined a minimum data set for trauma patients. This was unexpected, since one clear finding in this current study was that expectations of clinicians were not being met at handover due to no agreement on what information was required to be transferred. Identifying the minimum data needed for continuing patient care was a positive outcome of the study and provided staff with an agreed expectation of what information was required that could improve the chance that handovers would become more meaningful if this dataset was able to be documented and communicated at patient transition. One study (Maughan et al., 2011) that focussed on medical handoffs in the emergency department found that using a minimum data set and handover structure that referred back to the minimum data set was useful in reducing communication errors in the handoffs.

5.8 WORKPLACE CULTURE

Aside from the nature of workflow in the clinical environment, there is also the influence that management and work climate has on the culture of the workplace and then the flow on effect this has on communication (Botti et al., 2009). While staff may have underpinning knowledge of communication requirements, one study found that staff felt unsupported by the organisation to manage appropriate levels of documented
communication processes in their work environments (Cheevakasemsook et al., 2006). To be able to implement safe and effective approaches to written and verbal communication, organisations must have clear policies related to communication for staff to follow (Australian Commission on Safety and Quality in Health Care, 2011b). In the setting of this study there had been no previously ascribed processes in place to manage the quality of information transfer, patient transition or even clinician expectations at handover. This meant that many staff had developed individual practices that led to widespread variability in how well information was transferred, and little control over patient transition or expectations held of clinical handover. It was this level of variability of practice that led to mounting frustration, poor relations between clinician groups, both within the ED and upon discharge from the ED, and this often impacted negatively on patient transition to another care area.

A lack of significant improvement in staff perceptions in regard to information transfer practices as measured in staff surveys in this study, may be due to some staff still not being clear about or engaging with the intervention. This may have included staff not understanding why a standardised approach was chosen for creating meaningful communication at handover time, the clinical area culture influence and continued divisiveness between clinical departments or other unidentified variables. This limited improvement following a standardised approach has also been identified in intervention projects aimed at improving communication of patient care (Benham-Hutchins & Effken, 2010). Kotter (1995) described why transformation efforts often failed, attributing the number one factor as not enough motivation for individuals to change and that transformation efforts take a long time to change perceptions. In this study it is possible that staff perceptions did not change as the number of staff involved was extremely high, and motivation to make changes dissipated depending on how relevant or engaged the staff were with the need to adopt these interventions. This may have been due to the workplace culture at the time, and because staff were unable to make the full changes they wished to in regard to the nursing documentation template, resistance from some senior staff in accepting the results of the pre-intervention phase, staff not wanting to compromise what they felt should be done versus what everyone agreed on and that shift work meant it was difficult to ensure that all staff received the same message and information that was being used to create a sense of urgency for change.
However, change agents felt that processes specific to supporting good information transfer did improve consistency in information and decrease gaps in information needed for safe patient care. The processes included an agreed handover structure; completed and comprehensive documentation in the nursing and medical trauma forms which were present at handover; and the sequencing of information handed over at transition. Standardisation of processes had already provided good outcomes in this ED in relation to the property disposition process and the form aimed at improving tracking of patient property through their hospital journey, which was implemented prior to data collection for the current study.

Changing staff behaviours in the ED and at transition was essentially what these interventions were aimed at. However, with a chaotic work environment, varied engagement, modified interventions and only six months to complete the intervention, expectation of widespread improvement was likely to be ambitious. Other researchers conducting intervention projects have identified these types of factors as an issue in intervention research and have proposed that to be able to change team behaviours, continual training must be the basis of staff training, and that one intervention would not work (Kilner & Sheppard, 2010).

The credibility of those implementing the change is also a large factor in success. In this study’s context, as nurses were mainly responsible for transitioning patients between care areas and the physical handover of the patient out of the ED, the intervention was mainly focussed on nurses, with some input from medical practitioners. This was a reasonable approach as nurses are seen to contribute significantly to patient outcomes using leadership, communication and being an effective team (Clements & Curtis, 2012).

Trust, credibility and expectations all impacted on each other for staff caring for trauma patients. Many factors affected these issues, such as previous experiences of the clinicians involved in the handover, expectations of the situation/staff involved, processes adhered to (or not), immediately visible discrepancies in information, if staff handing over were involved in the care, confidence levels of the staff involved, and the roles undertaken by the staff involved in the handover. Many staff became dismissive or distrusting of information handed over to them if there were any discrepancies or if a
certain level of expected information was not received. This then impacted on their engagement with the rest of the information on offer in the handover and often coloured their treatment of each other in a professional capacity. The researcher noted quite specific, cultivated opinions of staff performance from other clinical areas that participants reinforced with examples and what often appeared to be unsubstantiated assumptions as to why certain issues occurred. For example, one ICU participant stated ED nursing handover was often not worth even listening to as it was too superficial, and the nurses were always rushed.

_The handover - they have got an 18 gauge cannula in the left arm. I don't give a shit. What does that tell us? Intraoperative issues, they are off on a different tangent. Tell us what is relevant to us. ...I just go ‘whatever’ and insist on the medical one._ ICU4

This approach by ICU4 nurse may still be flawed, as one study identified that in approximately 33% of medical handovers that occurred out of hours, patient information was lacking and led to patient related issues that could have been anticipated and should have been discussed during handover (Borowitz et al., 2008). The findings go on to identify that a handover that did not give up to date information was not useful and for handover to be useful participants needed to identify the overall rationale for the plan of care and contingency plans for potential problems.

Nurses seemed to be distrusting of verbal information given to them by other nurses when inaccuracies were uncovered and there were only small amounts of information available to them. In contrast to this, nurses discussed trusting verbal information given to them by doctors more than from other clinicians. This seems to be an issue of credibility is consistent with Marshall et al.’s (2011) findings about staff evaluating and judging credibility of the individual providing information, rather than considering the value of the information itself.

**5.8.1 Specialty bias**

Considering the different perspectives of the participants in this study, there seemed to be a lack of teamwork around the focus of patient care and the means to achieve patient focused care, rather than clinician focused care. There was not a team approach to
handovers with the patient as the focus. Instead of fostering a collective responsibility, clinicians seemed to draw a ‘line in the sand’ when handing over the patient, with an attitude of ‘once handed over then that’s all you have to do with it - then it’s someone else’s issue to deal with’. This observation by the researcher was reinforced by the difficulty the strategy development group faced in coming to an agreement on the details of the strategies to be implemented, with most clinicians not wanting to compromise their processes or structure, but expecting clinicians from other care areas to agree to what they wanted as a whole. An example of this was one medical officer in the strategy development group stating he did not see the point of the group focussing on improving transfer of information for the fluid balance of the patient and how much they had received during resuscitation. This clinician felt that he would use all the fluid required to resuscitate and stabilise the patient, and this should not really matter to the receiving clinicians, what was important was that the patient was stabilised. A lot of discussion was needed before this clinician understood the perspective of why this information was important to receiving clinicians. Fluid balance was even more important to know if it came to light that the patient also had chronic condition such as renal impairment and may have to manage clinical deterioration later as a result of fluid overload, and that knowing the fluid balance of the patient on transfer made this easier to predict and manage.

The researcher noted distinct references to culture and stereotyping of nurses, by nurses from other care areas, according to where they worked and has referred to this as a specialty bias. From focus group interactions and observing the strategy development group (where nurses from different clinical areas came together) the researcher noted that nurses did not seem to understand nurses from other specialities (e.g. ICU vs ED) in terms of their expectations, perspectives and realities of care environments, unless they had worked in those areas. In this study it seemed that the culture in a unit was driven by discipline specialty biases, as well as individual and collective attitudes and practices. Indeed the expressions used by staff when discussing care focuses seemed to value their own care focus over that of other clinical areas as being more important, when in fact all focuses are important for the patient at different times of their care, hence the need to transition patients between these areas.
Every institution I have worked at, there is the general animosity between nursing staff, especially in critical care areas... ED, ICU and theatre... We are specialised in our little nook and our way is the right thing to do from our point of view. ICU3

One facet of ward culture seemed to be derived from the focus on patient care in their environment. For example, in the ICU one participant talked about this explicitly with ED being focused on immediate issues, while ICU focussed on ongoing care issues. It was interesting to note that ICU and HDU nurses had similar care focuses, and attitudes towards receiving patients from ED and PERIOP. ICU and HDU’s focus was a longer term view on prevention of issues and regaining of function and valued a structured, controlled approach to patient care. PERIOP and ED nurses had similar care focuses - immediate and short term, and valued being able to identify and solve immediate problems. An example identified by an ICU participant follows:

Their (ED) goal may be dump and run and I get that. Our role is to pick up the dump and turn it into a discharge. ICU3

5.9 TIME

Two aspects of time, including the availability of time and the time of day was perceived as affecting handover. Time available for handover influenced staff from different streams in different ways. In the ED time was seen as affecting documentation of care and transfer of a patient to another area. Not having enough time in relation to documenting patient care has been experienced in other studies as well (Bjorvell et al., 2003; Chan et al., 2013).

In every other clinical area, staff discussed the time of day as a factor that impacted on patient transition. In the perioperative area, day time was more confusing and not ideal for trauma patients to be transitioned, due to having more people around, the area being noisier, busier and generally after hours was easier for clinicians to focus on and manage a handover. In ICU and HDU it was the opposite, with afterhours being a more difficult time to manage transition and handover due to fewer staff being around to assist. HDU staff felt that during hours on weekends was as difficult as afterhours on weekdays due to this reason, however, this was not the case in ICU, with weekends
during working hours being similar to week days for staffing levels. Therefore, clinicians discussed time as a barrier to implementing best practice in these different ways as specific to their context. One study (Chan et al., 2013) described time constraints as impacting on how patient care was given with more competing demand leading to task-centred nursing, which in turn becomes impersonal care provision. This type of time pressure also attributes to ‘habituated’ ways of working and this can lead to errors and omissions in care.

5.10 FRAGMENTATION

Fragmentation in care is a reality for trauma patients due to the local model of medical care. This is a large factor in affecting communication quality and continuity of information as it is transferred at transition points. In other countries one trauma physician is the lead clinician for the trauma patient from admission to outpatient follow-up care, and even though other speciality doctors or team members may become involved in the trauma patient’s care, there is still one clinician who has the role of being the unbroken link as the patient navigates their way through their care transitions (description of model of care courtesy of personal communication Dr Michael Schuetz, 16th March 2010). In Australia, fragmentation of care for trauma patients is an accepted approach relating to many local models of care and as such, nursing related roles have emerged to ameliorate the issues associated with this fragmentation. Roles such as Trauma Nurse Coordinator/Case Manager have evolved in Australia (Curtis et al., 2004), with teams such as the Trauma Service at the study site another way of attempting to address fragmentation of care. In this study, clinicians agreed that when there were three or more medical specialities involved in a patient’s care, then coordination of care and effective communication between these teams was exponentially more difficult.

Fragmentation applied to practice related to broken links in documented or duplicated information, missing information due to patient acuity overtaking ability to document the treatment in time; time imperatives which affected each clinical area differently; and discrepancies between documented information or verbal and documented information. If staff were unable to clarify information and therefore experienced a broken link to information validity, this resulted in an information flow breakdown (Abraham et al., 2012). Fragmentation and duplication for emergency patients has also been found in
other studies as an issue impacting on the complexity of care (Kilner & Sheppard, 2010). As in most cases, factors that influence outcomes may be conduits or barriers to good outcomes, depending how they are enacted or affected. While fragmentation in communication and care givers was a barrier in this study to achieving good outcomes, in contrast to this was continuity.

Continuity applied to practice related to continuity of clinicians, and positive processes that were used to transfer information. Continuity factors that were positive or upheld also led to comprehensive information transfer; however, where continuity links were broken clinicians reported risks to patient safety due to minimal, missing or inaccurate information, or not being able to access accurate information in a timely manner. Continuity was the overarching aim for information transfer, including activities that lead into this such as handover, as well as clinician led roles such as trauma care coordinators. In fact continuity can be considered in three ways (Haggerty et al., 2003). Informational continuity, which is the appropriate use of information both present and past to make current care tailored to the individual. Management continuity, is the consistent approach to how the patient’s health condition is managed and responds to the patient’s changing needs. Relational continuity, an ongoing relationship of a therapeutic nature between one or more care providers and the patient (Haggerty et al., 2003).

Participants in this study discussed another issue of fragmentation in relation to informational continuity when they were not able to put the pieces of the patient story together and how this impacted on the patient transition to their clinical area. Their main concern was about planning safe care and this was significantly impacted on by missing or inaccurate information about the patient and their care. A major issue was how difficult it was for ED staff to be accessed after the handover had finished. In the ICU and HDU staff highlighted that being unable to validate/check information with ED staff was an issue in obtaining the ‘full true story’ of the patient’s care. Much of the process in handing over and looking at patient care notes was in the clinician assuming responsibility for the patient and being about to develop a picture of the patient with a complete ‘story’ of their injuries, care received and patient response to interventions as well as an ongoing plan of care. ED staff supported this view and stated that after handing over to the receiving clinicians they were usually very quickly, deeply involved
in another patient’s care, and it might be difficult to get to answer questions over the telephone. This also created tension in the ED staff who needed to care for patients’ still awaiting transfer to another clinical area and assessing and caring for new patients arriving in the ED. Staff were often torn between wanting to give the best possible handover, but also getting back to the ED as quickly as possible, which is why ED nurses could be perceived as being too eager to get back to the ED at handover time. This was a common view held by ED, ICU, HDU and TSU staff. Competing goals of ED staff is also discussed in the literature (Cheung et al., 2010) as impacting on care transitions. Cheung et al., (2010) proposed that balancing the goals of providing the best possible handover and continuing to provide care in a changing ED environment would continue to be challenging for most clinicians.

5.11 LESSONS LEARNT

As a beginning researcher a number of lessons were learnt about factors other than the research topic, but directly related to undertaking intervention based work in a clinical environment. These factors incorporated issues of research conduct, role of the researcher and engaging staff to change practice.

Barriers and conduits for this topic were generally the same things, often positives and negatives of each other. They were either a barrier or conduit based on the clinician’s choice of action, knowledge, attitude, environment factors and practices they subscribed to. Recognition of the dual aspects of many issues influenced the development and implementation strategies for the intervention.

As a researcher, building credibility and acceptance in a clinical area when you are not a clinician in the area requires time, multiple and reliable exposures of staff to you, presenting yourself as having credible business in the clinical area and being seen in the company of key people in the ED who already have credibility (e.g. the nurse educator), and an accepted way of thinking about your role for example, ‘visiting scholar’. Without this, it is very difficult to build credibility and therefore engagement with the wider clinician group. This may also have been an issue specific to this context, culture and setting, but based on focus group findings where ICU and ED nurses identified a specific culture to being an ED or ICU nurse, it may in fact just be another facet of the culture of nurses working in highly specialised areas.
Even though interventions in this study have improved aspects of documentation, it appears that staff perspectives of practice improvement are harder to gauge and perhaps change. However, this could also be due to the staff turnover factor and being unable to remeasure staff perceptions of the same staff cohort from pre-intervention to post-intervention phases.

Highlighting specific issues in documentation without changing documentation forms and templates can still positively affect documentation quality. One manager commented during the strategy development phase that shining a light on particular issues gave staff something to aim for instead of a broad explanation of issues, which was likely to confuse and divide staff. This seems to have particularly been the case in this ED environment. Following the initial staff resistance to gaps found in the documentation of care, the strategy development group and change agents prioritised the gaps in documentation, and specifically highlighted the issues seen as the most important to improve. In the post-intervention period these areas (fluid balance, level of consciousness on leaving the ED, the temperature of the patient, identifying staff who were involved in the care, when care was given and being able to build a picture of the patient in how they responded to interventions) all significantly improved. However, for this level of change in documentation to be sustained and continue to grow, follow up training and specific support of these interventions, including auditing of the practice and feedback is imperative (Bjorvell et al., 2002).

5.12 STRENGTHS AND LIMITATIONS

The strengths of this study related to the work and intervention being undertaken in context with relevance for the clinical area. The development of both the chart audit tool and staff survey tool ensured relevance due to having evolved out of the literature and focus group findings. The strategies implemented were also driven by key stakeholders in the clinical environment and the manner in which they were developed was inclusive, negotiated, collaborative and consultative. In line with a common belief that simple solutions cannot often solve complex problems, the intervention was multi-faceted and relied on more than just the researcher to embed them into the clinical environment. Using change agents from the environment where change was occurring ensured that the change message was being delivered in a less threatening way then by an external entity and was consequently more credible and acceptable to staff.
Limitations are present in every research project. Limitations specific to this study include aspects of the study design, resources and topic related issues. In using focus groups to identify specific issues and the details of the issues associated with this topic one limitation to be considered was whether the issue to be discussed was too sensitive (Happell, 2007). In this study however, communication of patient information was, in the researcher’s opinion, not apparently sensitive for group members to discuss openly, as long as they were within their own ward areas. When staff were discussing these issues later in a mixed group (see strategy development group) this dynamic changed and group members seemed to find this topic and discussion about barriers and conduits to effective information transfer more sensitive, and discussions were more often easily inflamed and argumentative.

In using chart audits to collect information, a number of limitations may be considered. Patient information must be documented in order for the researcher (or clinician) to extract it. Comments from focus groups identified missing patient progress notes and notes that were unfiled, and in ‘a mess’, and for this reason the presence of notes from specific health professional disciplines was recorded. However, it must be taken into account that the researcher audited patient charts that were collated and filed, and therefore cannot measure the condition/collation of the patient chart or access to progress notes (if at time of transfer they were still with the doctor or left behind in another care area) as described in the focus group comments. This condition notwithstanding, medical, nursing and ambulance notes were usually present (see table 4.6).

Further limitations in utilising chart audits existed around judging content out of context. Clinical documentation of patient assessments, interventions and observations is bound by a number of legal requirements, for example, date, time, name of clinician and designation and that it is written in indelible ink. Patient progress notes are only valuable to clinicians if they also comply with rules of relevance, legibility, completeness and objectivity. Not all of these conditions could be judged by the researcher. Issues such as relevance, completeness (except where specific rules apply such as drug orders) and objectivity are difficult to judge without the researcher comparing the written notes to the patient condition.
Not being able to fully implement the strategy developed by the clinician group in response to pre-intervention findings was a further limitation; however, still being able to generate positive outcomes within these limitations is a strength of this study. Resources, wider hospital initiatives and other environmental factors meant executive management of the clinical area restricted and required adaptation of the strategy before they would agree to implementation. This may have negatively impacted on the level of improvement identified in the study in the post-intervention period. This also delayed the intervention timeframe of the study, which impacted on being able to take advantage of the momentum created by change agents to engage with the intervention.

The nature of the clinical environment was another limitation in being able to gather clinicians together. Except for the researcher, the nurse educator and the trauma service, all clinicians and change agents involved in this study worked a 24 hour rotating roster in their clinical area. One study (Klee et al., 2012) which implemented changes to communication structures was funded to have a whole week of strategy development where clinicians were offline and able to focus on developing interventions and contingency plans. This approach would be more likely to produce better interventions, better planning for issues that may arise, and better engagement due to not having to juggle shift work and patient loads to attend meetings.

The design of this study did not test for uptake of the intervention, and focussed only on measuring projected outcomes. This may be an issue for pinpointing parts of the intervention that were more or less successful due to not testing for ecological validity of the interventions and tools used (Botti et al., 2009). Ecological validity is “the degree to which interpretation or innovations reflect the real-life situations in which they are to be applied to” (Botti et al., 2009, p. s159).

As identified previously, a number of aspects of documented information improved. However, this study did not identify if incomplete charts on arrival to the clinical area the patient was transferred to was still a major issue in the post-intervention period. While there was general improvement in staff perception of documented information (as identified in the staff survey), this improvement was not of a statistically significant level. One apparent confounding factor was that many of the staff in ICU (who made up the majority of participants) who had taken the pre-intervention survey were no longer
present to take the post-intervention survey (this was open to all nursing staff in the ICU and HDU) and so a true comparison of their perception of before and after intervention was not able to be undertaken. The constant people in this study were the researcher and change agents in the different clinical areas.

While staff perception of expectations were measured both pre and post-intervention, deeper views of staff expectations were not able to be explored as in the pre-intervention phase. Clinical handovers were also unable to be observed for adherence to the minimum data set identified.

5.13 CONCLUSION

Information transfer for multi-trauma patients on discharge from the ED is a complex topic. The results of this study, particularly in relation to transitioning the patient from the ED to their next clinical area for care provision, have been discussed in this chapter. The aim of handing over patients at transition points such as these is to reduce the risk of errors, and provide enough information so that those assuming responsibility for the patient can safely plan and implement care. Issues that can arise when this process does not succeed may include errors in patient care that can cause immediate harm, reduce likelihood of recovery from injuries, or increase the time of recovery from injury or harm sustained from the error. Errors can occur due to care delivery delay, medication errors, fluid status issues, inadequate nutrition, drug interactions, unclear care plans, and communication errors such as incorrect information or the absence of necessary information required to safely make care decisions.

In this chapter best practice, challenges and barriers were discussed in relation to the study’s results and the literature. Areas of discussion included common expectations, processes, tools, skills and knowledge, poor communication and communication breakdown, and information transfer principles. Information transfer principles were specifically discussed in regard to handover, documentation, standardisation and culture. The impact of time, information and carer fragmentation were identified as impacts on information transfer. In addition, the lessons learnt, and strengths and limitations of this study were also discussed.
Chapter 6: Conclusions

6.1 INTRODUCTION

Chapter six will conclude the reporting on this study. The importance of the topic of this study some seven years after the commencement remains a focus in the health care environment. Communication between health care providers remains at the core for quality improvement strategies in all health disciplines. Literature reporting on issues of communication breakdown, initiatives and trials to improve communication and communication related health care outcomes has increased immensely in the last five years, as health care professionals have been encouraged to try to find ways to ameliorate issues associated with communication breakdown and the impact this can have on patient outcomes (see for example American College of Obstetricians and Gynecologists, 2012; Australian Commission on Safety and Quality in Health Care, 2011a; Institute for Healthcare Communication, 2011; Jorm, White, & Kaneen, 2009; McCarthy, 2007; NSW Agency for Clinical Innovation, 2013; The Joint Commission Enterprise, 2012; U.S. Department of Health & Human Services, no date). The aims, questions asked, methods used, along with the findings and results will be summarised and opportunities for future research and education as a result of this study will be presented. A dissemination plan for study results will also be outlined.

6.2 STUDY AIM

The aims of the current study were to identify what health professionals deemed to be best practice for information transfer for multi-trauma patients when discharged from the ED. Within this, the researcher aimed to identify barriers to effective communication and factors that enhanced effective communication in order to develop, implement and evaluate strategies to improve communication for multi-trauma patients at a major metropolitan trauma hospital.

6.3 METHOD

This study was a single site multi-phase project that employed a mixed method research approach. The four phases were: Phase 1- context appraisal; Phase 2- strategy development; Phase 3- strategy implementation; Phase 4- evaluation. Methods used
within the four phases of naturalistic enquiry included a literature review, focus groups, patient chart audits, a staff survey and the evaluation of national and international practices. Methods were employed to directly answer research questions.

### 6.4 FINDINGS

Best practice identification was one of the main aims of this study. Generally participants believed that best practice for information transfer was clear, concise, pertinent communication at handover, relevant clear documentation that travelled with the patient, handover communication engaged in by both sender and receiver, and processes which were standardised and met the needs of all involved.

When asked specifically what information transfer ‘looked like’ participants were often unclear. In trying to describe what information transfer was and how it was enacted, the researchers noted a specific cultural context that staff identified with (e.g. ED vs ICU). Their culture seemed to be influenced by the approach to care in that environment, and was termed as a ‘specialty bias’. Specialty bias was where staff expectations were coloured by what their environment’s goal of care was and often staff devalued practices and approaches from different areas as not being as important for the patient.

In considering documentation for the multi-trauma patient, the nursing and medical templates used in the environment actually upheld the gold standard of information details; however, due to parts of the nursing form no longer being relevant, there tended to be poorer overall documentation in the nursing form. This documentation degradation occurred as staff felt the form was cluttered and difficult to navigate; therefore, staff did not fully engage in using the obsolete areas of the form.

The researcher noted difficulties in engaging staff from different areas (ICU, HDU, ED, TSU and PERIOP) in levelling expectations and developing common strategies, as staff did not want to compromise or change their present practices and expected others to change to suit them. The strategy development working party did finally identify strategies to improve information transfer; however, again these needed compromise when presented to ED management due to other external factors impacting on implementing all of the strategies. As a result, not all of the strategies put forward by the working party were able to be implemented and tested.
The researcher was able to measure significant improvement in documented information; however, other factors such as patient flow, timeliness and completeness of handover communication showed no improvement. Staff perception of information transfer did not improve, except for the factor of wards being notified ahead of time (the only significant measure of patient flow improvement). Since the methods did not include third party observation it is difficult to say with certainty if the factors measured actually did not improve or if staff just did not perceive any improvement. Long-standing perceptions are hard to shift. One reason for this viewpoint stems from when the research outcomes from the pre-intervention chart audit were being presented, ED staff found it difficult to believe the feedback on the results and felt the results did not represent their actual practice, despite the measured evidence.

6.4.1 Recommendations for practice

While some factors may be specific to the trauma care context, some issues are likely to be universal for patients transferring from one care area to another. For information transfer to occur the following practice recommendations need to be considered:

- Expectations of clinicians in different care areas in regard to information, and processes required to ensure positive patient transition need to be agreed upon by representatives from each care area who are credible (with their own colleagues).
- Agreed expectations of clinicians that communication is a two way responsibility of the giver and receiver, and does not just rest with the giver of information.
- Staff need to actively engage in listening, avoid ‘doing’ at the same time.
- An organisation wide communication structure to present the minimum amount of data needed to continue care for the patient, both for documentation and handover, is implemented.
- A process is followed to notify the receiving ward expecting the patient to ensure accurate pre-arrival information, such as patient condition and equipment needs, is clear before transferring the patient.
- Staff handing over need to prepare for handover before transferring the patient, ensure written care orders are present, clarify any unclear issues, orders or information with other team members before the team disperses.

- Documentation forms and templates, which provide a balance of triggers and information for clinicians, and integrated nursing, medical and allied health information, should be considered for use.

- Patient care documentation should be comprehensive and ensure trends in patient response to interventions, and an immediate and future care plan is clear.

- Be non-judgmental of staff handing over. For example, trauma team care is often chaotic, noisy and unpredictable and ED nurses handing over to nurses who are in controlled clinical environments like ICU and HDU often feel intimidated, unwelcome or looked down upon because aspects of care have not been able to be attended to in the ED environment.

- Receiving staff need to know what type of questions to ask during handover to ensure the information they receive will best support patient care planning and transition into the new care area.

- Where possible provide relational continuity, the clinician who has been involved in the care is the same person to transfer the patient to a different clinical area.

- All staff involved in handing over need to use professional terminology. This ensures a common language to ensure information is clear and not misinterpreted due to colloquialisms or abbreviations having multiple meanings.

- The clinician providing handover should review the documentation with the receiving clinician, during this process location of information and orders should be clarified, patient response to interventions identified, and if any trends in changes in the patient’s condition are linked to interventions.

- Management should consider the most effective ways to delegate staff to take on new processes or change existing ones. They need to consider the motivation for doing so, the skills and knowledge staff members already have
that are transferrable to the new processes, and the subsequent support and implementation methods chosen for the environment as being appropriate for the situation.

When followed, these principles should optimise the transfer of information and therefore transition for the patient upon leaving the ED. Nurses need to feel confident in being able to accurately handover the patient, and being able to meet common expectations. This should also improve the satisfaction of the receiving staff in accepting the patient into their clinical environment. Ultimately, while these principles are focused on staff, the patient is the one who reaps the benefit of a smoother transition between clinical areas.

6.4.2 Recommendations for education

The following recommendations relate to education to improve information transfer when patients are transferring from one clinical area to another:

- Within the clinical context, in house education should occur in relation to handover approaches, with an emphasis placed on the dual responsibility of clinical handover for both the giver and receiver. Few training programs formally teach clinicians how to handover and even fewer assess handover skills (Borowitz et al., 2008). Goals and characteristics of a concise and complete handover must be defined before curricula can be implemented (Borowitz et al., 2008). In the current study, goals and characteristics of what information must be transferred for trauma patients leaving the ED have been identified, and this could be used as the basis for curriculum development.

- Actively teach and examine communication skills for both one-on-one interaction and team interactions in undergraduate programs, and this should include the roles of team members. Simulation approaches have been identified as useful in being able to blend theoretical and practical approaches to teaching and learning that is meaningful from a student perspective (Capella et al., 2010; Miller, Crandall, Washington, & McLaughlin, 2012; Miller et al., 2009; Roberts et al., 2014).
A perception practice gap exists in how staff see their own written communication. Education could be given on self-auditing as a means of self-reflection and personal professional development. This will also require executive support to allow chart recall, and supported time and structure to ensure that the most benefit can be extracted from this process.

- Develop team leadership qualities in nurses handing over. Nurses need to be able to clarify priorities needed for patient safety and care. When nurses are handing over in a care area that is not their own, or are receiving handover from staff from different areas, leadership skills such as assertiveness, focusing others on a task, keeping control of a situation, assessing effectiveness of the interaction and changing approaches when issues are identified are important to optimise the effectiveness of the handover.

- Within each specialty environment teach staff how to ask the ‘right’ questions during handover. This may be very specific to their models of care, the type of care environment and scope of practice of clinicians. A transferable skill for staff would be how to identify what the right questions are for the situation at hand and the type of patients they are receiving. This is also likely to be linked to what the minimum data set is for the type of patient involved.

### 6.4.3 Recommendations for research

Opportunities for further research related to this study and that of information transfer include the following areas:

- Replicating the current study in other sites and comparing similarities and differences in outcomes.

- In handover, what type of information do staff value most, verbal or documented? This research would focus on what staff engaging in handover believe about verbal information. Initial findings in this current research suggest that they believe it is only useful until it can be validated by documented information. However, this was not the focus of this current study and warrants further investigation, as findings for this question may suggest different improvement strategies and focus in clinical practice.
• What are the long term changes or improvements to documentation at this study site? Consider conducting longitudinal evaluation of results from this current study. Evaluation of interventions in this study were considered for up to six months post-intervention. Considering results of strategies implemented over a longer time frame may validate further recommendations made from this study and raise issues around long term practice change.

• How closely does documented information match the care given during trauma and the handover of that care? Anecdotal information suggests a mismatch may frequently occur in this area. However, this type of research is time and people intensive and was outside of the scope of the current study. Considering what people hear during care delivery and then in handover and then choose to document would be instrumental in understanding what variables exist in this type of decision making and identify areas for improvement so that written records are as comprehensive, yet concise, as possible.

• How transferrable are the strategies implemented in this context to other health care patient transitions? If these strategies can be shown to improve information transfer in this high risk, time pressured cohort, then perhaps these strategies may be successfully transferrable to transition points which are not as time pressured and where patient acuity is not as high.

6.5 DISSEMINATION PLAN

The results of this study will be prepared for submission to high ranking peer reviewed journals. The results will also be presented at two international conferences. Presentation to local level research schools will also occur, as required in the development program for research students at the university involved and a final presentation will be offered to the study site.

6.6 CONCLUSION

The conclusion to this thesis is presented in this chapter. Study aims, methods and findings have been summarised. This study has identified many factors that influence information transfer for the multi-trauma patient on discharge from the ED. It has presented strategies developed to improve information transfer in this cohort, as patient
transition is a high risk time for errors and communication breakdown, which impact on patient safety and quality of care. The implications of the findings have been discussed within the broader literature and evidence. Recommendations for practice and research were presented, along with opportunities for further education.
Appendices

Appendix 1
Questions used to guide focus groups

Transfer of patients from ED (for ED staff only)

1. Consider two recent multi-trauma patient transfers from the ED. One transfer should be for an ideal transfer and the other should be an example of where the transfer of information was not ideal. Can you now tell me about what went wrong, what made you feel the transfer of information was not ideal?

2. In the scenario that was ideal what factors/processes made it ideal?

3. Are there specific pieces of information that you feel are important for any multi-trauma patient? I will list these.

4. Do you feel documented care is important to inform future care? Can you tell me why/why not?

Transfer of patients receiving from ED

1. Consider two recent multi-trauma patient transfers from the ED. One transfer should be for an ideal transfer and the other should be an example of where the transfer of information was not ideal. Can you now tell me about what went wrong, how this impacted on your care for the patient for each scenario?

2. In the scenario that was ideal what factors/processes made it ideal?

3. Are there specific pieces of information that you need every time for any multi-trauma patient? I will list these.

4. Do you refer to documented past care to help inform your own care? Is documented past care important or useful? Can you tell me why/why not?
**Appendix 2**

**Patient Chart Audit Tool**

Auditor Initials....................................... Date of Audit........................................

<table>
<thead>
<tr>
<th>Time spent navigating data</th>
<th>HRS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Time commenced audit.</strong></td>
<td></td>
</tr>
<tr>
<td>(Write in 24hr clock)</td>
<td></td>
</tr>
<tr>
<td><strong>2. Time completed audit.</strong></td>
<td></td>
</tr>
<tr>
<td>(Write in 24hr clock)</td>
<td></td>
</tr>
<tr>
<td><strong>Total time spent on audit in mins</strong></td>
<td></td>
</tr>
</tbody>
</table>

**Admission & Discharge data**

Unless specified all questions relate to ED notes only or notes that would have been present at or before discharge of the patient from the ED to the ward

<table>
<thead>
<tr>
<th>3. What was the patient’s admission date to the ED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>D D M M Y Y</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. What was the patient’s admission time to the ED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Write in 24hr clock)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. Was this patient transported to the ED via:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 = Helicopter retrieval</td>
</tr>
<tr>
<td>2 = RFDS</td>
</tr>
<tr>
<td>3 = Private vehicle</td>
</tr>
<tr>
<td>4 = QAS</td>
</tr>
<tr>
<td>5 = Inter- hospital</td>
</tr>
<tr>
<td>6 = Other (specify):.................................</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>6. What was the patient’s discharge date out of the ED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>D D M M Y Y</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>7. What day of the week was the discharge out of the ED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 = Monday</td>
</tr>
<tr>
<td>1 = Tuesday</td>
</tr>
<tr>
<td>2= Wednesday</td>
</tr>
<tr>
<td>3 = Thursday</td>
</tr>
<tr>
<td>4 = Friday</td>
</tr>
<tr>
<td>5 = Saturday</td>
</tr>
<tr>
<td>6= Sunday</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>8. What was the patient’s discharge time out of the ED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Write in 24hr clock)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>9. Destination of Discharge from ED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ICU</td>
</tr>
<tr>
<td>2. HDU</td>
</tr>
<tr>
<td>3. OT</td>
</tr>
</tbody>
</table>

**Content of documentation**

<table>
<thead>
<tr>
<th>10. Were nursing and medical notes present from ED?</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No</td>
</tr>
<tr>
<td>2. Yes</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Medical</th>
<th>Nursing</th>
</tr>
</thead>
</table>

11. Did notes contain legal requirements for documentation for each entry in the ED and the first 24 hours in the receiving unit (ICU, OT, HDU)?

Please separate into M= medical and N=Nursing

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td>No</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Yes</td>
</tr>
</tbody>
</table>

12. Was trauma call activated before patient arrived to ED?

<table>
<thead>
<tr>
<th></th>
<th>1 = No</th>
<th>2 = not documented/ unable to determine/find</th>
<th>3 = Yes</th>
</tr>
</thead>
</table>

13. Are any entries present in ED documentation that updated status of trauma call for OT? (e.g. trauma call cancelled, delayed etc from ED to OT)

<table>
<thead>
<tr>
<th></th>
<th>1 = No</th>
<th>2 = Yes</th>
</tr>
</thead>
</table>

13. Was patient conscious at time of transfer from the ED?

<table>
<thead>
<tr>
<th></th>
<th>1 = No</th>
<th>2 = not documented/ unable to determine/find</th>
<th>3 = Yes</th>
</tr>
</thead>
</table>

14. What was the patient’s GCS at transfer?

<table>
<thead>
<tr>
<th>Eyes</th>
<th>Verbal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor</td>
<td>Total GCS</td>
</tr>
</tbody>
</table>

15. Were the following details present and complete in the ED notes:

<table>
<thead>
<tr>
<th></th>
<th>0 = Not present</th>
<th>1 = Present but incomplete</th>
<th>2 = Present but some or all illegible</th>
<th>3 = Complete and legible</th>
</tr>
</thead>
</table>

16. What was the level of injuries detailed in the ED notes?

<table>
<thead>
<tr>
<th></th>
<th>0 = Complaint/primary injuries only- little detail</th>
<th>1 = Complaint/primary injuries + some details of MOI</th>
<th>2 = Complaint/primary injuries + detailed MOI</th>
<th>3 = Complaint/primary injuries + detailed MOI + any changes in condition since injury in pre-hospital transfer</th>
</tr>
</thead>
</table>

17. Were QAS/patient transfer notes present?

<table>
<thead>
<tr>
<th></th>
<th>1 = No</th>
<th>2 = Yes</th>
</tr>
</thead>
</table>

18. List investigations completed in ED as discernable from notes-medical and nursing (not lab reports)
19. How easy was it to find details of investigations in notes?
0 = Very difficult to find, confusing, incomplete when compared to lab/radiographic results etc
1 = Some difficulty in finding, some investigations not recorded when compared to lab/radiographic results
2 = Easy to find, all documented and accounted for when matching with lab/radiographic results

20. List the types of consults (e.g. Neurosurg) present in the ED notes.
For each listed consult was there enough information in your opinion to identify:
- the details of the response to the request
- if further consults were necessary
- what the outcome of the consult was
- if there were any issues for care arising out of the consult
0 = Not present
1 = Present but incomplete
2 = Present but some or all illegible
3 = Complete and legible

21. Was documentation of interventions/procedures Size & placement
present and complete?

<table>
<thead>
<tr>
<th>0 = Not present</th>
<th>1 = Present but incomplete/inaccurate</th>
<th>2 = Present but some or all illegible</th>
<th>3 = Complete, accurate and legible</th>
</tr>
</thead>
<tbody>
<tr>
<td>of tubes/drains used (ETT, IDC, IVC, NGT, ICC)</td>
<td>Fluid orders</td>
<td>Fluid balance</td>
<td>Medications/drugs ordered</td>
</tr>
<tr>
<td>Medications/drugs given</td>
<td>Pain management processes</td>
<td>Spinal Clearance</td>
<td>Pre-operative checklist</td>
</tr>
<tr>
<td>Internal monitoring access</td>
<td>Suturing/ wound care/ POP/ traction/ backslabs etc</td>
<td>Heating/Cooling devices</td>
<td>Other:</td>
</tr>
</tbody>
</table>

22. What observations were recorded?

<table>
<thead>
<tr>
<th>0 = Not recorded at all</th>
<th>1 = At least once, usually on presentation in ED</th>
<th>2 = Two or more times</th>
<th>3 = Regularly enough to give some trending data but not immediately before transfer</th>
<th>4 = Regularly enough to give trending data, including immediately before transfer</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>P</td>
<td>BP</td>
<td>R</td>
<td>SpO2</td>
</tr>
</tbody>
</table>

23. Are diagnoses listed and dated?

<table>
<thead>
<tr>
<th>1 = No</th>
<th>2 = Yes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Fluids</td>
</tr>
<tr>
<td>Diet</td>
<td>If requiring surgery and when</td>
</tr>
<tr>
<td>Further investigations</td>
<td>Other infusions</td>
</tr>
<tr>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

24. How easy it is to find diagnoses?

<table>
<thead>
<tr>
<th>0 = Very difficult to find, confusing, incomplete when compared to consultants involved</th>
<th>1 = Some difficulty in finding, some not recorded when compared to consultants notes from other services</th>
<th>2 = Easy to find, all documented and accounted for when matching with consultants involved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Fluids</td>
<td>Diet</td>
</tr>
<tr>
<td>Further investigations</td>
<td>Other infusions</td>
<td>Other:</td>
</tr>
</tbody>
</table>

25. Is a management plan documented for immediate care of the patient for the receiving ward for the following areas? (This can include management plans from consultations that are written while patient is still in ED)

<table>
<thead>
<tr>
<th>0 = Not present</th>
<th>1 = Present but incomplete/inaccurate/confusing</th>
<th>2 = Present but some or all illegible/confusing</th>
<th>3 = Complete, accurate and legible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>Fluids</td>
<td>Diet</td>
<td>If requiring surgery and when</td>
</tr>
<tr>
<td>Further investigations</td>
<td>Other infusions</td>
<td>Other:</td>
<td></td>
</tr>
</tbody>
</table>

26. Were patient injuries likely to affect physical transfer of patient at handover?

<table>
<thead>
<tr>
<th>1 = No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Question</td>
</tr>
<tr>
<td>-------------------------------------------------------------------------</td>
</tr>
<tr>
<td>27. Are written notes legible?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>28. If notes have areas of illegibility, write down details of what was illegible and the possible impact (e.g. medication errors, treatment missed or not delivered in a timely manner, pathology missed or duplicated etc) on understanding of issues/management for any staff at that point in the notes?</td>
</tr>
<tr>
<td>29. Are there notes written about socioeconomic issues that suggest these have been assessed?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>30. Are there notes written about emotional issues that suggest these have been assessed?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>31. Are family mentioned in the ED notes, particularly information given to them about patient prognosis, management and issues?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>32. Overall was there any duplication of information present (not including patient demographics/ identifier stickers etc)</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>33. In your opinion, how difficult was it to navigate to key data?</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Further comments?
Appendix 3.1

Ethics Approval from Griffith University

27 August 2009

TO WHOM IT MAY CONCERN

Griffith University Human Research Ethics Application – NRS/20/09/HREC

This is to confirm that Human Research Ethics Application NRS/20/09/HREC titled “PRIOR REVIEW: Information transfer for multi-trauma patients upon discharge from the Emergency Department” conducted by Leanne Aitken, Marie Cooke and Pauline Calleja was approved by the Griffith University Human Research Ethics Committee (HREC) on 27 June 2009. The authorisation for this research was issued from 27 June 2009 to 31 December 2012.

The HREC is constituted and operates in accordance with the National Statement on Ethical Conduct in Research Involving Humans.

Please do not hesitate to contact me if you have any further queries about this matter.

Regards

Gary Allen
Manager, Research Ethics
Office for Research

Office for Research
Nathan campus, Griffith University
170 Kessels Road
Nathan, Queensland 4111
Australia
Telephone +61 (0)7 3735 5456
Facsimile +61 (0)7 3735 7994
www.griffith.edu.au

Gold Coast  Logan  Mt Gravatt  Nathan  South Bank

Appendices 202
Appendix 3.2a
Ethics approval from Princess Alexandra Hospital

Office of the Human Research Ethics Committee

Ms Pauline Cajella
PO Box 2043
Kelvin Grove 4059

APPROVAL LETTER – PRINCESS ALEXANDRA HOSPITAL

Dear Ms Cajella

Research Protocol: 2009/081

Information transfer for multi-trauma patients upon discharge from the Emergency Department

| NEAF:                                      | Version 2.0
|--------------------------------------------|------------------
| Participant Information and Consent Form: |                      |
| Participant Information and Consent Form A|                      |
| Focus Group                                | Version 2, dated 18 March 2009 |
| Participant Information and Consent Form B|                      |
| Strategy development working group         | Version 2, dated 18 March 2009 |
| Participant Information and Consent Form C|                      |
| Change agent                               | Version 2, dated 18 March 2009 |
| Questionnaire cover letter:                | Version 1, dated 19 March 2009 |

At a meeting of the Princess Alexandra Hospital Human Research Ethics Committee (PAH HREC) held on 7/04/2009, the Committee reviewed the above research Protocol. The Princess Alexandra Hospital Human Research Ethics Committee is duly constituted, operates in accordance and complies with the current National Health and Medical Research Council's National Statement on Ethical Conduct in Human Research 2007.

On the recommendation of the Human Research Ethics Committee approval is granted for your project to proceed. This approval is subject to researcher(s) compliance throughout the duration of the research with certain requirements as outlined in the National Statement on Ethical Conduct in Human Research 2007 and Australian Research Code for the Responsible Conduct of Research.

The following links have been provided for your convenience:

Some requirements are briefly outlined below. Please ensure that you communicate with the PAH HREC on the following:

• Protocol Changes: Substantial changes made to the protocol require HREC approval.
As this research involves the recruitment of patients from the Princess Alexandra Hospital Health Service District (PAHSD), it is my responsibility to remind you of your ongoing duty of care for all people recruited into projects or clinical trials whilst public patients. All conditions and requirements regarding confidentiality of public information and patient privacy apply. You are required to comply at all times with any application requirements of Australian Law including the Health Services Act, the Privacy Act and other relevant legislation, ethics obligations and guidelines which may be applicable to the PAHSD from time to time including, without limitation, any requirement in respect of the maintenance, preservation or destruction of patient records.

When the study involves patient contact, it is your responsibility as the principal investigator to notify the relevant consultant and request their approval.

Should you have any problems, please liaise directly with the Chair of the HREC early in the program.

A copy of this letter should be presented when required as official confirmation of the approval of the Princess Alexandra Hospital Human Research Ethics Committee.

We wish you every success in undertaking this research.

Yours sincerely,

Dr David Thiele Snr
DISTRICT CHIEF EXECUTIVE OFFICER
METRO SOUTH DISTRICT

Office
Princess Alexandra Hospital
Health Service District

Postal
Ipswich Road
Woolloongabba Q 4102

Phone
61 7 3240 7672

Fax
61 7 3240 7667
Appendix 3.2b

Princess Alexandra Hospital ethics extension of study til 20 07 2012

Metro South
Human Research Ethics Committee

23 April 2012

Enquires to: Metro South Health Service District
Human Research Ethics Committee
07 3176 7072
Phone: 07 3176 7072
Fax: HREC Ref: HREC/09/QPAH/081
E-mail: HREC/09/QPAH/081
PAH.Ethics.Research@health.qld.gov.au

Ms Pauline Cajella
PO Box 2043
Kelvin Grove  QLD  4059

Dear Ms Cajella,

HREC Reference number: HREC/09/QPAH/081
Protocol title: Information transfer for multi-trauma patients upon discharge from the Emergency Department.

On the 17 April 2012 the Chair of the Metro South Health Service District Human Research Ethics Committee noted and approved the following:-

<table>
<thead>
<tr>
<th>Document</th>
<th>Version</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extension of Study til 20 July 2012</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The Metro South HREC is constituted and operates in accordance with the National Health and Medical Research Council’s “National Statement on Ethical Conduct in Human Research (2007), NHMRC and Universities Australia Australian Code for the Responsible Conduct of Research (2007) and the “CPMP/ICH Note for Guidance on Good Clinical Practice”.

It should be noted that all requirements of the original approval still apply.

A copy of this letter should be forwarded to your Research Governance Office(s).

If you have any queries please do not hesitate to contact the Human Research Ethics Committee office on +617 3176 7072.

Yours sincerely,

[Signature]

Ms Cecile Francis
Research Manager
Metro South Health Service District
Human Research Ethics Committee (EC00167)
Centres for Health Research
Princess Alexandra Hospital
Ipswich Road Woolloongabba QLD 4102
Appendix 3.3a
Public Health Act approval number 1 (pre-intervention)

Ms Pauline Calleja
PO Box 2043
KELVIN GROVE QLD 4059

Dear Ms Calleja

It is with pleasure that I am writing to inform you that your request for access to confidential health information for the project “Information transfer for multi-trauma patients upon discharge from the Emergency Department” has received approval from the Chief Executive Officer – Centre for Healthcare Improvement, (CHI), under delegation by the Director-General, Queensland Health. In accordance with section 281, of the Public Health Act 2005 the applicants listed in your application can access and use the specified confidential information, providing they act within the limits detailed in your application.

Please display this letter, a signed copy of the Undertaking of Confidentiality and a copy of your application when requesting the confidential information from the relevant information gatekeepers and provide a copy of this approval to the HREC that reviewed your protocol.

- This approval is for twelve (12) months commencing from the date of this letter.

You are required to provide an annual or final progress report as is required to the Research Ethics & Governance Unit. The templates can be found on the web page http://www.health.qld.gov.au/ohmr/html/research/ces_conf.htm


Should you wish to extend your research project beyond this time, you will need to re-apply for further approval for the release of confidential data by the same process. This includes disclosing this information to and recruiting additional people to this project.

Yours sincerely

Dr Tony O’Connell
Chief Executive Officer
Centre for Healthcare Improvement
2/7/09

Office
Floor 13
Queensland Health Building
147-163 Charlotte Street
BRISBANE QLD 4001

Postal
QH H-13
GPO Box 48
BRISBANE QLD 4001

Phone
(07) 3234 0034

Fax
(07) 3405 6131
Appendix 3.3b
Extension to PHA approval number 2 (post-intervention)

Ms Pauline Calleja
PO Box 2043
Kelvin Grove QLD 4059

Dear Ms Calleja

Research Title: Information transfer for multi-trauma patients upon discharge from the Emergency Department
HREC Number: HREC/09/QPAH/081

It is with pleasure that I am writing to inform you that your request to extend and amend your application has been approved under delegation of the Director General. In accordance with Section 281 of the Public Health Act 2005 the applicants listed in your application can access and use the specified confidential information, providing they act within the limits detailed in your application.

Please display this letter and a copy of your application when requesting the confidential information from the relevant data custodian and provide a copy of this approval to the Human Research Ethics Committee that reviewed your protocol.

Approval for this project commenced on 9 December 2011 and is now valid to 31 December 2012.

You are required to provide an annual progress report and a final report at the completion of your project, to the Research Ethics & Governance Unit. Templates can be found on the web page http://www.health.qld.gov.au/ohmu/him/hrsu/aces_conf.htm_info.asp

It should be noted that all requirements in the original approval still apply. Please feel free to contact the Coordinator on email regu@health.qld.gov.au or phone 07 3234 0034 if you have any queries on this matter.

Yours sincerely,

Professor Robin Mortimer
Executive Director
Office of Health & Medical Research

May 2012

Office
QHB - 13
147 – 163 Charlotte Street
BRISBANE QLD 4000

Postal
QHB - 13
GPO Box 48
BRISBANE QLD 4001
Appendix 3.3c
Public Health Act Approval number 2 (post-intervention)

Ms Pauline Calieja
Po Box 2043
Kelvin Grove QLD 4059

Dear Ms Pauline Calieja

Research Title: Information transfer for multi-trauma patients upon discharge from the emergency department

It is with pleasure that I am writing to inform you that your request for access to confidential health information for the above project has been approved under delegation of the Director-General. In accordance with Section 281 of the Public Health Act 2005 the applicants listed in your application can access and use the specified confidential information, providing they act within the limits detailed in the application.

Please display this letter and a copy of your application when requesting the confidential information from the relevant data custodian and provide a copy of this approval to the Human Research Ethics Committee (HREC) that reviewed your protocol.

This approval commences on the date of this letter and is valid to 20 April 2012. The data requested is for the period from 1 August 2011 to 31 January 2012.

This approval means that you must undertake the responsibilities and obligations of confidentiality of the information under the provisions of the Public Health Act 2005. You must take all reasonable steps necessary to ensure that the confidential information is kept confidential, including storing or disposing of all data, information, documents and associated correspondence in a secure manner. Unauthorised use or disclosure of confidential information may incur a penalty under the laws of the Queensland Government. These obligations include providing notification of any change in the names of persons who will be given the information for the research.

You are required to provide an annual progress report and a final report at the completion of your project, to the Research Ethics & Governance Unit. Templates can be found on the web page http://www.health.qld.gov.au/oah/htm/ncegs/conf_dec_fh_info.asp

Office
QHR - 13
‘47 – 163 Charlotte Street
BRISBANE QLD 4000

Postal
QHR - 13
GPO Box 48
BRISBANE QLD 4001
Should you wish to extend your research project beyond this time or amend the study protocol, you will need to seek approval of these amendments from the approving HREC and re-apply for approval for the release of confidential data. This includes disclosing this information to and recruiting additional people to this project. Please provide a copy of your HREC approval of the amendments when re-applying.

Please feel free to contact Martin Paterson on email recu@health.qld.gov.au or phone 07 3234 0034 if you have any queries on this matter.

Yours sincerely

Professor Robin Mortimer
Executive Director
Office of Health & Medical Research

December 2011
Appendix 4
Information for participants

Dear trauma care provider,

You are invited to participate in a research project based in your workplace called Information transfer for multi-trauma patients upon discharge from the Emergency Department.

About the Project

This project’s goal is to develop and test an intervention that aims to improve information transfer for multi-trauma patients at transition from the Emergency Department to other care areas.

While a trauma team may manage a patient with a single severe trauma very well, often more people are required to care for a patient with multiple severe injuries. As a result communication of patient information is more complex. Missing or fragmented patient care information appears to be a significant challenge in providing care for the trauma patient. Therefore, this study has the following aims:

a) To identify what is best practice in information transfer from the ED for multi-trauma patients, as perceived by health professionals.

b) To identify and develop strategies that facilitate optimal information transfer from ED staff to other staff involved in the care of multi-trauma patients.

c) To measure the relationship between the use of the developed strategies and accuracy, timeliness and completeness of handover communication, patient flow and documentation of communication, compared to current practices.

This study will use a mixed method design. Firstly data about the issue and current processes will be gathered from a number of sources (literature review, chart audit of the patient group, staff focus groups, staff survey, and a review of selected national and international emergency department practices/tools). After this information is collated, a
strategy development working group consisting of staff and the researchers will develop an intervention aiming to improve information transfer for multi-trauma patients. The intervention will be implemented with the support of change agents in the clinical areas. Effects of the intervention will be evaluated by repeating focus groups, staff survey and the audit of patient charts.

**Participation in this study could be in the following ways.**

1. You may volunteer to be a focus group member. This means participation in at least 2 but up to 4 group discussions (over approximately 12 months) regarding your opinions and perceptions about information transfer for multi-trauma patients. Focus groups members can be further involved by volunteering to participate in the strategy development working group to develop an intervention for the study. You would have the opportunity to have a direct say in the development and implementation of a practice based intervention in your workplace as well as be a representative of your peers.

2. You may choose to have less direct involvement but still have input into the project by completing an anonymous survey at two points. The first point would be at the commencement of the project before the intervention is implemented. The second point would be after the implementation of the intervention as an evaluation of the process. Consent will be implied by returning a completed survey.

Participation in this study is voluntary; there will be no penalties for not being involved. If you choose to be involved in either capacity you retain the option of withdrawing from the study at any time without personal or professional consequence. In order to withdraw you will need to inform the Principle Investigator by email or telephone. Participants will receive a summary report at the end of each phase of the study by email and will receive a final written report at the end of the study by email. Publications resulting from the study will be displayed in each involved work environment.

**Risks and Projected benefits**
This project is about team practice for documentation and verbal communication processes. Identification of sub-optimal processes may lead to stress and anxiety on behalf of the participants. However it is a professional expectation that health care personnel identify areas of potential improvement and attempt to rectify identified issues. There will not be any identification of individual practice nor will any individual practice be reported to management.

The projected benefits of this for multi-trauma patients include decreased errors or delays in communication leading to improved care. For staff benefits may include decreased time by staff receiving patients used to gather patient information; improved consistency in quality of recorded patient information and improved communication leading to decreased fragmentation of information.

About the Investigators

Pauline Calleja is a Griffith University PhD candidate and is the primary investigator. Pauline is also a liaison academic for post-graduate Emergency Nursing studies at Queensland University of Technology.

Professor Leanne Aitken is a Clinical Chair in Critical Care Nursing between Griffith University and the PAH. Leanne is Pauline’s Principle Supervisor.

Associate Professor Marie Cooke is Deputy Head of School at Griffith University-Nathan Campus and is a visiting scholar to the Princess Alexandra Hospital Emergency Department. Marie is Pauline’s Associate Supervisor.

Why you have been chosen as a potential participant

Staff who provide trauma care (medical or nursing) in the areas of the Emergency Department, Intensive Care Unit, Operating Theatre and High Dependency Unit are the basis of the study. You have been identified by your unit manager as a care provider to trauma patients. You are under no obligation to participate, however you are likely to be working with the development and results of this study as it is practice based and located within your working environment. Approximately 200 participants will be
invited to participate in some form (see previous information about how you can participate).

**Further Information and Ethical Approval**

This study has undergone peer review via Griffith University processes and has received approval to continue from the Griffith Graduate Research School. This study has also been approved by the Princess Alexandra Hospital and the Griffith University Human Research Ethics Committee.

To obtain more information please contact Pauline Calleja either by email on mtppproject@live.com.au or telephone on 0438 758 520. Should you have any questions or concerns about the ethical conduct of this study please contact the Secretariat of the human Research Ethics Committee (07 3240 5856) at the Princess Alexandra Hospital.

**Confidentiality**

Information obtained throughout the project will be treated as confidential, and will be stored and disposed of in accordance with NHMRC guidelines. Information obtained during this study will only be used for the purposes as stated in the aims of this study.
Appendix 5
Consent form - focus groups

Princess Alexandra Hospital

Ipswich Rd, Woolloongabba, QLD, 4102

Ph (07) 3240 2111

Participant Information and Consent Form A

Focus Group
Version 2, dated 18th March 2009

Information transfer for multi-trauma patients upon discharge from the Emergency Department

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

This Participant Information and Consent Form is five pages long. Please make sure you have all the pages.
1. Your Consent

We wish to invite you to take part in this research project. This Participant Information contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Please read this Participant Information carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend - feel free to do this.

Once you understand about the project and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project. You will be given a copy of the Participant Information and Consent Form to keep as a record.

You have been identified by your unit manager as a care provider to trauma patients. You are under no obligation to participate, however you are likely to be working with the development and results of this study as it is practice based and located within your working environment. Approximately 200 participants will be invited to participate in some form.

2. Purpose and Background

This project's goal is to develop and test an intervention that aims to improve information transfer for multi-trauma patients at transition from the Emergency Department to other care areas.

While a trauma team may manage a patient with a single severe trauma very well, often more people are required to care for a patient with multiple severe injuries. As a result communication of patient information is more complex. Missing or fragmented patient care information appears to be a significant challenge in providing care for the trauma patient.
Therefore this study has the following aims:

a) To identify what is best practice in information transfer from the ED for multi-trauma patients, as perceived by health professionals.

b) To identify and develop strategies that facilitate optimal information transfer from ED staff to other staff involved in the care of multi-trauma patients.

c) To measure the relationship between the use of the developed strategies and accuracy, timeliness and completeness of handover communication, patient flow and documentation of communication, compared to current practices.

This study will use a mixed method design. Firstly data about the issue and current processes will be gathered from a number of sources (literature review, chart audit of the patient group, staff focus groups, staff survey, and a review of selected national and international emergency department practices/tools). After this information is collated, a strategy development working group consisting of staff and the researchers will develop an intervention aiming to improve information transfer for multi-trauma patients. The intervention will be implemented with the support of change agents in the clinical areas. Effects of the intervention will be evaluated by repeating focus groups, staff survey and the audit of patient charts.

3. Procedures

If you agree to participate, you will be asked to attend focus group meetings. This means participation in at least 2 but up to 4 group discussions (over approximately 12 months) regarding your opinions and perceptions about information transfer for multi-trauma patients. You would have the opportunity to have a direct say in the development and implementation of a practice based intervention in your workplace as well as be a representative of your peers.

Focus groups members may be approached to have further involvement in the study by agreeing to participate in the strategy development working group to develop an
intervention for the study and then further as an active change agent during the implementation of the intervention.

If you choose to be a focus group member you are not obligated to be involved in the strategy working group or act as a designated change agent during the intervention implementation.

4. Possible Benefits and Risks

This project is about team practice for documentation and verbal communication processes. Identification of sub-optimal processes may lead to stress and anxiety on behalf of the participants. However it is a professional expectation that health care personnel identify areas of potential improvement and attempt to rectify identified issues. There will not be any identification of individual practice nor will any individual practice be reported to management.

The projected benefits of this for multi-trauma patients include decreased errors or delays in communication leading to improved care. For staff benefits may include decreased time by staff receiving patients used to gather patient information; improved consistency in quality of recorded patient information and improved communication leading to decreased fragmentation of information.

5. Privacy, Confidentiality and Disclosure of Information

Information obtained throughout the project will be treated as confidential, and will be stored and disposed of in accordance with NHMRC guidelines. Information obtained during this study will only be used for the purposes as stated in the aims of this study.

In any publication, information will be provided in such a way that you cannot be identified. Only summarised data will be made publicly available to maintain confidentiality. Information you provide for this study will be retained for a minimum of 5 years. After this time, all data will be destroyed.

6. Further Information and Ethical Approval
This study has undergone peer review via Griffith University processes and has received approval to continue from the Griffith Graduate Research School. This study has also been approved by the Princess Alexandra Hospital and the Griffith University Human Research Ethics Committee.

To obtain more information please contact Pauline Calleja either by email on mtppproject@live.com.au or telephone on 0438 758 520. Should you have any questions or concerns about the ethical conduct of this study please contact the Secretariat of the Human Research Ethics Committee (07 3240 5856) at the Princess Alexandra Hospital.

7. Participation is Voluntary

Participation in this study is voluntary; there will be no penalties for not being involved. If you choose to be involved in either capacity you retain the option of withdrawing from the study at any time without personal or professional consequence. In order to withdraw you will need to inform the Principle Investigator by email or telephone. Participants will receive a summary report at the end of each phase of the study by email and will receive a final written report at the end of the study by email. Publications resulting from the study will be displayed in each involved work environment.
Princess Alexandra Hospital
Ipswich Rd, Woolloongabba, QLD, 4102
Ph (07) 3240 2111

Participant Information and Consent Form A
Focus Group
Version 2, dated 18th March 2009

Information transfer for multi-trauma patients upon discharge from the Emergency Department

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

I have read and understand the Participant Information, Version 1, dated 9th March, 2009.

I freely agree to participate in this project according to the conditions in the Participant Information.

I will be given a copy of the Participant Information and Consent Form to keep

The researcher has agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.

Participant’s Name (printed) ………………………………………………………………

Signature……………………………………………………………………………

Date…………………………………………………………………………………..
Princess Alexandra Hospital
Ipswich Rd, Woolloongabba, QLD, 4102
Ph (07) 3240 2111

Revocation Of Consent Form A

Focus Group
Version 2, dated 18th March 2009

Information transfer for multi-trauma patients upon discharge from the Emergency Department

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

I hereby wish to WITHDRAW my consent to participate in the research proposal described above and understand that such withdrawal WILL NOT jeopardise employment or my relationship with the Princess Alexandra Hospital.

Participant’s Name (printed) .................................................................

Signature Date
Appendix 6
Staff Survey Tool

All questions in this survey relate to multi-trauma patients.
☐ Nursing ☐ Medical ☐ ED ☐ HDU ☐ PERIOP ☐ TSU ☐ ICU

Please circle the number that best describes your response:

<table>
<thead>
<tr>
<th></th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Handover for multi-trauma patients is complex</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Expectations of handover upon discharge from the ED to other departments are clear</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Staff from different departments (ED, ICU, HDU, OT) agree and understand what should be handed over when the patient leaves the ED</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. The information that is handed over is consistent and in the same order for most patients discharged from the ED</td>
<td>1 2 3 4</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 5. (Nursing only)

If the patient is transferred to the ward by a nurse that has not been caring for the patient in the ED a comprehensive handover is still provided | 1 2 3 4 |
| 6. Documented information from the ED is comprehensive enough to assist in providing ongoing care for the patient on transfer to the ward | 1 2 3 4 |
| 7. Documentation in the trauma notes is systematic | 1 2 3 4 |
| 8. ED nursing notes are user-friendly and easy to navigate | 1 2 3 4 |
| 9. There is enough data usually available in the resuscitation notes to identify trends in patient status (observations, monitoring) | 1 2 3 4 |
| 10. When the patient has been unstable during resuscitation(e.g. life or limb threatened), documentation of interventions and treatment remains comprehensive in the ED notes | 1 2 3 4 |
| 11. Documented information for most trauma resuscitations could be considered detailed enough to be a comprehensive record of patient care | 1 2 3 4 |
| 12. Most boxes/prompts on the trauma resuscitation form are filled in for most patients (that is relevant to their care) | 1 2 3 4 |
| 13. All monitoring/observation recording areas of the trauma | 1 2 3 4 |
resuscitation form are relevant for every patient

<table>
<thead>
<tr>
<th>Question</th>
<th>Strongly Agree</th>
<th>Agree</th>
<th>Disagree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>14. Most patients only have two or three full sets of observations recorded</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>15. On discharge from the ED, handover is comprehensive enough to undertake immediate care of the patient, without looking for further details</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>16. On discharge from the ED, documented care orders are clear enough to undertake immediate care of the patient, without further clarification needed</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>17. When handing over/receiving patients staff peruse patient charts and direct attention to relevant sections of documented care and treatment plans</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>18. Social work consultation/intervention is included in handover</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>19. At handover all staff stop 'doing' and give/listen to handover before we physically transfer the patient</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>20. Information given/received at handover is valuable to patient care</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>21. Staff/units who are receiving patients from ED are notified when to expect the patient</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>22. FOR ED STAFF ONLY: Processes are in place during resuscitations that enable staff to communicate about patient condition and treatment</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Comments

________________________
________________________
________________________
________________________
________________________
Appendix 6.1
Cover letter for survey

Dear trauma care provider,

You are invited to participate in a research project based in your workplace called Information transfer for multi-trauma patients upon discharge from the Emergency Department.

About the Project
This project’s goal is to develop and test an intervention that aims to improve information transfer for multi-trauma patients at transition from the Emergency Department to other care areas and has the following aims:

a) To identify what is best practice in information transfer from the ED for multi-trauma patients, as perceived by health professionals.

b) To identify and develop strategies that facilitate optimal information transfer from ED staff to other staff involved in the care of multi-trauma patients.

c) To measure the relationship between the use of the developed strategies and accuracy, timeliness and completeness of handover communication, patient flow and documentation of communication, compared to current practices.

Invitation to be involved:
This letter is attached to a questionnaire as we would like to invite you to have input into the project by completing an anonymous survey at two points. The first point would be at the commencement of the project before the intervention is implemented. The second point would be after the implementation of the intervention as an evaluation of the process. Consent will be implied by returning a completed survey.

Participation in this study is voluntary; there will be no penalties for not being involved. If you choose to be involved in either capacity you retain the option of withdrawing from the study at any time without personal or professional consequence. In order to withdraw you will need to inform the Principle Investigator by email or telephone.
Participants will receive a summary report at the end of each phase of the study by email and will receive a final written report at the end of the study by email. Publications resulting from the study will be displayed in each involved work environment.

**Why you have been chosen as a potential participant**
Staff who provide trauma care (medical or nursing) in the areas of the Emergency Department, Intensive Care Unit, Operating Theatre and High Dependency Unit are the basis of the study. You have been identified by your unit manager as a care provider to trauma patients. You are under no obligation to participate, however you are likely to be working with the development and results of this study as it is practice based and located within your working environment. Approximately 200 participants will be invited to participate in some form (see previous information about how you can participate).

**Confidentiality**
Information obtained throughout the project will be treated as confidential, and will be stored and disposed of in accordance with NHMRC guidelines. Information obtained during this study will only be used for the purposes as stated in the aims of this study.

**Further Information and Ethical Approval**
This study has undergone peer review via Griffith University processes and has received approval to continue from the Griffith Graduate Research School. This study has also been approved by the Princess Alexandra Hospital and the Griffith University Human Research Ethics Committee.

To obtain more information please contact Pauline Calleja either by email on mtpproject@live.com.au or telephone on 0438 758 520. Should you have any questions or concerns about the ethical conduct of this study please contact the Secretariat of the human Research Ethics Committee (07 3240 5856) at the Princess Alexandra Hospital.

Thank you for your time and valuable input
Regards
Pauline Calleja
Principle Investigator
Appendix 7. Documentation summary - national and international forms

<table>
<thead>
<tr>
<th>Chart origin</th>
<th>Parts that make up the trauma chart</th>
<th>Positive aspects</th>
<th>Detractors from using this chart</th>
</tr>
</thead>
</table>
| Edinburgh Royal Infirmary (sourced in 2008)      | 1. Nursing notes- this includes medication record, infusion record, GCS score, Pain score, BSL, Urine output, other, BP, pulse, RR, T, SpO2, IV lines x two. Pt management plan- primary assessment, equipment, referral, procedures list  
2. Nursing Care plan  
3. Intra-inter hospital transfer document  
4. Pt progress notes for doctors records          | • Nursing chart is easy to follow. All parameters have a separate box so they are not too busy to make sense of. Also have normal and abnormal reporting parameters  
• Intra-inter hospital form- Like the Information checklist on this form  
• Is optional for nursing care plan to be attached if in the ED for long periods of time | • Medical and nursing notes still separate  
• No room for nursing progress notes  
• No discharge designation or other details  
• Intra-inter hospital transfer is on separate sheet used from transfer out of the ED |
• Lots of resources embedded into the document  
• A complete chart for medical | • Very long and involved  
• Would take quite some time to get used to  
• Is formula controlled- no flexibility for patient type |
| Charite-Berlin Germany | Medical recording chart - Details if work related or patient insurance. Type of trauma (burns, head, electrical etc). Trauma team staff names. Hanoverian trauma score including age. Diagnoses. Additional diseases- history. Initial management. Additional investigations/needs (e.g. Planned surgery, consent, premedication for OT). Consults needed. Details of primary investigations and interventions- bloods, IDC, IVC, ADT, Temp etc. Relatives. Orders for ward- drugs, infusions& positioning. Previous history. Accident site. Body systems approach to assessment (starting at head and breathing). Diagrams to mark injuries on. Hanover polytrauma score classification and GCS chart. ISS scoring chart. Orthopaedic fracture classification cahrt. DRG related classifications for compensations Nursing chart- plastic folder with pull down areas | \- Lots of resources for the clinician embedded into the document \- Content is driven by what reporting and recording functions needed for that hospital and it funding/follow up \- Inbuilt system of flagging new orders for nursing staff. That extra sheets are filed with nursing chart and kept together | \- Medical and nursing is separate. \- Reflective of the one doctor being responsible for patient from admission to discharge. |
for new orders. Room for documentation observations and interventions not already documented by medical staff.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>Notes</th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Johannesburg Hospital</td>
<td>Combined nursing and medical notes-Trauma resuscitation nursing form-pre-hospital data. Resuscitation team activation and team details, primary, secondary and tertiary survey complete, discharge from unit time. Actions in resuscitation area- Airway, Circulation, bloods, lines, defibrillation, procedures, radiology, general, ABG, other. Doctors information/notes- A,B,C. History, general data, examination, GCS, RTS admission, CNS system, head and neck injuries, systemic injuries, injury list x-ray findings, skeletal injuries AIS scoring. Vital signs etc (Heart Rate, Blood Pressure, Pulse, Spo2, Respiratory Rate, tidal volume, airway pressure, GCS, pupils, CVP, fluids, drugs, temp, urine output).</td>
<td>All can be separated in trauma then put together on discharge out of the ED.</td>
<td>Vital sign chart is very difficult to look at for sense of what flows next-no graphing ability, poor clarity about medication orders and documentation.</td>
</tr>
<tr>
<td>Royal Children’s</td>
<td>Medical trauma admission form- Patient identification, trauma call, weight, allergies, details</td>
<td>Comprehensive but not too busy. Room for all specialities to add to notes and not have separate</td>
<td>No nursing notes.</td>
</tr>
<tr>
<td>Hospital- Brisbane</td>
<td>of incident, presenting history. Primary survey notes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------------------------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(Timed, Airway, breathing, circulation, disability, exposure, x-rays- c-spine clearance and collar removal with a signature for this). Secondary survey- head to toe approach. Summary of findings, management initiated, investigation result, past history, plans. Space for other consults. Tertiary survey head to toe approach. Review of radiology, missed injury, referrals, signature of team members.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 8
Consent form change agent

Princess Alexandra Hospital
Ipswich Rd, Woolloongabba, QLD, 4102
Ph (07) 3240 2111

Participant Information and Consent Form C
Change Agent
Version 2, dated 18th March 2009

Information transfer for multi-trauma patients upon discharge
from the Emergency Department

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

This Participant Information and Consent Form is five pages long. Please make sure you have all the pages.

1. Your Consent

We wish to invite you to take part in this research project. This Participant Information contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Please read this Participant Information carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend - feel free to do this.

Once you understand about the project and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project. You will be given a copy of the Participant Information and Consent Form to keep as a record.

You have been identified by your unit manager as a care provider to trauma patients. You are under no obligation to participate, however you are likely to be working with
the development and results of this study as it is practice based and located within your working environment. Approximately 200 participants will be invited to participate in some form.

2. **Purpose and Background**

This project's goal is to develop and test an intervention that aims to improve information transfer for multi-trauma patients at transition from the Emergency Department to other care areas.

While a trauma team may manage a patient with a single severe trauma very well, often more people are required to care for a patient with multiple severe injuries. As a result communication of patient information is more complex. Missing or fragmented patient care information appears to be a significant challenge in providing care for the trauma patient.

Therefore this study has the following aims:

a) To identify what is best practice in information transfer from the ED for multi-trauma patients, as perceived by health professionals.

b) To identify and develop strategies that facilitate optimal information transfer from ED staff to other staff involved in the care of multi-trauma patients.

c) To measure the relationship between the use of the developed strategies and accuracy, timeliness and completeness of handover communication, patient flow and documentation of communication, compared to current practices.

This study will use a mixed method design. Firstly data about the issue and current processes will be gathered from a number of sources (literature review, chart audit of the patient group, staff focus groups, staff survey, and a review of selected national and international emergency department practices/tools). After this information is collated, a strategy development working group consisting of staff and the researchers will develop an intervention aiming to improve information transfer for multi-trauma patients. The intervention will be implemented with the support of change agents in the clinical areas. Effects of the intervention will be evaluated by repeating focus groups, staff survey and the audit of patient charts.

3. **Procedures**

If you agree to participate, you will be asked to act as a change agent in your workplace to assist in the implementation of the developed intervention for this study. This may mean a number of different responsibilities according to your work area and how readily other staff are adjusting to the intervention. You would have the opportunity to have a direct input into the implementation of a practice based intervention in your workplace.

4. **Possible Benefits and Risks**

This project is about team practice for documentation and verbal communication processes. Identification of sub-optimal processes may lead to stress and anxiety on behalf of the participants. However it is a professional expectation that health care personnel identify areas of potential improvement and attempt to rectify identified
issues. There will not be any identification of individual practice nor will any individual practice be reported to management.

The projected benefits of this for multi-trauma patients include decreased errors or delays in communication leading to improved care. For staff benefits may include decreased time by staff receiving patients used to gather patient information; improved consistency in quality of recorded patient information and improved communication leading to decreased fragmentation of information.

5. Privacy, Confidentiality and Disclosure of Information

Information obtained throughout the project will be treated as confidential, and will be stored and disposed of in accordance with NHMRC guidelines. Information obtained during this study will only be used for the purposes as stated in the aims of this study.

In any publication, information will be provided in such a way that you cannot be identified. Only summarised data will be made publicly available to maintain confidentiality. Information you provide for this study will be retained for a minimum of 5 years. After this time, all data will be destroyed.

6. Further Information and Ethical Approval

This study has undergone peer review via Griffith University processes and has received approval to continue from the Griffith Graduate Research School. This study has also been approved by the Princess Alexandra Hospital and the Griffith University Human Research Ethics Committee.

To obtain more information please contact Pauline Calleja either by email on mtpproject@live.com.au or telephone on 0438 758 520. Should you have any questions or concerns about the ethical conduct of this study please contact the Secretariat of the Human Research Ethics Committee (07 3240 5856) at the Princess Alexandra Hospital.

7. Participation is Voluntary

Participation in this study is voluntary; there will be no penalties for not being involved. If you choose to be involved in either capacity you retain the option of withdrawing from the study at any time without personal or professional consequence. In order to withdraw you will need to inform the Principle Investigator by email or telephone. Participants will receive a summary report at the end of each phase of the study by email and will receive a final written report at the end of the study by email. Publications resulting from the study will be displayed in each involved work environment.
Princess Alexandra Hospital  
Ipswich Rd, Woolloongabba, QLD, 4102  
Ph (07) 3240 2111

**Participant Information and Consent Form C**  
**Change Agent**  
**Version 2, dated 18th March 2009**

**Information transfer for multi-trauma patients upon discharge**  
**from the Emergency Department**

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

---

I have read and understand the Participant Information, Version 1, dated 9th March, 2009.

I freely agree to participate in this project according to the conditions in the Participant Information.

I will be given a copy of the Participant Information and Consent Form to keep.

The researcher has agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.

---

Participant’s Name (printed) ………………………………………………………………

Signature Date

Name of Witness to Participant’s Signature (printed) ……………………………

Signature Date

Researchers Name (printed) ………………………………………………………………

Signature Date
Princess Alexandra Hospital
Ipswich Rd, Woolloongabba, QLD, 4102
Ph (07) 3240 2111

Revocation Of Consent Form C
Change Agent
Version 2, dated 18th March 2009

Information transfer for multi-trauma patients upon discharge
from the Emergency Department

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

I hereby wish to WITHDRAW my consent to participate in the research proposal
described above and understand that such withdrawal WILL NOT jeopardise
employment or my relationship with the Princess Alexandra Hospital.

Participant’s Name (printed) ……………………………………………………………

Signature Date
Appendix 8.1
Consent form Strategic Development Working Group

Princess Alexandra Hospital
Ipswich Rd, Woolloongabba, QLD, 4102
Ph (07) 3240 2111

Participant Information and Consent Form B
Strategy Development Working Group
Version 2, dated 18th March 2009

Information transfer for multi-trauma patients upon discharge from the Emergency Department

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

This Participant Information and Consent Form is five pages long. Please make sure you have all the pages.

1. Your Consent

We wish to invite you to take part in this research project. This Participant Information contains detailed information about the research project. Its purpose is to explain to you as openly and clearly as possible all the procedures involved in this project before you decide whether or not to take part in it.

Please read this Participant Information carefully. Feel free to ask questions about any information in the document. You may also wish to discuss the project with a relative or friend - feel free to do this.

Once you understand about the project and if you agree to take part in it, you will be asked to sign the Consent Form. By signing the Consent Form, you indicate that you understand the information and that you give your consent to participate in the research project. You will be given a copy of the Participant Information and Consent Form to keep as a record.

You have been identified by your unit manager as a care provider to trauma patients. You are under no obligation to participate, however you are likely to be working with the development and results of this study as it is practice based and located within your working environment. Approximately 200 participants will be invited to participate in some form.
2. **Purpose and Background**

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3. **Procedures**

If you agree to participate, you will be involved in a working group to help develop an intervention for this study. This means participation in at least 2 meeting build a strategy and intervention to improve information transfer for multi-trauma patients. You would have the opportunity to have a direct say in the development and implementation of a practice based intervention in your workplace.

Strategy development working group members may be approached to have further involvement in the study by agreeing to act as an active change agent during the implementation of the intervention in their own work area.

If you choose to be a strategy development working group member you are not obligated to act as a designated change agent during the intervention implementation.
4. Possible Benefits and Risks

This project is about team practice for documentation and verbal communication processes. Identification of sub-optimal processes may lead to stress and anxiety on behalf of the participants. However it is a professional expectation that health care personnel identify areas of potential improvement and attempt to rectify identified issues. There will not be any identification of individual practice nor will any individual practice be reported to management.

The projected benefits of this for multi-trauma patients include decreased errors or delays in communication leading to improved care. For staff benefits may include decreased time by staff receiving patients used to gather patient information; improved consistency in quality of recorded patient information and improved communication leading to decreased fragmentation of information.

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Princess Alexandra Hospital  
Ipswich Rd, Woolloongabba, QLD, 4102  
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Participant Information and Consent Form C  
Change Agent  
Version 2, dated 18th March 2009  

Information transfer for multi-trauma patients upon discharge  
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Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University  

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I will be given a copy of the Participant Information and Consent Form to keep  

The researcher has agreed not to reveal my identity and personal details if information about this project is published or presented in any public form.  

Participant’s Name (printed) ………………………………………………………  
Signature                      Date  

Name of Witness to Participant’s Signature (printed) …………………..  
Signature                      Date  

Researcher’s Name (printed) ………………………………………………….  
Signature                      Date
Princess Alexandra Hospital
Ipswich Rd, Woolloongabba, QLD, 4102
Ph (07) 3240 2111

Revocation Of Consent Form B
Change Agent
Version 2, dated 18th March 2009

Information transfer for multi-trauma patients upon discharge
from the Emergency Department

Principal Researcher: Pauline Calleja, PhD Candidate, Griffith University

I hereby wish to WITHDRAW my consent to participate in the research proposal
described above and understand that such withdrawal WILL NOT jeopardise
employment or my relationship with the Princess Alexandra Hospital.

Participant’s Name (printed) ………………………………………………………………..

Signature Date
22nd June 2009

Dear Mr MacDonald,

Queensland Nursing Council research grant RAN 0927

Title: Information transfer for multi-trauma patients upon discharge from the Emergency Department.

I refer to the offer of grant funding from the Queensland Nursing Council sent on the 9th June 2009. I am very happy to accept this offer of funding for this project.

I am in contact with Ian Pieper at Griffith University and will forward account details as soon as they are provided to me.

I enclose with this letter the ethics approval letter from Princess Alexandra Hospital for this project and will send on the approval letter from Griffith University once I receive it.

Once again my thanks for this opportunity,

Yours Sincerely

Pauline Calleja

Encl: Princess Alexandra HREC approval letter


